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Final Report on the Attitudinal Assessments of Motor Vehicle Inspection Station Personnel and Motor Vehicle Owners Towards the Rhode Island Inspection/Maintenance Program

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16. ABSTRACT This report gives the results of a study of Rhode Island's Inspection/Maintenance Program which was conducted in cooperation with The Rhode Island Lung Association. The study was based upon interviews with inspection station personnel and motor vehicle owners in the state. It evaluated the program in terms of public awareness, program quality, program deficiencies, inspection station quality and fee structure. The report findings will enable the Rhode Island Lung Association to make recommendations for enhancing and redirecting the program's public information campaign to detail its benefits. Key findings of the study were: (1) A preference for the private garage system by both groups; (2) A preference to have the State's "Challenge Station" issue inspection stickers for cars which it passes but were previously failed at a garage; (3) A majority of the inspection station personnel feeling that the inspection fee was too low; (4) The majority of the motor vehicle owners being unaware of the existence and purpose of the "Challenge Station".					
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FINAL REPORT ON THE ATTITUDINAL ASSESSMENTS
OF MOTOR VEHICLE INSPECTION STATION PERSONNEL
AND MOTOR VEHICLE OWNERS TOWARDS THE RHODE
ISLAND INSPECTION/MAINTENANCE PROGRAM
September, 1979

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EXECUTIVE SUMMARY

The State of Rhode Island began a mandatory vehicle safety and emissions inspection/maintenance (I/M) program January 1, 1979. The approximately 500,000 vehicles which are subject to the program are required, for a \$4 fee, to have the hydrocarbons and carbon monoxide in their exhausts measured and their safety equipment checked.

The Rhode Island Lung Association in conjunction with the Rhode Island Department of Environmental Management is conducting an educational public information campaign on the I/M program to create "... public understanding and cooperation ..." according to their jointly issued concord on the campaign. TRC - THE RESEARCH CORPORATION of New England was contracted by the EPA Region I office on behalf of the Rhode Island Lung Association to implement two phases of the campaign by conducting attitudinal assessments of motor vehicle inspection station personnel and motor vehicle owners.

TRC conducted in-person interviews of 99 motor vehicle inspection station personnel and telephone interviews of 300 motor vehicle owners during the month of April, 1979. These interviews were statistically valid and representative of their respective total populations.

The key findings and recommendations of the interviews are the following:

- Although 78% of the motor vehicle owners do not have or know anyone who has an illness aggravated by air pollution, 61% of them would describe Rhode Island's air quality problem as moderate or severe. Thirty-nine percent of the people say the government is responsible for achieving clean air; thirty-seven percent say industry is responsible and twenty-one percent say the public is. Industry is viewed as the major contributor to air pollution by a 46% plurality.

RECOMMENDATION: AN INCREASED PUBLIC EDUCATION PROGRAM SHOULD BE PREPARED AND IMPLEMENTED.

- A preference for the private garage system was voiced by a majority of the inspection station personnel and motor vehicle owners.

RECOMMENDATION: PRIVATE GARAGES SHOULD REMAIN AS OFFICIAL TESTING FACILITIES FOR THE INSPECTION/MAINTENANCE PROGRAM.

- Forty-four percent of the inspection station personnel and a sizeable majority of the motor vehicle owners believe that "hot stickers" can be obtained.

RECOMMENDATION: A PROGRAM SURVEILLANCE SYSTEM SHOULD BE DEVELOPED SO THAT IT IS MORE DIFFICULT FOR PEOPLE TO OBTAIN ILLEGAL OR "HOT STICKERS."

- The majority of the inspection station personnel (56%) and the motor vehicle owners (88%) prefer to have the Challenge Station issue the sticker for a vehicle which passes there but was previously failed at a garage.

RECOMMENDATION: STICKERS SHOULD BE ISSUED ON-THE-SPOT TO CARS WHICH PASS INSPECTION AT THE CHALLENGE STATION.

- The majority of the inspection station personnel had no strong objections to the State's overall required emissions testing training program and would be willing to demonstrate their proficiency through certification examinations before being licensed by the State. Many inspection station personnel thought the training course should have been longer to cover additional material such as fuel injection, maintenance problems and expanded attention to analyzer operations.

RECOMMENDATION: THE TRAINING COURSE SHOULD INCLUDE A PROFICIENCY TEST AS PREREQUISITE FOR BECOMING A CERTIFIED STATION INSPECTOR.

- Seventy-six percent of the inspection station personnel thought the \$4 fee was too low because it did not cover their costs. More than 50% of the inspection station personnel thought the \$4 fee encouraged shortened inspections and 40% thought the low fee encouraged unnecessary repairs.

RECOMMENDATION: A STUDY OF THE ACTUAL COST OF INSPECTIONS SHOULD BE UNDERTAKEN TO DETERMINE IF AN INCREASE IN THE FEE IS NECESSARY.

- Four and one-half percent of the motor vehicle owners reported that their cars failed the first inspection. The figure is low when compared with the overall failure rate of 21% recorded for the 1978 voluntary inspection program.

RECOMMENDATION: THE LOWER FAILURE RATE SHOULD BE INVESTIGATED BY THE STATE.

- The majority (71%) of the motor vehicle owners were unaware of the existence and purpose of the Challenge Station; forty-five percent found its hours inconvenient.

RECOMMENDATION: THE CHALLENGE STATION'S EXISTENCE SHOULD BE PUBLICIZED AND ITS HOURS EXPANDED.

- At the time of the interviews 70% of the inspection stations had not received the green I/M information cards.

RECOMMENDATION: NONE.

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SECTION 1

INTRODUCTION

Effective January 1, 1979, the State of Rhode Island began a mandatory vehicle safety and emissions inspection/maintenance (I/M) program. The program requires inspection of nearly all of the motor vehicles in the State weighing 8,000 lbs. or less. Exempted vehicles are those whose original sales date is less than twelve months prior to the first of the year (provided that they have not been driven over 12,000 miles), electric vehicles, motorcycles, trailers, those burning diesel fuel and those weighing over 8,000 lbs. Approximately 500,000 vehicles are subject to the program.

A check of all vehicle safety equipment and the measurement of vehicle exhaust emissions for hydrocarbons (HC) and carbon monoxide (CO) is required of each vehicle at one of the 792 Department of Transportation-licensed inspection stations throughout the State. Vehicles passing both tests, which are conducted for a fee of \$4, receive a windshield sticker. Reports on failure causes are given to owners of vehicles which do not pass. The owners have fourteen days in which to have the problem or problems corrected.

The Rhode Island Lung Association in conjunction with the Rhode Island Department of Environmental Management is conducting an educational public information campaign on the I/M program to create "... public understanding and cooperation..." according to their jointly issued concord on the campaign. Two phases of the plan to implement the campaign are separate attitudinal assessments of inspection station personnel and motor vehicle owners.

TRC - THE RESEARCH CORPORATION of New England was contracted by the EPA Region I office to conduct the attitudinal assessments for the Rhode Island Lung Association. The assessments were to evaluate the I/M program in terms of:

- Public awareness, understanding, cooperation and acceptance
- Program quality
- Program deficiencies previously identified by the Rhode Island Lung Association
- Competency and reliability of inspection stations
- Fee structure

The evaluation will enable the Rhode Island Lung Association to make recommendations for enhancing and redirecting the public information campaign

detailing the benefits of the program. They will also enable the RILA to make recommendations for augmenting or modifying the informational and operational aspects of the program.

