



United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-274459

September 26, 1996

The Honorable Lauch Faircloth
Chairman, Subcommittee on
Clean Air, Wetlands, Private
Property, and Nuclear Safety
Committee on Environment and
Public Works
United States Senate

Dear Mr. Chairman:

To address the problem of air pollution from motor vehicles, EPA requires states to implement inspection and maintenance (I/M) programs to help ensure that vehicles are being maintained adequately. In a July 20, 1995, letter to the Environmental Protection Agency's (EPA) Assistant Administrator for Air and Radiation, you asked for information on the date, number, value, and purpose of all contracts, grants, and cooperative agreements¹ issued or used by EPA's office responsible for administering the I/M program. On October 27, 1995, and November 16, 1995, we reported to you on the accuracy and completeness of EPA's information.² This report responds to your remaining request for us to (1) determine the number and value of the contracts and grants issued or used during the period November 5, 1992, through September 30, 1995, to support EPA's I/M program and (2) describe the scope of work and tasks completed under the contracts and grants specifically related to the I/M program.

¹Grants provide organizations with financial assistance to carry out a program without substantial federal involvement. Cooperative agreements provide organizations with financial assistance but require substantial federal involvement. Throughout this report, we refer to grants and cooperative agreements as grants.

²*Data on EPA's Contracts* (GAO/RCED-96-33R, Oct. 27, 1995) and *EPA's Grants and Agreements* (GAO/RCED-96-44R, Nov. 16, 1995).

In summary, we found 42 contract work assignments³ and grants valued at about \$9.2 million related to the I/M program. As shown in table 1, we found that generally, the scope of work and tasks completed under the contracts and grants included (1) 30 work assignments and grants valued at about \$6.9 million for testing, research, and the development and purchase of equipment; (2) 10 work assignments and grants valued at about \$2.1 million for training, technical, and policy assistance to EPA and state and local agencies; and (3) two grants valued at about \$152,000 for providing education/media outreach on the benefits of the enhanced I/M program.

Table 1: Scope of Work and Tasks Completed

Scope or work and tasks completed	Number of work assignments and grants	Dollar value
Testing, research, and equipment development and purchase	30	\$6,917,275
Training, technical, and policy assistance to EPA and state and local agencies	10	2,074,578
Education/media outreach on the benefits of enhanced I/M program	2	151,920
Total	42	\$9,143,773

(For additional details on the work performed on each contract work assignment and grant, see encs. I-III.)

AGENCY COMMENTS

We provided EPA with a draft of this report for review and comment. In commenting on the report, the Deputy Director of the Office of Mobile Sources and the Associate Director, Policy, Budget, and Planning Division of the Office of Air and Radiation, agreed that the data presented are accurate and reflect the

³A work assignment describes the task to be performed and any reporting or product development requirements.

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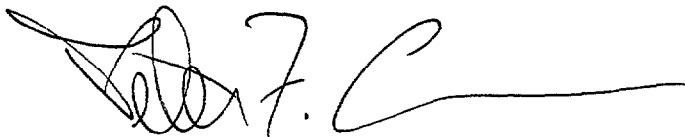
work completed under the I/M-related contracts and grants. We have incorporated clarifying comments provided by EPA where appropriate.

SCOPE AND METHODOLOGY

In conducting our work, we reviewed a listing of contracts and grants used by EPA from November 5, 1992, to September 30, 1995. We selected and reviewed the scope of work for the contracts and grants that were related to the I/M program. To determine what tasks were completed under the I/M-related contracts and grants, we reviewed the I/M-related work assignments and the scope of work to determine the objectives and tasks requested. We also reviewed and analyzed progress reports and final reports to determine the tasks completed. We performed our work from June 1996 through August 1996 in accordance with generally accepted government auditing standards.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 14 days after the date of this letter. At that time, we will send copies to the Administrator of EPA and other interested parties. We will make copies available to others upon request. If you or your staff have any questions, please contact me at (202) 512-6111. Major contributors to this report were William McGee, Odell Pace, Hamilton Greene, Michelle Leach, and Jim Hayward.

Sincerely yours,



Peter F. Guerrero
Director, Environmental
Protection Issues

Enclosures - 3

SUMMARY DESCRIPTION OF WORK PERFORMED—
TESTING, RESEARCH, EQUIPMENT DEVELOPMENT, AND PURCHASE

Contract: 68C10055 Contractor: Automotive Testing Labs, Inc. Contract awarded by: Office of Mobile Sources, Office of Air and Radiation			
Work assignment number	Project period	Estimated EPA costs of work ^a	Summary description of work
1-4	10/1/92 to 9/30/93	\$1,236,987	EPA's Office of Mobile Sources issued a work assignment to Automotive Testing Labs, Inc., to operate an inspection/maintenance (I/M) lane where four research projects were performed. The first project included selecting 1,574 vehicles, performing the state I/M test and an IM240 inspection, ^b and comparing the emissions results. An incentive of \$15.60 was paid to the vehicle owners to participate. ^c The second project involved a random sample of 176 vehicles selected for repair/retest to determine the cost to make necessary repairs. Participants were offered the following: (1) a late-model loaner vehicle with a full tank of fuel, (2) payment of \$100 for the first 7 days and \$15 a day thereafter, (3) free repairs performed during the course of testing, and (4) their vehicle returned with a full tank of fuel after being cleaned. The third project involved selecting 46 vehicles that failed the official state I/M test and offering an incentive of \$50 to the owners if they would return for inspection after having the repairs done. Data on the repairs performed were analyzed and the vehicles retested. The final project involved retesting the 20 vehicles during different times of the day and after different driving trips.

^aAmount paid through June 1996.

^bIM240 testing equipment is a high-tech computer-controlled emissions analyzer that measures tailpipe emissions under a 240-second simulated driving cycle.

^cThe incentive included the \$5.60 state inspection fee and \$10.