SECTION 2

SUMMARY OF FINDINGS AND RECOMMENDATIONS

TASK I - ATTITUDINAL ASSESSMENT OF MOTOR VEHICLE INSPECTION STATION PERSONNEL
AND TASK II - ATTITUDINAL ASSESSMENT OF MOTOR VEHICLE OWNERS

Project Description

The project was divided into two major tasks. Task I - Attitudinal Assessments of Motor Vehicle Inspection Station Personnel - involved conducting 99 in-person interviews with inspection station owners, managers, mechanics or any combination of these categories. Task II - Attitudinal Assessments of Motor Vehicle Owners - was accomplished by completing randomly selected telephone calls to approximately three hundred motor vehicle owners whose automobiles should have been inspected since January 1, 1979.

General Findings

1. Sixty-two percent of the two-hundred and ninety-two motor vehicle owners interviewed indicated that they left their cars all day for inspection.
2. The inspection station personnel indicated that they handled 79% of their inspections by appointment.
3. Half of the motor vehicle owners feel that the I/M Program has been responsible for unnecessary repairs but 85% of them have never suspected that unnecessary repairs were performed on their vehicles as a result of the inspection. More than 40% of the inspection station personnel feel that the low fee encourages unnecessary repairs.

RECOMMENDATIONS: AN UNDERCOVER INVESTIGATION OF FRAUDULENT AUTO REPAIR PRACTICES SHOULD BE CONSIDERED AND CONDUCTED BY THE STATE TO DETERMINE IF THIS IS A PROBLEM OF SIGNIFICANCE.

Program Support Findings

1. The majority of the motor vehicle owners (88%) and the inspection station personnel (80%) feel that automobile emissions tests are important.

2. A preference for the private garage system, as opposed to a state-run or contractor-run system, was voiced by 69% of motor vehicle owners and 69% of inspection station personnel.

RECOMMENDATIONS: PRIVATE GARAGES SHOULD REMAIN AS OFFICIAL TESTING FACILITIES IN THE INSPECTION/MAINTENANCE PROGRAM.

Program Obstacle Findings

1. Nearly half of the inspection station personnel and a sizeable majority of the motor vehicle owners believe that "hot stickers" can be obtained. They feel that more thorough means of preventing cheating should be implemented.

RECOMMENDATIONS: PROGRAM SURVEILLANCE PROCEDURES SHOULD BE DEVELOPED SO THAT IT IS MORE DIFFICULT FOR PEOPLE TO OBTAIN ILLEGAL OR "HOT STICKERS." REQUIRING PROOF OF INSPECTION FOR REGISTRATION MAY BE ONE METHOD.

2. The majority of the inspection station personnel (56%) and the motor vehicle owners (88%) prefer to have the Challenge Station issue the sticker for a vehicle which passes there but was previously failed at a garage.

RECOMMENDATIONS: STICKERS SHOULD BE ISSUED ON-THE-SPOT TO CARS WHICH PASS INSPECTION AT THE CHALLENGE STATION.

TASK I - ATTITUDINAL ASSESSMENT OF MOTOR VEHICLE INSPECTION STATION PERSONNEL

General Findings

1. Sixty-five percent of inspection station personnel interviewed feel that automobile pollution is a threat to the health of Rhode Island residents.
2. There is an average of 2.5 people per station qualified to perform the emissions testing.
3. The average capital cost for an inspection station's emissions analyzer is \$2,149. The warm-up time for 25% of the analyzers is 11-20 minutes; for 38%, it is more than 20 minutes. Twenty-five percent of the stations leave their analyzers on all day. Seventy percent of the analyzers are calibrated weekly.
4. The inspection station personnel identified poorly tuned engines and carburetor problems as the causes of excessive auto emissions in 82%

of the cases. These statistics compare well with EPA national statistics on causes for excessive emissions.

5. Twenty-nine percent of the personnel reported that it required 21-30 minutes to perform the combined emissions and safety test; fifty-six percent reported a combined time of 30-60 minutes. According to 20% of the personnel, the emissions testing only required 0-3 minutes, 35% reported an average time of 4-5 minutes, 22% reported an average time of 5-10 minutes and 21% reported that the emissions testing required more than 11 minutes. The majority of the stations do not set a time limit for the inspections and do not feel that they interfere with their other activities.
6. The majority of the inspection station personnel reported that they issue a failure report to the vehicles' owners and keep a record of those reports. Most will make minor adjustments and not report a vehicle as having failed if those adjustments will allow the vehicle to pass the emissions tests.
7. The reporting form used in the 1978 voluntary emissions inspection program presented no problems to 58% of the personnel who felt it should be left as it is. The 39% of the personnel who had problems with the form described it as too lengthy or causing too much paper-work.
8. The majority of the personnel reports that 75% or more of the I/M business is from regular customers with 59% saying that the I/M program has been responsible for more business and 37% saying that the amount of business has remained the same. The personnel report that an average of 16% of their repair work comes from emissions repair work.
9. The majority of the personnel reports that their inspections are as stringent or more stringent now that the program is mandatory; they also say that they are not more lenient on inspections with regular customers than they are with infrequent customers. The majority also says that they are not reluctant to issue a failure report to a customer knowing that such a report could possibly result in the suspension of that person's automobile registration plates.

Program Support Findings

1. The majority of the personnel felt the state's training course adequately prepared them to perform the emissions tests. They had no strong objections to the overall program and 75% would be willing to demonstrate their proficiency through certification examinations before being licensed by the state. Thirty-seven percent of the

inspection station personnel thought that more time should have been spent in the training program. Their comments are included in Appendix B.

RECOMMENDATIONS: THE TRAINING COURSE SHOULD INCLUDE A PROFICIENCY TEST AS A PREREQUISITE FOR BECOMING A CERTIFIED STATION INSPECTOR. THE STATE SHOULD REVIEW THOSE AREAS HIGHLIGHTED IN THE ASSESSMENT BY THE INSPECTION STATION PERSONNEL AS AREAS FOR INCLUSION IN THE TRAINING PROGRAM.

2. Seventy-two percent of the stations report only personnel who have taken the state's emissions testing course are allowed to conduct the tests.

RECOMMENDATIONS: WHILE THE MAJORITY OF INSPECTIONS ARE PERFORMED BY TRAINED MECHANICS THE FACT THAT 28% ARE NOT SHOULD BE ADDRESSED BY THE STATE.

3. DOT inspectors visit the stations monthly say 52% of the station personnel with an additional 32% receiving visits more often than monthly. The inspectors were judged as competent by 69% of the personnel with the remaining personnel viewing them as either incompetent or some as competent and others as not. Unfamiliarity with the analyzer calibration procedures was the most common reason for incompetence.

RECOMMENDATIONS: DOT INSPECTORS SHOULD RECEIVE MORE THOROUGH TRAINING IN THE THEORY OF ANALYZER OPERATION AND CALIBRATION. IT WOULD BE IMPOSSIBLE TO EXPECT THEM TO BE FAMILIAR WITH EVERY ANALYZER CALIBRATION PROCEDURE CONSIDERING THE NUMBER OF DIFFERENT MAKES AND MODELS EMPLOYED. WITH THOROUGH THEORY TRAINING AND A REVIEW OF THE ANALYZER MANUAL AT THE STATION BEING INSPECTED, THE INSPECTOR SHOULD BE ABLE TO DETERMINE IF THE CALIBRATION IS BEING PERFORMED CORRECTLY.