Contract: 68C10055 Contractor: Automotive Testing Labs, Inc. Contract awarded by: Office of Mobile Sources, Office of Air and Radiation			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
1-6	1/15/93 to 5/26/93	\$99,997	EPA's Office of Mobile Sources issued a work assignment to Automotive Testing Labs, Inc., to quantify the evaporative hydrocarbons emissions from 25 vehicles procured from the Hammond, Indiana, inspection lane for laboratory testing. The Environmental Protection Agency (EPA) was provided with the results from the tests for each vehicle.
1-7	4/15/93 to 9/30/93	\$61,724	EPA's Office of Mobile Sources issued a work assignment to Automotive Testing Labs, Inc., to determine if common emission component failures cause changes in the IM240 emission results. If it were found that a given failure caused a consistent and distinctive pattern in emissions, then this information could be used to guide mechanics in the diagnosis and repair of a vehicle. Sixteen vehicles were selected at a state I/M lane, and participants were offered the following incentives: (1) a late-model loaner vehicle with a full tank of fuel, (2) payment of \$50 for the first 5 days and \$5 a day thereafter, (3) free repairs performed during the course of testing, and (4) their vehicle returned with a full tank of fuel after being cleaned. A series of defects was implanted on each vehicle, and IM240 emissions tests were then performed on the vehicles. A diagnostic and repair flowchart procedure was provided to the contractor by EPA and was evaluated on the basis of the results obtained on the 16 vehicles.

Contract: 68C10055 Contractor: Automotive Testing Labs, Inc. Contract awarded by: Office of Mobile Sources, Office of Air and Radiation			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
1-8	5/17/93 to 9/30/93	\$48,987	EPA's Office of Mobile Sources issued a work assignment to Automotive Testing Labs, Inc., to perform additional evaluations of an EPA-supplied diagnostic and repair procedure. (See work assignment 1-7, p. 5.) Sixteen vehicles were selected at a state I/M lane, and participants were offered the following incentives: (1) a late-model loaner vehicle with a full tank of fuel, (2) payment of \$50 for the first 5 days and \$5 a day thereafter, (3) free repairs performed during the course of testing, and (4) their vehicle returned with a full tank of fuel after being cleaned. An IM240 emissions test was performed on the vehicles. Additional evaluations were done on the diagnostic and repair procedures previously evaluated under work assignment 1-7 on the basis of the results obtained on the 16 vehicles.

Contract: 68C90049 Contractor: Automotive Testing Labs, Inc. Contract awarded by: Office of Mobile Sources, Office of Air and Radiation			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
3-1	10/92 to 1/93	\$421,077	<p>EPA's Office of Mobile Sources issued a work assignment to Automotive Testing Labs, Inc., to procure a random sample of vehicles from a mandatory I/M lane for additional emission testing and an evaluation of the enhanced I/M test. The vehicle owners who requested to participate were offered an incentive of \$20 to participate in the slightly longer test series. Eight hundred seventy-eight vehicles were tested at the lane; the test included all components of the official state I/M test, an assessment of the condition and performance of the evaporative control system, and an IM240 test. In addition, a sample of 39 vehicles was selected for additional testing, including 225 IM240 tests, at the Automotive Testing Labs' emission-testing facility. Incentives for participating in the laboratory testing included the following: (1) a late-model loaner vehicle with a full tank of fuel; (2) payment of \$50 for the first 5 days, \$5 per day thereafter for older cars, and \$250 per week for newer cars; (3) the participant's vehicle returned with a full tank of fuel after being cleaned; and (4) free repairs during the course of testing. The additional testing at the laboratory included all tests performed at the lane using the as-received fuel and testing after draining and refueling the vehicles with test fuel. Results from all testing were submitted to EPA for review and inclusion in EPA's data system.</p>

Contract: 68C30370 Contractor: Automotive Testing Labs, Inc. Contract awarded by: Office of Mobile Sources, Office of Air and Radiation			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
0-1	11/15/93 to 12/15/93	\$15,967	EPA's Office of Mobile Sources issued a work assignment to Automotive Testing Labs, Inc., to evaluate the status of the Government Furnished IM240 lane equipment previously used under another contract and then stored. All equipment was powered up and reconnected into the normal operating configuration and tested to ensure that it was functional.
0-2	11/22/93 to 1/31/94	\$129,705	EPA's Office of Mobile Sources issued a work assignment to Automotive Testing Labs, Inc., to operate and maintain an I/M lane at an official Indiana inspection station for 6 weeks. At the inspection lane, staff selected 270 vehicles from those in line for the official Indiana I/M test and performed the official Indiana I/M test and the IM240 test on each vehicle. Staff offered \$10 as an incentive to the vehicle owners for the longer time necessary to perform both the IM240 and the official state I/M tests. One hundred forty-six, or 54 percent, of the vehicles passed the IM240 test, and 229, or 85 percent, of the vehicles passed the official Indiana inspection.

Contract: 68C30370 Contractor: Automotive Testing Labs, Inc. Contract awarded by: Office of Mobile Sources, Office of Air and Radiation			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
0-3	11/22/93 to 12/31/93	\$166,557	EPA's Office of Mobile Sources issued a work assignment to Automotive Testing Labs, Inc., to obtain vehicles from an Indiana inspection station for laboratory testing to determine the types and costs of repairs necessary to pass the I/M test and the impacts of those repairs on emission levels. Participants were offered the following incentives: (1) a late-model, fully insured loaner vehicle with a full tank of fuel, (2) payment of \$50 for the first 5 days and \$5 per day thereafter, (3) free repairs performed during the program, (4) their vehicle returned with a full tank of fuel after being cleaned, and (5) an I/M certificate or waiver for those vehicles that entered the program after failing the official I/M test. Thirty-two vehicles were selected, tested, repaired, and retested. Records were maintained on the repairs and adjustments that resulted in the greatest reduction of exhaust emissions.