Program Obstacles Findings

1. Seventy-six percent of the inspection station personnel thought the \$4 fee was too low and, on the average, thought the fee should be raised to \$8.40. Fifty-two percent of these same personnel thought the fee encouraged shortened inspections.

RECOMMENDATIONS: A STUDY OF THE ACTUAL COST OF INSPECTIONS SHOULD BE UNDERTAKEN. THIS STUDY SHOULD TAKE ACTUAL COSTS OF INSPECTION STATION OPERATIONS AND PERSONNEL INTO ACCOUNT BEFORE RECOMMENDING ANY NEW FEE.

2. Forty-four percent of the inspection station personnel urged more emphasis on training in areas such as: fuel injection, analyzer operations, maintenance problems and course reviews.

RECOMMENDATIONS: THE STATE TRAINING COURSE SHOULD CONTAIN AN EVALUATION COMPONENT TO GATHER DETAILED INFORMATION ON STATION PERSONNEL TRAINING NEEDS AND INCLUDE THESE NEEDS IN FUTURE TRAINING.

3. At the time of the interviews 70% of the stations had not received the green I/M information cards.
4. A comparison of the responses reveals several areas of significant differences between the stations which had failed less than 10% of the cars they tested for emissions during the voluntary program in 1978 and those which had a 10% or greater failure rate. These are addressed in the discussion section on Findings and Recommendations.

Table 1 summarizes the responses for all the inspection station personnel. Tables 2 and 3 summarize the responses of the stations according to the 1978 voluntary program, by those with a less than 10% failure rate and those with a greater than 10% failure rate, respectively.

TABLE 1. SUMMARY OF OVERALL RESPONSES OF INSPECTION STATION PERSONNEL

QUESTION NUMBER	QUESTION	RESPONSE			CONFIDENCE INTERVAL AT 95% LEVEL	TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER		
1	Respondent is:			Manager-7.1% Owner-23.2% Mechanic-28.3% Manager-Mechanic-9.1% Owner-Manager- Mechanic-31.3%		98
2	Do you feel automotive pollution is a threat to the health of RI residents?	64.6%	30.3%	Do not know-5.3%	.646 \pm .051	99
3	Do you feel the IM Program is an important step in curbing auto emissions?	79.8%	20.2%		.798 \pm .080	99
4	Do you feel the state's training program offered in the Fall of 1977 on emissions testing adequately trained you to perform the tests with confidence and accuracy?	81.8%	15.2%	Did not go-3%	.818 \pm .071	99
5	Do you think certain areas of the training program need more emphasis?	43.8%	56.3%	Did not know-5%	.4375 \pm .099	99
6a	How would you feel about having to take a test after the course to demonstrate your ability to do emissions testing before being licensed by the State?	72.9%	21.9%	Do not know-5.2%		99
6b	How would you feel about an annual recertification test?	3.3%	64.6%	Do not know-4.2%		98
7	Do you think courses should be conducted on repair problems which cause vehicle inspection failure?	36.5%	63.5%		.365 \pm .096	96
8	Are there any aspects of the emissions testing program to which you object strongly?	27.3%	72.7%		.273 \pm .089	99
9a	How many qualified people do you have to run the tests?			2.5 people/station Range: 1-8 people/ station		99
9b	Do only personnel who have taken the emissions testing course conduct emissions tests?	71.7%	28.3%		.717 \pm .089	99

TABLE 1. SUMMARY OF OVERALL RESPONSES OF INSPECTION STATION PERSONNEL (Continued)

QUESTION NUMBER	QUESTION	RESPONSE			CONFIDENCE INTERVAL AT 95% LEVEL	TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER		
10a	What make and model instrument do you use for your emissions testing?			See Appendix C		99
10b	What was the cost of the instrument?			\$2,149 x 95 stations Range: \$900 to \$7,000		95
10c	How long is the instrument warmed up before you proceed with the inspection?			0-5 - 4% 6-10 - 7.1% 11-20 - 25.3% 20+ min. - 38.4% Left on all day-24.2% Do not know-1%		98
6 10d	How frequently do you calibrate it?			Every day-9.1% Every other day-1% Twice a week-3.0% Every week-79% Every other week-4.0% Every month-3.0% Every test-1%		
10e	Are you happy with it?	86.9%	13.1%		.869 ± .066	99
11	On a scale of 1-5, from very easy to very difficult to use, rate your instrument. (1 = Very Easy, 5 = Very Difficult)			1 - 77.8% 2 - 14.1% 3 - 7.1% 4 - 1.0% 5 - 0.0%		99
12	When a car which you failed is passed by the "Challenge Station" whom would you prefer to issue the sticker, your garage or the "Challenge Station"?			Garage-34.3% Challenge Station-55.6% Do not care-10.1%		99
13	What do you see as the major cause of excessive auto emissions?			Poorly tuned engine-33.6% Malfunctioning emission control devices-7.8% Broken valves/rings-6.3% Carburetor-49.8% Other-3.1%		97

TABLE 1. SUMMARY OF OVERALL RESPONSES OF INSPECTION STATION PERSONNEL (Continued)

QUESTION NUMBER	QUESTION	RESPONSE			CONFIDENCE INTERVAL AT 95% LEVEL	TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER		
14	If you feel a minor adjustment will allow a vehicle to pass the emissions test, will you make the adjustment without having reported the vehicle as having initially failed?	88.9%	10.1%	Do not know-1%	.889 + .059	99
15a	How long does it take to perform an emissions and safety test and record the results?			0-10 min - 1% 11-20 min - 6.1% 21-30 min - 29.3% 30-60 min - 55.6% 60+ min. - 6.1%		97
15b	Emissions only?			0-3 - 20.2% 4-5 - 35.4% 5-10 - 22.2% 11+ min. - 21.2% Do not know-1%		98
16	What percentage of your inspections are handled by appointment?			78.5%		96
17a	Does the station set a time limit for the inspection test?	19.2%	80.8%		.192 + .078	99
17b	If YES, how much?			1 hour		15
18a	Is the \$4 fee adequate to cover the cost of the emission/safety inspection?	23.2%	75.8%	Do not know-1%	.232 + .088	98
18b	If NOT, what should it be?			\$8.40 avg Range: \$5.00 to \$20.00		70
18c	Does the low fee encourage stations to shorten inspections?	51.5%	43.4%	Do not know-5.1%		99
18d	Does the low fee encourage stations to make unnecessary repairs?	40.4%	54.5%	Do not know-5.1%		99
19	When was the last time a DOT inspector paid you a visit?			Today-1% 1 day ago-4% 2 days ago-2% 3 days ago-4%		96

TABLE 1. SUMMARY OF OVERALL RESPONSES OF INSPECTION STATION PERSONNEL (Continued)