Contract: 68C30370 Contractor: Automotive Testing Labs, Inc. Contract awarded by: Office of Mobile Sources, Office of Air and Radiation			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
0-5 and 1-1	3/16/94 to 3/95	\$697,643	EPA's Office of Mobile Sources issued two work assignments to Automotive Testing Labs, Inc., to operate and maintain an I/M lane at an official state emission inspection facility in order to collect data to be used in assessing emission inventories, evaluating I/M alternatives, and selecting vehicles for further laboratory testing under work assignments 0-6 and 1-2. (See p. 11.) Vehicle owners entering the state emission inspection facility were offered an incentive of \$10 to participate in a slightly longer test sequence. Testing included 2,566 IM240 inspections and 3,126 official state inspections. EPA was provided with the test results for analysis.

Contract: 68C30370 Contractor: Automotive Testing Labs, Inc. Contract awarded by: Office of Mobile Sources, Office of Air and Radiation			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
0-6 and 1-2	3/15/94 to 3/95	\$961,518	EPA's Office of Mobile Sources issued two work assignments to Automotive Testing Labs, Inc., to select vehicles from the I/M lane operated under work assignments 0-5 and 1-1 (see p. 10) for further laboratory testing to evaluate the IM240 and the state I/M tests on the basis of several criteria. A sample of 93 vehicles was selected, and participants were offered the following incentives: (1) a late-model fully insured loaner vehicle with a full tank of fuel (2) payment of \$50 for the first 5 days and \$5 per day thereafter, (3) free repairs performed during the program; (4) their vehicle returned with a full tank of fuel after being cleaned, and (5) an I/M certificate or waiver for those vehicles that entered the program after failing the official I/M test. At the laboratory, repeats of the testing done at the inspection lane under work assignment 0-5 were performed, and repairs were performed in an attempt to achieve a passing status. Data were maintained on the types and costs of repairs necessary to pass the I/M test.

Contract: 68C30370 Contractor: Automotive Testing Labs, Inc. Contract awarded by: Office of Mobile Sources, Office of Air and Radiation			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
1-4	3/1/95 to 9/1/95	\$391,393	EPA's Office of Mobile Sources issued a work assignment to Automotive Testing Labs, Inc., to operate and maintain an enhanced I/M lane at the official Chicago Heights centralized I/M inspection station according to the procedures outlined in the High Tech I/M Guidance. Staff randomly selected vehicle owners from those in line for the official I/M test and offered the payment of \$10 as an incentive to participate. For those vehicles selected, 483 tests were performed to monitor the effectiveness of IM240 to determine the flow of fuel vapors from the evaporator canister to the engine (purge test ^a). EPA was provided with the test results for analysis.
1-6	9/18/95 to 9/30/95	\$7,982	EPA's Office of Mobile Sources issued a work assignment to Automotive Testing Labs, Inc., to remove the government-furnished equipment from the Hammond, Indiana, inspection lane, restore the site to its original state that existed prior to occupancy, and prepare the government-furnished equipment for return to EPA.

^aA purge test measures the flow of vapors from the canister to the engine.

Contract: 68C40018 Contractor: Automotive Testing Labs, Inc. Contract awarded by: Office of Mobile Sources, Office of Air and Radiation			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
0-1	10/94 to 1/15/95	\$60,860	EPA's Office of Mobile Sources issued a work assignment to Automotive Testing Labs, Inc., to procure a sample of pre-1981 vehicles that failed the IM240 inspection, perform repairs on the vehicles, and use the experience gained to start the development of a systematic repair approach for this class of vehicles. Seventeen vehicles were selected at an I/M station, where participants were offered \$25 and a chance to receive free repairs required to pass the state I/M test if they allowed additional testing to be performed at Automotive Testing Labs' laboratory. Repairs were performed, and post repair I/M inspections were completed. The experience gained was used to evaluate the repairs necessary to pass an EPA- suggested IM240 inspection.

Contract: 68C40018 Contractor: Automotive Testing Labs, Inc. Contract awarded by: Office of Mobile Sources, Office of Air and Radiation			
Work assignment number	Project period	Estimated EPA costs work	Project period
0-3	4/18/95 to 5/15/95	\$19,513	EPA's Office of Mobile Sources issued a work assignment to Automotive Testing Labs, Inc., to evaluate the effectiveness of inspection techniques to identify a vehicle's catalytic converter that was not performing as designed. Six vehicles were selected at an I/M station, and participants were offered \$50 and the use of a loan vehicle. A series of four tests was performed including (1) three General Motors (GM) catalyst tests, ^a (2) three Aspire converter efficiency tests, ^b (3) one BAR90 2500/idle test, ^c and (4) two IM240 tests. From the data gathered, the converter efficiency for the IM240 test was calculated.
0-4	4/18/95 to 6/15/95	\$113,006	EPA's Office of Mobile Sources issued a work assignment to Automotive Testing Labs, Inc., to further evaluate the effectiveness of inspection techniques to identify a vehicle's catalytic converter that was not performing as designed. (See work assignment 0-3 above.) Seventy vehicles were selected at an I/M station, and participants were offered \$50 and the use of a loaner vehicle for up to 5 days. A series of four tests was performed on each vehicle. From the data gathered, the converter efficiency for the IM240 test was calculated.

^aThe GM test evaluates the ability of a vehicle's catalytic converter to oxidize hydrocarbons.

^bA test developed by Aspire to evaluate a vehicle's catalytic converter.

^cBureau of Automotive Repair (BAR) tests evaluate a vehicle's catalytic converter.