QUESTION NUMBER	QUESTION	RESPONSE			CONFIDENCE INTERVAL AT 95% LEVEL	TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER		
19 Cont'd				1 week ago-42.4% 2 weeks ago-23.2% 3 weeks ago-11.1% 1 month ago-6.1% 2 months ago-2% 3 months ago-1%		
20a	How frequently do DOT inspectors check your station?			Weekly-7.1% Every two weeks-25.3% Every three weeks-8.1% Monthly-56.6%		96
20b	How do you perceive the competence of the DOT inspectors?			Competent-68.7% Incompetent-17.2% Some were and some were not-11.1%		96
21a	Do you issue a failure report with the results to the owner of a vehicle which has failed the emissions test?	85.9%	9.1%	No response-5%	.859 \pm .055	99
21b	Do you keep a record of these failures?	85.8%	7.1%	No response-7.1%	.858 \pm .049	99
22a	Did the voluntary emissions report form present any problems to complete?	39.4%	57.6%	3% other responses	.394 \pm .096	96
22b	If in the future, the state requires documentation of the test, how would you improve the form?			See Appendix B, Question 22b		89
23	What approach would you prefer to the inspections and repairs?			Inspection by State owned stations with private garages handling the repairs-27.3% Inspection by contractors to the State with private garages handling the repairs-2% Inspections and repairs by private garages-68.7%		97

TABLE 1. SUMMARY OF OVERALL RESPONSES OF INSPECTION STATION PERSONNEL (Continued)

QUESTION NUMBER	QUESTION	RESPONSE			CONFIDENCE INTERVAL AT 95% LEVEL	TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER		
24	Does IM interfere with other activities?	13.1%	85.9%		.131 + .066	98
25a	What percentage of your IM business is from regular customers (those who patronize the station - gas, oil, repairs and routine servicing on a frequent basis)?			0-25% - 2% 26-50% - 7.1% 51-75% - 24.2% 75+ - 63.6%		96
25b	How much of your business comes from emissions repair work?			16.25% Range: 1.0% to 100%		90
26	Has IM been responsible for more business, less business, or the same amount?			More-58.6% Less-1% Same-37.4% Do not know-3%		99
12 27	Are your inspections more or less stringent now that the program is mandatory?			More-45.5% Less-1% Same-53.5%		99
28	Is the industry more lenient with regular customers than with infrequent customers?	25.3%	71.7%		.253 + .085	96
29	If you know or feel a customer's registration plate will be suspended if you issue a failure report, will you be more lenient with their inspection, or more reluctant to fill out a report?	5.1%	90.9%	Do not know-4%	.051 + .043	99
30	How many people who fail emission inspections have their repairs performed here?			85.8%		93
31	How easy is it for a person to obtain an improper or "hot sticker" for a car that fails an emissions test or is not inspected?			Easy-42.4% Hard-45.5% Do not know-12.1%		99
32a	Have you received the Green IM card?	29.3%	70.7%		.293 + .092	99
32b	Are you distributing them to your customers?	79.3%	6.9%			25
32c	How useful is the card?			Useful-58.6% Useless-3.4% Do not know-38.0%		25

TABLE 2. SUMMARY OF RESPONSES OF INSPECTION STATION PERSONNEL AT STATIONS WITH
GREATER THAN 10% FAILURE RATE*

QUESTION NUMBER	QUESTION	RESPONSE			TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER	
1	Respondent is:			Manager-6.3% Owner-23.8% Mechanic-28.8% Manager-Mechanic-8.8% Owner-Manager- Mechanic-32.5%	80
2	Do you feel automotive pollution is a threat to the health of RI residents?	64.2%	30.9%	Other responses-4.9%	77
3	Do you feel the IM Program is an important step in curbing auto emissions?	80.2%	19.8%		81
4	Do you feel the state's training program offered in the Fall of 1977 on emissions testing adequately trained you to perform the tests with confidence and accuracy?	80.2%	16.0%		78
5	Do you think certain areas of the training program need more emphasis?	46.2%	53.8%		78
6a	How would you feel about having to take a test after the course to demonstrate your ability to do emissions testing before being licensed by the State?	70.4%	22.2%	Other responses-7.4%	75
6b	How would you feel about an annual recertification test?	29.6%	63.0%		75
7	Do you think courses should be conducted on repair problems which cause vehicle inspection failure?	34.6%	61.7%		78
8	Are there any aspects of the emissions testing program to which you object strongly?	29.6%	70.4%		81
9a	How many qualified people do you have to run the tests?			2.5 people/station Range: 1-8 people/station	81
9b	Do only personnel who have taken the emissions testing course conduct emissions tests?	70.4%	29.6%		81

*Based upon 1978 voluntary emissions inspection program.

TABLE 2. SUMMARY OF RESPONSES OF INSPECTION STATION PERSONNEL AT STATIONS WITH
GREATER THAN 10% FAILURE RATE (Continued)

QUESTION NUMBER	QUESTION	RESPONSE			TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER	
10a	What make and model instrument do you use for your emissions testing?			See Appendix C	81
10b	What was the cost of the instrument?			\$2,224 Aug/78 stations Range: \$900 to \$7,000	78
10c	How long is the instrument warmed up before you proceed with the inspection?			0-5 - 2.5% 6-10 - 6.2% 11-20 - 27.2% 20+ min. - 37.0% Left on all day-25.9%	80
10d	How frequently do you calibrate it?			Every day-11.1% Every other day-1.2% Twice a week-2.5% Every week-76.6% Every other week-4.9% Every month-3.7%	81
10e	Are you happy with it?	84.0%	16.0%		81
11	On a scale of 1-5, from very easy to very difficult to use, rate your instrument. (1 = Very Easy, 5 = Very Difficult)			1 - 77.8% 2 - 14.8% 3 - 6.2% 4 - 1.2% 5 - 0%	81
12	When a car which you failed is passed by the "Challenge Station" whom would you prefer to issue the sticker, your garage or the "Challenge Station"?			Garage-34.6% Challenge-54.3%	72
13	What do you see as the major cause of excessive auto emissions?			Poorly tuned engine-36.1% Malfunctioning emission control devices-0% Broken valves/rings-7.2% Carburetor-53.6% Other-3.1%	80
14	If you feel a minor adjustment will allow a vehicle to pass the emissions test, will you make the adjustment without having reported the vehicle as having initially failed?	88.9%	9.9%		

TABLE 2. SUMMARY OF RESPONSES OF INSPECTION STATION PERSONNEL AT STATIONS WITH
GREATER THAN 10% FAILURE RATE (Continued)

QUESTION NUMBER	QUESTION	RESPONSE			TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER	
15a	How long does it take to perform an emissions and safety test and record the results?			0-10 - 1.2% 11-20 - 4.9% 21-30 - 30.9% 30-60 - 55.6% 60+ min. - 4.9%	79
15b	Emissions only?			0-3 - 22.2% 4-5 - 35.8% 5-10 - 21.0% 11+ min. - 19.8%	80
16	What percentage of your inspections are handled by appointment?			76.9%	78
17a	Does the station set a time limit for the inspection test?	18.5%	81.5%		81
17b	If YES, how much?			1 hour	12
18a	Is the \$4 fee adequate to cover the cost of the emission/safety inspection?	22.2%	77.8%		81
18b	If NOT, what should it be?			\$8.82 Range: \$5.00 to \$18.00	59
18c	Does the low fee encourage stations to shorten inspections?	49.4%	48.1%		79
18d	Does the low fee encourage stations to make unnecessary repairs?	38.3%	59.2%		79
19	When was the last time a DOT inspector paid you a visit?			Today-1% 1 day ago-4.9% 2 days ago-2.5% 3 days ago-4.9% 1 week ago-44.4% 2 weeks ago-18.5% 3 weeks ago-12.3% 1 month ago-6.2% 2 months ago-2.5% 3 months ago-1.2%	79
20a	How frequently do DOT inspectors check your station?			Weekly-6.2% Every two weeks-24.7% Every three weeks-9.9% Monthly-55.6%	78

TABLE 2. SUMMARY OF RESPONSES OF INSPECTION STATION PERSONNEL AT STATIONS WITH
GREATER THAN 10% FAILURE RATE (Continued)

QUESTION NUMBER	QUESTION	RESPONSE			TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER	
20b	How do you perceive the competence of the DOT inspectors?			Competent-66.7% Incompetent-18.5% Some were and some we not-11.1%	78
21a	Do you issue a failure report with the results to the owner of a vehicle which has failed the emissions test?	86.4%	9.9%		78
21b	Do you keep a record of these failures?	86.4%	7.4%		76
22a	Did the voluntary emissions report form present any problems to complete?	39.5%	58.0%		79
22b	If in the future, the state requires documentation of the test, how would you improve the form?			Delete-13.6%, Shorten- 29.6%, Consolidate- 13.6%, Wouldn't change- 34.6%, Make it more specific-1.2%	75
23	What approach would you prefer to the inspections and repairs?			Inspection by State owned stations with private garages handling the repairs -24.7% Inspection by contrac- tors to the State with private garages han- dling the repairs-2.5% Inspections and repairs by private garages- 70.4%	79
24	Does IM interfere with other activities?	13.6%	85.2%		80
25a	What percentage of your IM business is from regular customers (those who patronize the station - gas, oil, repairs and routine servicing on a frequent basis)?			0-25 - 1.2% 26-50 - 8.6% 51-75 - 25.9% 75+ - 61.7%	79

TABLE 2. SUMMARY OF RESPONSES OF INSPECTION STATION PERSONNEL AT STATIONS WITH
GREATER THAN 10% FAILURE RATE (Continued)

QUESTION NUMBER	QUESTION	RESPONSE			TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER	
25b	How much of your business comes from emissions repair work?			16.2% Range: 1-10%	73
26	Has IM been responsible for more business, less business, or the same amount?			More-58.0% Same-40.7%	80
27	Are your inspections more or less stringent now that the program is mandatory?			More-43.2% Less-1.2% Same-55.6%	81
28	Is the industry more lenient with regular customers than with infrequent customers?	25.9%	72.8%		80
29	If you know or feel a customer's registration plate will be suspended if you issue a failure report, will you be more lenient with their inspection, or more reluctant to fill out a report?	6.17%	92.6%		80
30	How many people who fail emission inspections have their repairs performed here?			85.8%	76
31	How easy is it for a person to obtain an improper or "hot sticker" for a car that fails an emissions test or is not inspected?			Easy-44.4% Hard-43.2% Do not know-12.3%	81
32a	Have you received the Green IM card?	28.4%	71.6%		81
32b	Are you distributing them to your customers?	87.0%	4.3%		21
32c	How useful is the card?			Useful-60.9% Useless-4.3%	21

TABLE 3. SUMMARY OF RESPONSES OF INSPECTION STATION PERSONNEL AT STATIONS WITH
LESS THAN 10% FAILURE RATE*

QUESTION NUMBER	QUESTION	RESPONSE			TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER	
1	Respondent is:			Manager-11.1% Owner-22.2% Mechanic-27.8% Manager-Mechanic-11.1% Owner-Manager- Mechanic-27.8%	18
2	Do you feel automotive pollution is a threat to the health of RI residents?	66.7%	27.8%		17
3	Do you feel the IM Program is an important step in curbing auto emissions?	77.8%	22.2%		18
4	Do you feel the state's training program offered in the Fall of 1977 on emissions testing adequately trained you to perform the tests with confidence and accuracy?	88.9%	11.1%		18
5	Do you think certain areas of the training program need more emphasis?	33.3%	66.7%		18
6a	How would you feel about having to take a test after the course to demonstrate your ability to do emissions testing before being licensed by the State?	72.2%	16.7%		16
6b	How would you feel about an annual recertification test?	33.3%	61.1%		17
7	Do you think courses should be conducted on repair problems which cause vehicle inspection failure?	38.9%	61.1%		18
8	Are there any aspects of the emissions testing program to which you object strongly?	16.7%	83.3%		18
9a	How many qualified people do you have to run the tests?			2.4 people/station Range: 1-5 people/station	18
9b	Do only personnel who have taken the emissions testing course conduct emissions tests?	77.8%	22.2%		18

*Based upon 1978 voluntary emissions inspection program.

TABLE 3. SUMMARY OF RESPONSES OF INSPECTION STATION PERSONNEL AT STATIONS WITH
LESS THAN 10% FAILURE RATE. (Continued)

QUESTION NUMBER	QUESTION	RESPONSE			TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER	
10a	What make and model instrument do you use for your emissions testing?			See Appendix C	18
10b	What was the cost of the instrument?			\$1,805.00 Range: \$1,000 to \$6,000	18
10c	How long is the instrument warmed up before you proceed with the inspection?			0-5 - 11.1% 6-10 - 11.1% 11-20 - 16.7% 20+ min. - 44.4% Left on all day-16.7%	18
10d	How frequently do you calibrate it?			Twice a week-5.5% Every test-5.5% Every week-88.9%	18
10e	Are you happy with it?	100%			18
11	On a scale of 1-5, from very easy to very difficult to use, rate your instrument. (1 = Very Easy, 5 = Very Difficult)			1 - 77.8% 2 - 11.1% 3 - 11.1% 4 - 0% 5 - 0%	18
12	When a car which you failed is passed by the "Challenge Station" whom would you prefer to issue the sticker, your garage or the "Challenge Station"?			Garage-33.3% Challenge-61.1%	17
13	What do you see as the major cause of excessive auto emissions?			Poorly tuned engine-38.0% Malfunctioning emission control devices-0% Broken valves/rings-4.8% Carburetor-52.4% Other-4.8%	18
14	If you feel a minor adjustment will allow a vehicle to pass the emissions test, will you make the adjustment without having reported the vehicle as having initially failed?	88.9%	11.1%		

TABLE 3. SUMMARY OF RESPONSES OF INSPECTION STATION PERSONNEL AT STATIONS WITH
LESS THAN 10% FAILURE RATE (Continued)