Contract: 68C10079 Contractor: Sierra Research Inc. Contract awarded by: Office of Mobile Sources, Office of Air and Radiation			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
2-01	12/13/93 to 5/13/94	\$51,030	<p>EPA's Office of Mobile Sources issued a work assignment to Sierra Research Inc. to complete four projects that involved the evaluation and analysis of proposals to meet the enhanced inspection and maintenance requirement. The contractor evaluated the Desert Research Institute's analysis of the California program and determined the reasons for the fundamental difference between Desert Research Institute's I/M benefit estimates and estimates made by EPA and California State officials. Also, the contractor provided a detailed analysis of data collected by California during the 1,100-vehicle undercover program to determine the extent to which fraud or testing error might be causing the true emissions of vehicles to exceed the results reported by California stations. Additionally, the contractor provided a report analyzing the effectiveness and cost effectiveness of remote sensing devices as well as a detailed description and comparison of California's proposal to meet the enhanced I/M requirement with EPA's model program and the legislative proposal.</p>

Contract: 68C10079 Contractor: Sierra Research Inc. Contract awarded by: Office of Mobile Sources, Office of Air and Radiation			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
2-04	4/18/94 to 7/30/94	\$46,482	EPA's Office of Mobile Sources issued a work assignment to Sierra Research Inc. to collect, assemble, and deliver to EPA, in electronic form, the necessary parameters to properly adjust high-tech IM240 equipment for each vehicle subject to the high-tech inspection. Vehicles subject to enhanced I/M have exhaust emissions measured and evaporative emission control systems tested while the vehicle is being driven on a chassis dynamometer using the IM240 equipment. To effectively use the equipment, the technician must quickly and easily adjust the chassis dynamometer for each class of vehicle being inspected. Sierra Research Inc. analyzed various sources of data, used various computational methodologies, and constructed an electronic look-up table to be used by the technician to quickly and easily adjust the chassis dynamometer for each vehicle to be inspected.

Contract: 68C10079 Contractor: Sierra Research Inc. Contract awarded by: Office of Mobile Sources, Office of Air and Radiation			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
2-06	8/1/94 to 9/30/94	\$56,977	EPA's Office of Mobile Sources issued a work assignment to Sierra Research Inc. to determine the testability of each vehicle/engine category for completing an I/M evaporative system pressure and/or purge check. Functional checks of the evaporative control system are required under the enhanced I/M program. However, some vehicle types are difficult to test, and EPA decided that it would be beneficial for inspection technicians to be aware of those vehicles prior to testing. Sierra Research Inc. acquired pressure and purge data from various sources, analyzed the data, and decided the testability status of different vehicle categories. This information will allow inspection technicians in test-only I/M programs to quickly determine which vehicles cannot easily be inspected.

Contract: 68C40056 Contractor: Sierra Research Inc. Contract awarded by: Office of Mobile Sources, Office of Air and Radiation			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
0-1	10/15/94 to 8/1/95	\$42,228	EPA's Office of Mobile Sources issued a work assignment to Sierra Research Inc. to update and correct errors and omissions in vehicle testing parameters that exist in the EPA Vehicle Specific Data Sheet for IM240 Testing (lookup tables), which were originally developed under work assignment 2-04, contract 68C10079. (See p. 16.) Specifically, the contractor (1) participated in meetings to identify and develop the necessary enhanced I/M test parameters; (2) identified sources of data for missing or incomplete test parameters and incorporated new data in the tables; (3) identified methods for determining default values for test parameters; (4) corrected errors that existed in the tables; (5) prepared a draft lookup table in electronic format; (6) sent a copy of the draft data-only report in electronic form to all vehicle manufacturers and requested their review; (7) reviewed all corrections and additions made by the vehicle manufacturers, incorporated additional data, and incorporated any corrections to the lookup table after EPA's approval; (8) reported changes and any significant issues to EPA; and (9) distributed the draft lookup table to other interested parties for further review.

Contract: 68C40056 Contractor: Sierra Research Inc. Contract awarded by: Office of Mobile Sources, Office of Air and Radiation			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
0-2	11/1/94 to 9/30/95	\$91,495	<p>EPA's Office of Mobile Sources issued a work assignment to Sierra Research Inc. to determine the testability status of each vehicle model for completing an I/M evaporative system functional check, which is required in an enhanced I/M inspection. According to EPA, some vehicle models are difficult to test in a high-volume I/M inspection lane. Therefore, Sierra Research Inc. was directed to (1) analyze available test data to determine the testability status of vehicles on the basis of their make, model, and model year; (2) evaluate the reasons why certain makes and models cannot be tested with EPA's standard procedures; (3) evaluate whether the alternative test procedures would increase the fraction of vehicles that could be tested; and (4) identify vehicle design features and test parameters that would need to be known to properly conduct an alternative test procedure. The primary conclusions of the study were that (1) EPA's test procedures cannot be used on a significant fraction of the vehicle fleet and (2) EPA's draft alternative procedure is capable of testing a higher fraction of vehicles; however, testability rates could be improved with more thorough technician training.</p>

Contract: 68C40056 Contractor: Sierra Research Inc. Contract awarded by: Office of Mobile Sources, Office of Air and Radiation			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
0-3	12/1/94 to 3/15/95	\$51,122	<p>EPA's Office of Mobile Sources issued a work assignment to Sierra Research Inc. to organize the data that were collected during the California enhanced I/M pilot program into a consistent and easily usable database. During the latter half of 1994, California conducted an enhanced I/M pilot program to investigate the feasibility of implementing a hybrid enhanced I/M program. Under the program, vehicles suspected of the highest emissions would require inspection at a test-only facility, while other vehicles could be tested at a test and repair facility. In organizing the data and conducting the study, Sierra Research Inc. compared the effectiveness of the IM240 and two acceleration simulation mode procedures.^a According to the study, vehicles with excess emissions can be identified with equal effectiveness using either the IM240 or a combination of two acceleration simulation mode test procedures. Also, the study concluded that both the IM240 and the acceleration simulation mode were equally effective in determining when a vehicle has been adequately repaired. According to EPA's work assignment, the findings will be used in EPA's overall evaluation of the California I/M program and will be used to assist other states in the development and operation of their enhanced I/M program.</p>

^aThe acceleration simulation mode was developed as an alternative test to the IM240.

Contract: 68C20106 Contractor: Hamilton Test Systems, Inc. Contract awarded by: Office of Mobile Services, Office of Air and Radiation		
Project period	Estimated EPA costs of work	Summary description of work
9/30/92 to 12/31/94	\$238,000	EPA's Office of Mobile Sources awarded a contract to Hamilton Test Systems, Inc. to develop, construct, and install an I/M 240 test system at the National Vehicle and Fuel Emissions Laboratory in Ann Arbor, Michigan. In addition, Hamilton Test Systems, Inc., was to submit the documentation and operating manual as well as a warranty to ensure the operation of the system after installation.

Contract: 68D50067 Contractor: Hughes Santa Barbara Research Center. Contract awarded by: Air and Energy Engineering Research Laboratory, Office of Research and Development		
Project period	Estimated EPA costs of work	Summary description of work
9/5/95 to 6/1/96	\$100,000 ^a	EPA's Air and Energy Engineering Research Laboratory awarded a contract to Hughes Santa Barbara Research Center to provide and install an infrared remote sensing device capable of measuring concentrations of carbon monoxide, hydrocarbons, nitrogen oxides, and carbon dioxide in exhaust plumes behind automobiles passing a point at a high-volume traffic location. The equipment was designed for on-site calibration, automated data collection and storage, and unattended operation after setup. The automated collection system was synchronized to enable the pollutant concentrations and meteorological data to be stored together on computer storage media.

^aPaid as of May 21, 1996. Unpaid balance is \$57,000.

<p>Contract: 68D30138 Contractor: Remote Sensing Technologies. Contract awarded by: Air and Energy Engineering Research Laboratory, Office of Research and Development</p>		
Project period	Estimated EPA costs of work	Summary description of work
9/27/93 to 1/28/94	\$189,855	EPA's Air and Energy Engineering Research Laboratory awarded a contract to Remote Sensing Technologies to provide a mobile system for remote sensing measurements and associated equipment and services meeting all specifications and requirements. The remote system was to be capable of capturing license plate data and measuring concentrations of carbon monoxide, hydrocarbons, and carbon dioxide in exhaust plumes behind all automobiles and light duty trucks passing a point at a high-volume traffic location. The remote system was also to be capable of unattended operation, on-site calibration, and automated data collection and storage. In addition, the system was to be enclosed in a self contained mobile van that could be moved to new sampling locations easily.

Cooperative agreement: 823020-01-0 Grantee: Georgia Tech Research Corporation Agreement entered into by: Air and Energy Engineering Research Laboratory, Office of Research and Development		
Project period	Estimated EPA costs of work	Summary description of work
10/1/94 to 9/30/99	\$1,303,360 ^a	EPA's Air and Energy Engineering Research Laboratory entered into a cooperative agreement with Georgia Tech Research Corporation for the research and development of improved emission inventory methodologies for highway vehicles. The overall objective of the project was to develop cost-effective and accurate emission inventory methods that can be validated. Under the cooperative agreement, seven remote sensing studies were initiated, ^b and all but one have been completed. Some of the seven remote sensing studies required field measurements at different times over several years. These studies were primarily done to (1) evaluate the effectiveness of programs for inventory projections, (2) compare I/M test equipment, and (3) evaluate fleet characteristics. The results of some of the remote sensing studies have been submitted for publication. For example, the grantee has submitted the following study for publication: <i>Measuring Inspection Program Effectiveness Using Optical Remote Sensing: Results of Continuous Atlanta Fleet Evaluation</i> . In addition to conducting remote sensing studies and preparing the studies for publication, the grantee contributed papers at meetings and symposia held by others, and the presentations discussed preliminary evaluations of all remote sensing work.

^aPaid as of June 20, 1996. Unpaid balance is \$887,340.

^bRemote sensing devices use an infrared beam to assess vehicles' exhaust emissions in actual traffic conditions on public roads.

Cooperative agreement: 819554-01-0 Grantee: University of Denver Agreement entered into by: Environmental Monitoring and Systems Laboratory, Office of Research and Development		
Project period	Estimated EPA costs of work	Summary description of work
6/22/92 to 6/21/95	\$122,500	EPA's Environmental Monitoring and Systems Laboratory entered into a cooperative agreement with the University of Denver for Remote Monitoring of Vehicle Emissions--a multitask program to develop, evaluate, and demonstrate technology for real-time on-road vehicle emissions monitoring. Previous EPA research reported that remote sensing has the potential to contribute to enhanced motor vehicle inspection and maintenance programs. Three programs involving remote sensing of motor vehicle emissions were included in this cooperative agreement: (1) development of nitric oxide remote sensing technologies, (2) development of a vehicle of known emissions, and (3) measurement of opacity (diesel soot). The research concluded that the on-road nitric oxide detection is possible but that more work is needed. The remote sensor's performance was evaluated with on-board instrumentation to provide real-time emission measurements. In addition, the research on diesel soot measurement was deemed a success, although of limited applicability in the United States because there are only a few light-duty diesel vehicles with low-level exhaust systems. Testing done in Hong Kong, where 65 percent of their fleet is diesel, showed that the measurement system developed would be very helpful toward Hong Kong's high level of commitment to control visible soot.

Cooperative agreement: 819554-02-0 Grantee: University of Denver Agreement entered into by: National Exposure Research Laboratory, Office of Research and Development		
Project period	Estimated EPA costs of work	Summary description of work
6/22/92 to 6/21/95	\$102,322	EPA's National Exposure Research Laboratory entered into a cooperative agreement with the University of Denver for Remote Monitoring of Vehicle Emissions--a multitask program to develop, evaluate, and demonstrate technology for real-time on-road vehicle emissions monitoring. According to EPA and the grantee, this work showed that a remote sensing nitric oxide detector has been successfully developed and integrated into the original carbon monoxide- and hydrocarbon-measuring system previously developed. The system provides a practical approach for monitoring simultaneously on-road vehicle carbon monoxide, hydrocarbon, and nitric oxide emissions.