QUESTION NUMBER	QUESTION	RESPONSE			TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER	
15a	How long does it take to perform an emissions and safety test and record the results?			0-10 - 0% 11-20 - 11.1% 21-30 - 22.2% 30-60 - 55.5% 60+ min. - 11.1%	79
15b	Emissions only?			0-3 - 11.1% 4-5 - 33.3% 5-10 - 27.8% 11+ min. - 27.8%	18
16	What percentage of your inspections are handled by appointment?			85.7%	18
17a	Does the station set a time limit for the inspection test?	22.2%	77.8%		18
17b	If YES, how much?			1 hour	3
18a	Is the \$4 fee adequate to cover the cost of the emission/safety inspection?	27.8%	66.7%		17
18b	If NOT, what should it be?			\$8.82 Range: \$6.00 to \$20.00	11
18c	Does the low fee encourage stations to shorten inspections?	61.1%	22.2%		15
18d	Does the low fee encourage stations to make unnecessary repairs?	50.0%	33.3%		15
19	When was the last time a DOT inspector paid you a visit?			Today-5.6% 1 week ago-33.3% 2 weeks ago-44.4% 3 weeks ago-5.6% 1 month ago-5.6%	15
20a	How frequently do DOT inspectors check your station?			Weekly-11.1% Every two weeks-27.8% Monthly-61.1%	78
20b	How do you perceive the competence of the DOT inspectors?			Competent-77.8% Incompetent-11.1% Some were and some were not-11.1%	18

TABLE 3. SUMMARY OF RESPONSES OF INSPECTION STATION PERSONNEL AT STATIONS WITH
LESS THAN 10% FAILURE RATE (Continued)

QUESTION NUMBER	QUESTION	RESPONSE			TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER	
21a	Do you issue a failure report with the results to the owner of a vehicle which has failed the emissions test?	83.3%	5.6%		16
21b	Do you keep a record of these failures?	83.3%	5.6%		16
22a	Did the voluntary emissions report form present any problems to complete?	38.9%	55.6%		17
22b	If in the future, the state requires documentation of the test, how would you improve the form?			Delete-11.1%, Shorten-22.2%, Consolidate-16.7%, Would not change it-33.3%	15
23	What approach would you prefer to the inspections and repairs?			Inspection by State owned stations with private garages handling the repairs -38.9%	18
				Inspection by contractors to the State with private garages handling the repairs-0.0%	
				Inspections and repairs by private garages-61.1%	
24	Does IM interfere with other activities?	11.1%	88.9%		18
25a	What percentage of your IM business is from regular customers (those who patronize the station - gas, oil, repairs and routine servicing on a frequent basis)?			0-25 - 5.56% 26-50 - 0% 51-75 - 16.7% 75+ - 72.2%	17
25b	How much of your business comes from emissions repair work?			17% Range: 5-40%	17
26	Has IM been responsible for more business, less business, or the same amount?			More-61.1% Same-5.6% Same-2.2% Do not know-1.1%	18

TABLE 3. SUMMARY OF RESPONSES OF INSPECTION STATION PERSONNEL AT STATIONS WITH
LESS THAN 10% FAILURE RATE (Continued)

QUESTION NUMBER	QUESTION	RESPONSE			TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER	
27	Are your inspections more or less stringent now that the program is mandatory?	<u>MORE</u> 55.6%	<u>LESS</u> 44.4%		18
28	Is the industry more lenient with regular customers than with infrequent customers?	22.2%	66.7%		16
29	If you know or feel a customer's registration plate will be suspended if you issue a failure report, will you be more lenient with their inspection, or more reluctant to fill out a report?		83.3%		15
30	How many people who fail emission inspections have their repairs performed here?			86.9%	17
31	How easy is it for a person to obtain an improper or "hot sticker" for a car that fails an emissions test or is not inspected?			Easy-33.3% Hard-55.6%	18
32a	Have you received the Green IM card?	33.3%	66.7%		18
32b	Are you distributing them to your customers?	50.0%	16.7%		4
32c	How useful is the card?			Useful-50%	3

TASK II - ATTITUDINAL ASSESSMENT OF MOTOR VEHICLE OWNERS

General Findings

1. Although 78% of the motor vehicle owners do not have or know anyone who has an illness aggravated by air pollution, 61% of them would describe Rhode Island's air quality problem as moderate or severe. Thirty-nine percent of the people interviewed think the government is responsible for achieving clean air; 37% think it is primarily industry's responsibility, and 21% think private citizens should be most responsible. Industry is viewed as the major contributor to air pollution by a plurality of those interviewed (46%). Twenty-six percent of the people think that cars are the major air polluters and 23% think that buses and trucks are.

RECOMMENDATIONS: AN INCREASED PUBLIC EDUCATION PROGRAM SHOULD BE PREPARED AND IMPLEMENTED. FOCUS SHOULD BE ON AIR POLLUTION PROBLEMS TO SERVE TO ENLIGHTEN THE PUBLIC OF THEIR CONTRIBUTION TO AIR POLLUTION BY DRIVING POORLY MAINTAINED AUTOMOBILES. STRESS SHOULD BE PLACED ON THE FACT THAT AUTOMOBILES ARE SIGNIFICANT SOURCES OF AIR POLLUTION AND THAT THE PUBLIC IS EQUALLY RESPONSIBLE FOR CLEANING UP THE AIR POLLUTION PROBLEM AS ARE INDUSTRY AND GOVERNMENT. IN ADDITION, THE PUBLIC SHOULD BE MADE AWARE THAT A PROPERLY TUNED VEHICLE NOT ONLY CONTRIBUTES LESS TO AIR POLLUTION, BUT ALSO IS MORE ECONOMIC TO OPERATE DUE TO MORE EFFICIENT COMBUSTION.

2. Ninety-two percent feel the \$4 is entirely reasonable. Some believe the inspections should be free of charge, while others are willing to pay any charge to a maximum of \$50.
3. Only two respondents resent the government's involvement in this program and think that the government should place more pressure on automobile manufacturers to design cars with lower air pollution potential rather than placing the burden on the public.
4. The majority of the people brought their cars to their regularly patronized garage and feel that the people conducting the inspections are competent. Of the two-hundred and ninety-two responses, seventy-two owners (25%) had not had their automobiles inspected since the I/M program became effective on January 1, 1979. Half of the respondents would not offer reasons; the majority of the remaining respondents had legitimate reasons such as: ignorance of the program, having just purchased a car and their inspection time not being due yet (see Table 10).
5. Eighty-one percent of the respondents whose cars had been inspected by the time of the survey had taken their automobiles to a garage less than five miles from their residence. Sixty-nine percent took

their cars to their regular garages. Of the people who had their cars inspected, 95% passed the test the first time. An average of 1.4 inspections were needed for the cars that had failed initially.

6. Four and one-half percent of the motor vehicle owners interviewed reported their cars failed the first inspection. This figure is low when compared with the overall failure rate of 21% obtained by EPA in 1978 and may be attributable to the inspection garage people making the minor repairs on vehicles which fail.

RECOMMENDATIONS: THE LOWER THAN PREVIOUSLY REPORTED FAILURE RATE OBTAINED AS A RESULT OF THE PUBLIC ASSESSMENT (4.5% AS OPPOSED TO 21%) SHOULD BE INVESTIGATED BY THE STATE.

Program Support Findings

1. Respondents (approximately 10%) have commented that they are happy to see the government taking a role in reducing automobile-related air pollution.
2. Eighty-six percent of the respondents were aware of the mandatory emissions/safety inspection program. The majority of the motor vehicle owners (88%) feel that automobile tests are important.

Program Obstacles Findings

1. The majority of the people interviewed were unaware of the existence and purpose of the Challenge Station.

RECOMMENDATIONS: THE APPROPRIATE STATE AGENCIES AND ORGANIZATIONS SHOULD PUBLICIZE THE CHALLENGE STATION FURTHER. SINCE IT IS DESIGNED TO BE A CONSUMER SAFEGUARD, IT IS IMPORTANT THAT THE PUBLIC BE MADE AWARE OF ITS EXISTENCE.