Contract: 68D30029 Contractor: TRC Environmental Corporation Contract awarded by: Office of Air Quality Planning and Standards, Office of Air and Radiation.			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
0-12	9/17/93 to 8/31/94	\$88,988	EPA's Region 8 issued a work assignment to TRC Environmental Corporation (TRC) to assist Colorado in studying the feasibility of remote sensing technology (1) to supplement an enhanced I/M program in nonattainment areas and (2) as a stand-alone program to assist in the maintenance of attainment status. ^a The project had two phases: (1) the assessment of available information related to the use of remote sensing technology for reducing highway vehicle emissions and (2) the preparation of a proposed remote sensing feasibility study design to address critical issues and information gaps related to the use of remote sensing in motor vehicle control programs. In August 1994, TRC submitted its report, <i>Feasibility Study of Use of Remote Sensing Technology for Reduction of Highway Mobile Source Emissions</i> . The report (1) summarized the available information related to the types of remote sensing applications identifying the key technical, cost, regulatory, and administrative issues related to the use of remote sensing and (2) identified critical issues related to remote sensing that can be approached through the execution of a field study and provided a set of study designs that can serve as a framework for performing such studies.

^aEPA's Office of Air Quality Planning and Standards awarded the overall contract; other EPA organizations were allowed to issue work assignments under the contract.

SUMMARY DESCRIPTION OF WORK PERFORMED--
TRAINING AND TECHNICAL AND POLICY ASSISTANCE TO
EPA AND STATE AND LOCAL AGENCIES

Grant: 902841-01-0 Grantee: Coalition for Safer, Cleaner Vehicles. ^a Grant awarded by: Office of Mobile Sources, Office of Air and Radiation.		
Project period	Estimated EPA costs of work ^b	Summary description of work
4/24/95 to 8/23/95	\$46,330	EPA's Office of Mobile Sources awarded a grant to the Coalition for Safer, Cleaner Vehicles to partially fund the operation of the National Train-the-Trainer Program to assist in the education of the nation's technicians in the effective diagnosis and repair of automobile emissions problems related to EPA's I/M regulations. The first phase of the grant addressed the critical need for training instructors, who will subsequently train the technicians by delivering a course focused on emissions diagnosis to the 135 technicians who became training instructors. Under the second phase of the grant, the 135 training instructors each trained 10 to 20 additional instructors (representing 36 states), thereby establishing a strong national infrastructure of qualified training instructors. Overall, training was given to more than 1,000 instructors nationwide. The total cost of the program was about \$927,000, and EPA provided 5 percent of the funds.

^aThe Coalition for Safer, Cleaner Vehicles is a nonprofit educational organization committed to promoting the effective inspection and repair of motor vehicles. Membership includes consumer groups, state vehicle and pollution control administrators, educators, automotive associations, and individual companies.

^bAmount paid through June 1996.

Cooperative agreement: 901883-01-0 Grantee: Colorado State University Agreement entered into by: Office of Mobile Sources, Office of Air and Radiation.		
Project period	Estimated EPA costs of work	Summary description of work
8/12/91 to 8/11/94	\$552,783	EPA's Office of Mobile Sources entered into a cooperative agreement with Colorado State University to continue the National Center for Vehicle Emission Control and Safety. The Center received support for over 10 years for its programs, which provide state and local agencies' vehicle inspection and maintenance programs with assistance nationwide. The specific purpose of this cooperative agreement was to provide I/M programs throughout the country with assistance through (1) information exchange to increase the knowledge base of individuals and agencies responsible for the various aspects of the automotive emission-air quality relationships through newsletters, publications, and seminars; (2) curriculum development involving such topics as new technology updates, program evaluation strategies for I/M programs, guidelines for design, and implementation of enhanced I/M programs; (3) training to include comprehensive courses on transportation control measures, emissions analyzers, and auditing decentralized station paperwork; (4) program development and technical assistance to meet the needs peculiar to a given region, state, or area involved with a basic I/M or enhanced I/M program; (5) policy analysis to provide others with information permitting them to make more informed judgments about policy alternatives affecting the ways in which automotive emissions are controlled in the interest of air quality; and (6) applied research to respond to the substantial numbers of requests for information from around the country.

Cooperative agreement: 824064-01-0 Grantee: Coordinating Committee for Automotive Repair. ^a Agreement entered into by: Office of Mobile Sources, Office of Air and Radiation.		
Project period	Estimated EPA costs of work	Summary description of work
4/4/95 to 10/31/95	\$100,000	EPA's Office of Mobile Sources entered into a cooperative agreement with the Coordinating Committee for Automotive Repair to continue the work started under a previously awarded cooperative agreement. (See p. 33.) The purpose of the cooperative agreement was to implement a national industry/educator/government partnership to provide for better education/training of auto technicians who service and maintain emissions-control systems of the nation's vehicles. The four phases of this work included (1) continuing to maintain the formalized structure of the Coordinating Committee for Automotive Repair, (2) developing and prioritizing coordination activities that must be accomplished so that improvement in the expertise of the nation's automotive technicians will result, (3) developing and continually updating an action plan that will accomplish the identified and prioritized coordination activities, and (4) implementing those coordination action plans. Two outreach programs implemented during this cooperative agreement include (1) a State Inspection/Maintenance Coordinators Network to establish common goals and effective communications among the state coordinators and (2) a Satellite TeleLearning Network to provide high school students, counselors, teachers, and parents with a satellite link up to provide them with information about the growing need for qualified automotive technicians.

^aThe Coordinating Committee for Automotive Repair is a nonprofit organization established to form an industry/educator/government partnership to identify, recruit, educate, equip, and retain competent personnel for the vehicle service/repair industry. Membership is open to any recognized automotive-related organization.

Cooperative agreement: 824376-01-0 Grantee: Coordinating Committee for Automotive Repair Agreement entered into by: Office of Enforcement and Compliance Assurance.		
Project period	Estimated EPA costs of work	Summary description of work
9/18/95 to 9/17/97	\$223,717 ^a	EPA's Office of Enforcement and Compliance Assurance entered into a cooperative agreement with the Coordinating Committee for Automotive Repair to operate the National Automotive Service Compliance Center, an information center for EPA regulations and educational information for automotive technicians, shop owners, and students. The center was designed to provide multimedia environmental compliance information and pollution prevention and material substitution ideas for helping the shop owners comply with the various environmental requirements. The three objectives of the center are to (1) provide the automotive technician, shop owner, and educator with a nonthreatening "one-stop center" to seek and retrieve information that will aid in compliance; (2) develop, where appropriate, and encourage the use of environmental compliance curricula in automotive education school programs and technician in-service training programs that improve compliance with appropriate environmental regulations; and (3) encourage state and local governments to explore new means of promoting compliance within the automotive service sector. The National Automotive Service Compliance Center opened on June 3, 1996, with a toll-free phone number and Internet Web site. According to EPA and the grantee, the grantee and the Office of Mobile Sources are in the process of deciding what information should be made available about the Inspection and Maintenance Program through the Center.

^aPaid as of June 20, 1996. Unpaid balance is \$526,283 if cooperative agreement extends to expiration date of September 17, 1997.

Cooperative agreement: 820640-01-0 Grantee: National Automotive Technician Education Foundation, Inc. ^a Agreement entered into by: Office of Mobile Sources, Office of Air and Radiation.		
Project period	Estimated EPA costs of work	Summary description of work
9/1/92 to 8/31/95	\$360,371	EPA's Office of Mobile Sources entered into a cooperative agreement with the National Automotive Technician Education Foundation, Inc., to operate a pilot project whose purpose was to demonstrate that through peer expertise exchanges between automotive training schools, the number and quality of automotive technician education programs can be increased. The grantee focused on increasing the number of National Institute for Automotive Service Excellence-certified training schools in nonattainment areas in hopes of getting better trained automotive technicians and, therefore, cleaner air. As of April 1995, 26 of the 223 schools in the targeted areas covered by the cooperative agreement that had automobile programs had been certified by the National Institute for Automotive Service Excellence program. EPA and the grantee anticipate that the end results will be better automotive technician expertise to service the nation's high-tech vehicles, which should result in properly maintained and repaired vehicles, thereby ensuring that the air pollutant standards are met and the nation's air quality improved.

^aThe National Automotive Technician Education Foundation, Inc., is a nonprofit organization whose goal is to improve the quality of automotive technician training nationwide through the evaluation and certification of training programs on the basis of industry standards by the National Institute of Automotive Service Excellence program.

Cooperative agreement: 822089-01-0 Grantee: National Automotive Technician Education Foundation, Inc. Agreement entered into by: Office of Mobile Sources, Office of Air and Radiation.		
Project period	Estimated EPA costs of work	Summary description of work
9/1/93 to 4/30/95	\$250,000	<p>EPA's Office of Mobile Sources entered into a cooperative agreement with the National Automotive Technician Education Foundation, Inc., to implement a national industry/educator/government partnership to provide for better education/training of auto technicians who service and maintain the emissions-control systems of the nation's vehicles. The purpose of the cooperative agreement was to demonstrate that a partnership could be formed to increase the quality and quantity of skilled automotive technicians needed to repair the vehicles of today and the future in order to maintain effective emission control technology, vehicle safety, energy conservation, and consumer product protection. The cooperative agreement included four phases of work. Phase I was designed to define the mission statements of the National Automotive Technician Education Foundation, Inc., established to focus on technician recruitment/retention, technician education, testing and certification, and technical support devoted to the task of improving the skills of the automobile technicians. Phase II was designed to (1) identify and prioritize resources for the education and training of future technicians; (2) develop a communication strategy to inform industry about the needs, goals, and activities of the vehicle service/repair sector including data on I/M 240 failure rates and regulatory update information; and (3) develop a strategy for improving the image of automotive technicians. Phases III and IV were designed to develop and implement the action plans for the identified and prioritized activities. As part of this agreement, a series of visits by the grantee to nonattainment areas in Arizona, Colorado, and Maine were held to communicate the IM240 program and its positive benefits.</p>

Contract: 68C40018 Contractor: Automotive Testing Labs, Inc. Contract awarded by: Office of Mobile Sources, Office of Air and Radiation.			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
0-2	11/18/94 to 4/13/95	\$139,173	<p>EPA's Office of Mobile Sources issued a work assignment to Automotive Testing Labs, Inc., to administer a training program in Arizona that had converted from a basic I/M program to an enhanced IM240 test procedure. Two training sessions of 30 hours each were delivered to 11 students. Thirty-three vehicles were selected for the students to work on, and the owners of the vehicles were offered the following: (1) a loaner vehicle, (2) payment of \$50 for the first 5 days and \$5 a day thereafter, and (3) completion of repairs up to \$450 in repair parts and 5 hours of labor at no cost to the owners. Repaired vehicles were retested at an I/M station, and the students returned to their jobs in the repair industry, where nine technicians continued to use the strategies learned. The purpose of the training program was to evaluate the concept of training technicians to repair emission failures using an overall top-down strategy.</p>

Cooperative agreement: 902836-01-0 Grantee: Colorado State University Agreement entered into by: Office of Mobile Sources, Office of Air and Radiation.		
Project period	Estimated EPA costs of work	Summary description of work
9/1/94 to 8/31/97	\$306,235 ^a	EPA's Office of Mobile Sources entered into a cooperative agreement with Colorado State University to provide state and local agencies and repair providers with technical assistance and support for I/M programs. The six activities included in the cooperative agreement were (1) an information exchange to increase the knowledge base of individuals and agencies responsible for the various aspects of the automotive emission-air quality relationship; (2) curriculum development to extend and expand the National Center's training capacity; (3) training to translate and transmit the curriculum's purpose and content to specified learners; (4) program development and technical assistance to meet the needs peculiar to a given region, state, or area involved with a basic I/M and enhanced I/M program; (5) policy analysis to provide others with information permitting them to make more informed judgments about policy alternatives affecting the ways in which automotive emissions are controlled in the interest of air quality; and (6) applied research to respond to the substantial numbers of requests for information from around the country. Under this cooperative agreement, training has been provided in Arizona, Maryland, Texas, and Wisconsin.