2. The presently scheduled Challenge Station operating hours are not convenient for 45.2% of the motor vehicle owners questioned. Of these, 23.5% prefer that evening hours be added and 16.3% prefer that Saturday hours be made available for the retests.

RECOMMENDATIONS: THE CHALLENGE STATION HOURS SHOULD BE EXPANDED ON A TRIAL BASIS TO INCLUDE AT LEAST ONE EVENING PER WEEK AND/OR SATURDAY MORNINGS.

3. Eighty-eight percent of the public interviewed thought the Challenge Station should issue stickers.

RECOMMENDATIONS: THE CHALLENGE STATION SHOULD ISSUE THE STICKERS TO CARS THAT DO PASS THE INSPECTIONS THERE.

4. Fourteen percent of the motor vehicle owners were not aware that their auto emissions had to be tested. Of the 86% who were aware, 54% learned of the requirement through mass media - radio, tv and newspapers.

RECOMMENDATIONS: AN OFFICIAL AND UNIFORM MEANS OF NOTIFICATION FOR THE I/M INSPECTIONS SHOULD BE IMPLEMENTED. THIS COULD BE ACCOMPLISHED IN CONJUNCTION WITH REGISTRATION NOTICES.

5. A substantial portion of the public was not aware that emissions tune-ups also would save them gasoline.

RECOMMENDATIONS: THE PUBLIC INFORMATION CAMPAIGN SHOULD STRESS THE ENERGY CONSERVATION ASPECTS OF I/M.

Table 4 summarizes the interview responses of the motor vehicle owners. Appendix E contains a summary of comments made by the motor vehicle owners when asked about their likes and dislikes for suggestions to the I/M program.

TABLE 4. SUMMARY OF RESPONSES OF MOTOR VEHICLE OWNERS

QUESTION NUMBER	QUESTION	RESPONSE			CONFIDENCE INTERVAL AT 95% LEVEL	TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER		
1	Do you own and drive a registered automobile?	100%				292
2	What year model is it?			1979-3.1% 1977-78-19.2% 1973-76-40.8% 1970-72-24.3% Earlier than 1970-13.7%		295
3a	What is the car's average annual mileage?			10,000		260
3b	What is the car's average present mileage?			44,000		
4	Are you aware that your car's exhaust must be tested for air pollution? If yes:	85.6%	14.4%			292
	How did you become aware of the emissions inspection program?			By having car inspected-26% Word of mouth-10.4% Newspaper-34.4% Gas station-10.4% Radio-9.6% TV-10.4% DOT notice-8.8% Other-4.4%		
5	Do you think that exhaust emissions tests on automobiles are important?	87.5%	8.7%	Don't car-8.8%	.875 \pm .032	292
6	Has your car been inspected since January of this year? If no, why not?	76.7%	23.3%		.767 \pm .048	288
	If yes:			See Table 10		
	Did you get the results?	57.9%	26.2%		.579 \pm .051	186
	Would you like to know the results of the test?	47.1%	10.8%		.471 \pm .041	150
7a	How far did you travel for the emission test?			Less than 5 miles-81% 5-10 miles-10.4% 10-15 miles-9.0% More than 15 miles-1.8%		207
7b	What is the maximum distance you should have to travel for this test?			Avg. of 6.9 miles		159

TABLE 4. SUMMARY OF RESPONSES OF MOTOR VEHICLE OWNERS (Continued)

QUESTION NUMBER	QUESTION	RESPONSE			CONFIDENCE INTERVAL AT 95% LEVEL	TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER		
8a	Did your car pass or fail the initial test?			P-95%, F-4.5%		220
8b	If the car failed, how many tests were required before the car passed?			Av. of 1.4		10
9a	Have you ever suspected that unnecessary repairs were made on your car as a result of an inspection?	10.9%	85.0%		.109 \pm .017	211
9b	If your car was adjusted to pass the test, have you had any problems with the car's performance?	5.6%	56.4%		.056 \pm .023	136
10	Do you think that the State should set a limit for repairs costs to get the car to pass the inspection?	55.0%	37.7%		.055 \pm .019	204
11	Do you think it's possible for someone to get a sticker for a car that failed the test?	77.7%	17.7%		.777 \pm .049	210
12a	Was the inspection conducted at a garage which you patronize, frequently, infrequently or never?			Frequently-69.4% Infrequently-21.5% Never-7.3%		215
12b	Do you feel that the inspection personnel were competent?	90.0%	4.6%	Do not know-5.4%	.9 \pm .009	189
13a	Do you think the \$4 inspection fee is reasonable?	92.2%	6.8%		.922 \pm .033	217
13b	What is the most you should have to pay for the inspection?			Avg.-\$5.20 Range \$0.00 to \$50.00		195
13c	Do you think the \$4 fee is so low that it encourages stations to shorten inspections?	27.6%	58.5%	Do not know-13.9%	.276 \pm .053	187
14	Do you think the inspection program has increased the problem of auto repair fraud of unnecessary repairs?	50.2%	33.6%	Do not know-16.2%	.502 \pm .055	217

TABLE 4. SUMMARY OF RESPONSES OF MOTOR VEHICLE OWNERS (Continued)

QUESTION NUMBER	QUESTION	RESPONSE			CONFIDENCE INTERVAL AT 95% LEVEL	TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER		
15	How long did you have to wait to have your car inspected?			Done immediately-15.7% Less than 15 min-.9% 15 min to 1/2 hour-4.1% 1/2 hr to 1 hr-5.1% More than 1 hr-5.5% Left the car the day-62.2%		217
16	How long did the actual inspection take?			15 min or less-6.5% 15 min to 1/2 hr-12.0% 1/2 hr to 1 hr-9.2% Long than 1 hr-9.2% Do not know-63.1%		217
17a	Several states have had the inspection program working for some time. Some states have found that state-run inspection stations are effective while others are satisfied with the work of private contractors or independent garages. If you had a choice, who would you rather have your car inspected by?			State-run garage-13.8% Private garage-68.7% A 3rd party hired by the state that would not make repairs-15.2%		212
17b	Would you feel more protected if the testing was separated from repair work?	48.8%	41.9%		.488 \pm .06	174
18a	Are you aware of the state run "Challenge Station" where you can double check the results of a garage inspection?	27.6%	71.0%		.176 \pm .059	214
18b	If you wanted to get your car checked by a "Challenge Station" would it be convenient for you to get there between 7:30 a.m. to 3:30 p.m., Monday through Friday?	52.5%	45.2%	Other times: Open on Saturday-16.3% Open evenings-23.5% Open early morning-1%	.525 \pm .077	212 40
19	Do you think the "Challenge Station" should issue the sticker if you pass the test, rather than having to go back to the inspection garage?	88%	9.2%		.88 \pm .0-38	211
20	Do you think that 14 days is enough time to have your car repaired and retested?	71%	27.6%		.71 \pm .059	214

TABLE 4. SUMMARY OF RESPONSES OF MOTOR VEHICLE OWNERS (Continued)