^aPaid as of June 20, 1996. Unpaid balance is \$57,376.

Contract: 68D30035 Contractor: E.H. Pechan & Associates, Inc. Contract awarded by: Office of Air Quality Planning and Standards, Office of Air and Radiation.			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
0-36	3/24/94 to 9/30/94	\$70,804	EPA's Office of Policy, Planning, and Evaluation issued a work assignment to E.H. Pechan & Associates, Inc., to implement improvements to a previously created emissions-based registration fee analysis. ^a The use of fees, rebates, or other charges based on the emissions of vehicles as measured by the enhanced I/M program has received considerable attention as one option to achieving required reductions in the emissions of air pollutants from motor vehicles. EPA began an emissions-based registration fee analysis under previous work. Under this work assignment, E.H. Pechan & Associates, Inc., was to implement improvements to the emissions-based fee computer model and utilize the model to evaluate several scenarios related to emissions-based fee implementation. Specifically, the contractor was to (1) update the emissions-based fee model to incorporate revisions suggested by EPA, (2) utilize the updated model to evaluate five policy cases, (3) provide copies of model inputs and outputs related to each of the five policy case investigations, and (4) produce a final report.

^aEPA's Office of Air Quality Planning and Standards awarded the overall contract; other EPA organizations were allowed to issue work assignments under the contract.

Contractor: 68D30029 Contractor: TRC Environmental Corporation Contract awarded by: Office of Air Quality Planning and Standards, Office of Air and Radiation.			
Work assignment number	Project period	Estimated EPA costs of work	Summary description of work
0-6	6/15/93 to 9/30/93	\$25,165	<p>EPA's Region 1 issued a work assignment to TRC Environmental Corporation to provide staff and technical support and to attend and document all testimony presented at the Massachusetts Special Commission on Vehicle Inspection and Maintenance meetings.^a On December 30, 1991, the Commonwealth of Massachusetts passed a resolution for an investigation and study by a special commission relative to revising the vehicle emissions inspections and maintenance program. The commission consisted of 19 members--8 from the state legislature, 3 from state agencies, and 1 each representing the New England Service Station and Automobile Repair Association, a licensed operator of a motor vehicle inspection station, the Associated Industries of Mass., the American Lung Association of Mass., the Sierra Club, the Mass. Petroleum Council, the American Automobile Association, and a nonvoting member from EPA. In addition to documenting the meetings of the commission and providing technical support, TRC Environmental Corporation prepared the Special Commission on Vehicle Inspection and Maintenance Final Report, which recommends that enhanced vehicle emissions inspection and maintenance be conducted biennially in a test-only private contractor inspection program.</p>

^aEPA's Office of Air Quality Planning and Standards awarded the overall contract. Other EPA organizations were allowed to issue work assignments under the contract.

SUMMARY DESCRIPTION OF WORK PERFORMED--
EDUCATION/MEDIA OUTREACH ON THE BENEFITS OF ENHANCED I/M PROGRAM

Grant: 992123-01-0 Grantee: American Lung Association of New York Grant awarded by: EPA Region II, New York, N.Y.		
Project period	Estimated EPA costs of work ^a	Summary description of work
2/15/95 to 9/30/95	\$2,000	EPA's Region II in New York awarded a grant to the American Lung Association to conduct an education/media outreach program to promote the public health benefits of air pollution reduction strategies of the enhanced I/M program in newspapers in upstate New York metropolitan areas. This effort was designed to educate the public on the health benefits of implementing the Clean Air Act. In addition, this effort was designed to educate the public on the need for enhanced I/M and was designed for the public to accept the program as a cost-effective way to reduce air pollution. Staff and volunteers of the American Lung Association (1) produced materials on the benefits of the enhanced I/M program; (2) attended editorial board meetings of newspapers in Albany, Binghamton, Buffalo, Poughkeepsie, Rochester, and Syracuse, N.Y.; and (3) contacted newspapers in Glens Falls, Schenactady, Troy, and Utica, New York, to educate local grass-roots advocates on the need to implement programs such as the enhanced I/M program. Four of the newspapers published editorials on the need for and the benefits of the enhanced I/M program over other testing alternatives such as the test-and-repair programs where inspectors/mechanics are allowed to both test and repair vehicles.

^aAmount paid through June 1996.

Cooperative agreement: 824138-01-0 Grantee: Coalition for Safer, Cleaner Vehicles Agreement entered into by: Office of Mobile Sources, Office of Air and Radiation.		
Project period	Estimated EPA costs of work	Summary description of work
6/12/95 to 12/11/95	\$149,920	EPA's Office of Mobile Sources entered into a cooperative agreement with the Coalition for Safer, Cleaner Vehicles to conduct an education outreach program on the benefits of EPA's enhanced I/M program to provide automotive technicians with up-to-date information to enhance their knowledge of inspection and maintenance programs. Accordingly, on January 4-5, 1996, the Coalition for Safer, Cleaner Vehicles and the Consumer Federation of America jointly sponsored a conference entitled <i>Clearing the Air: Meeting the Needs of Consumers</i> . Eighteen people representing state officials, enforcement agencies, trade associations, and health/environmental organizations attended the 2-day conference, which examined all varieties of I/M programs, including test and repair, test only, and hybrid programs. ^a The intent of the conference was to give consumer representatives a list of consumer issues that are involved in any type of I/M program. The Coalition for Safer, Cleaner Vehicles reproduced 22 documents as handout materials for the participants at the conference, including various Office of Mobile Sources fact sheets, such as <i>Milestones in Auto Emissions Control</i> and <i>High-Tech Inspection and Maintenance Tests</i> , and a State and Territorial Air Pollution Program Administration Association of Local Air Pollution Control Officials publication entitled, <i>Mobile Source Control Strategies</i> .

^aTest-and-repair programs allow the facilities to make repairs in addition to inspecting the vehicles. Test only programs prohibit facilities from making any repairs. Hybrid programs include both types of facilities.

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