QUESTION NUMBER	QUESTION	RESPONSE			CONFIDENCE INTERVAL AT 95% LEVEL	TOTAL NO. OF RESPONDENTS
		YES	NO	OTHER		
21a	Do you, a relative or anyone you know have a respiratory illness aggravated by air pollution?	20.4%	77.6%		.204 \pm .053	221
21b	Who do you think is most responsible for cleaning up the air?			Private citizen-20.7% Industry-37.4% Government-38.9%		221
21c	What do you think contributes most to air pollution?			Cars-26.4% Buses & trucks-23.3% Industry-45.8% Other-2.8%		221
22	How would you describe the seriousness of Rhode Island's air quality problem?			No problem-9.5% Slight problem-24.9% Moderate problem-46.5% Severe problem-14.5%		187
23	Do you believe that the Inspection Maintenance Program will save you money by increasing gas mileage as well as decreasing air pollution?	52.1%	34.7%		.521 \pm .060	219
24	This program has been labeled "improved." Do you think that this year's inspection system is better than last year's.			Better-33.8% Same-35.1% Worse-2.3% Do not know-28.8%		219
25	What do you like and dislike about the program?			See Appendix E		
26a	If you had to classify your household income before taxes, would it be:			0-\$9,999-20.6% \$10,000-19,999-29% \$20,000-49,999-13.1% Above \$50,000-3.3%		119
26b	What is your age?			Avg. 46 years		181
26c	What is your occupation?			See Table 11		

SECTION 3

METHODOLOGY

GENERAL

Questionnaires for the motor vehicle inspection station personnel and the motor vehicle owners attitudinal assessments were drafted incorporating the directions, data, and information of the EPA and the Rhode Island Lung Association. The questionnaires were revised according to the comments and suggestions offered by the EPA Task Officer, the Rhode Island Lung Association, the Rhode Island Department of Transportation and the Rhode Island Department of Environmental Protection personnel prior to conducting preliminary interviews.

Preliminary interviews were conducted for both tasks. Ten were conducted for the inspection station personnel and thirty were conducted for the motor vehicle owners. The purpose of the preliminary interviews was to evaluate the questions for clarity, to screen ambiguous ones, to identify areas which had not been covered and to assess the types of responses interviewers could expect in order to refine the questionnaires for responsive and comprehensive interviews. When the preliminary interviews were completed, final revisions were incorporated in the questionnaires and the principal interviews were conducted.

Appendices A and D contain finalized copies of the questionnaires.

TASK I - ATTITUDINAL ASSESSMENT OF INSPECTION STATION PERSONNEL

A master list of the Rhode Island Inspection stations was obtained from the Rhode Island Department of Transportation. A team of two TRC Technical Specialists randomly chose ten Providence, R.I. inspection stations from that list for preliminary interviews and conducted the interviews on April 5 and 6, 1979. After the questionnaire underwent a final revision, teams of TRC Technical Specialists conducted ninety-nine interviews of inspection station personnel. A three-member team conducted fifty-eight interviews from Tuesday to Friday during the week beginning April 8, 1979. The following week a two member team conducted forty-one interviews from Monday through Friday.

The DOT List contained the names, addresses and station numbers of the Rhode Island Motor Vehicle Inspection Stations. It was numerically sequential by station numbers but random with respect to the municipal location of the stations.

The EPA furnished a list, compiled under a data management contract, of the stations which had participated in the 1978 voluntary emissions program. The listing did not indicate station names or towns but did provide statistically summarized data on the vehicles inspected in the 1978 program and their emissions.

The EPA list was used to segregate the stations on the DOT listing according to the approximately 20% which had failed less than 10% of the vehicles which they had inspected for emissions in 1978 and the approximately 80% of those which failed 10% or more during the 1978 program.

To achieve the targeted number of ninety principal interviews, a systematic selection procedure was used after separating the categories of less than 10% and greater than 10% failure rates. The target number of ninety interviews was selected as a sample size which would meet temporal and manpower allotments for conducting the assessments, fulfill all statistical analytical requirements and be representative of the population mean and population variances. Every fifth station under 10% and every eighth station over 10% was selected from the DOT listing for the principal interviews. This provided a selection of 107 stations for the ninety required interviews.

The interview teams attempted to conduct interviews at the stations which were initially selected. They found that approximately 20% of the stations which they visited were unable or unwilling to answer their questions. In these cases, the interviewers referred to their TRC prepared list of the number of stations in that town and the DOT listing of their addresses. They attempted to interview the station nearest to the original selection. If one or two attempts at locating an alternative station in the vicinity proved unfruitful, the interviewer proceeded to the next primary selection on his list.

If the fifth or eighth station turned out to be a station which had been visited during the preliminary interviews, the next station on the listing was substituted.

In the case where the refusing station was a 10% or less station, the interviewer consulted his TRC and DOT lists to locate another 10% or less station in the same town. Most of the times the interviewers were able to locate an alternative station within a few miles of the original station. Table 5 lists the number of stations visited per town.

TASK II - ATTITUDINAL ASSESSMENT OF MOTOR VEHICLE OWNERS

A team of four TRC staff members conducted thirty preliminary interviews on April 3 and 4, 1979. During the weeks beginning April 8, 15 and 22, 1979, the principal interviews were accomplished by telephone interviews of a random sample of Rhode Island motor vehicle owners. The number of people whose automobiles were to have undergone the combination emissions and safety

TABLE 5. STATIONS VISITED PER TOWN

TOWN	NUMBER OF STATIONS INTERVIEWED
Providence	16 (3)
East Providence	10
North Providence	2
Cranston	11 (3)
Pawtucket	6
Central Falls	3
Cumberland	3 (1)
Lincoln	2
Middletown	5 (1)
Warwick	12 (3)
Barrington	2 (1)
Bristol	1 (1)
Conventry	1
Chepaquet	1
East Greenwich	1
Hopkinton	1
Johnston	5 (4)
Kenyon	1
North Kingston	5 (1)
Newport	1
Oakland	1
Pascoag	1
Tiverton	4
Wakefield	1
Westerly	2
Woonsocket	3 (1)
West Warwick	6

() - Parenthetical number indicates number of stations in that town where interviews were conducted that had a emissions inspection failure rate of less than 10% in the 1978 voluntary emissions inspection program.

inspections since January 1, 1979 was limited to those people whose last names began with H through L.

The total number of interviews to be conducted was decided to be 300 + 10. The number of calls, 300, is a standard sample size employed for opinion assessments. The number is large enough to fulfill all analytical statistical requirements and be representative of the population mean and the population variances. A proportional number of telephone interviews were allocated to each Rhode Island city or town in proportion to the state population. This is termed "proportional stratified sampling." Population figures for Rhode Island were obtained from the most recent Census of Population published by the U.S. Bureau of the Census. Table 6 shows the projected and actual call distributions for the cities/towns in the survey. Random sampling without replacement was used to generate the pages to be used from the Rhode Island telephone directories. This sampling method involved the use of a random number table (included in Appendix G) for page selection. The first page with names beginning with H was designated page one; the remaining pages were consecutively numbered. Once a page was selected using the random number table, it was removed from use. In other words, one page was used for call selection only once; it was not returned to the "pool" of numbers.

The individuals selected for participation in the attitude assessment were obtained by a systematic selection procedure. Every tenth name on the randomly selected page was called. The telephone was allowed to ring seven times. If no one answered, the number was noted and if time allowed, it was called again that evening. If the line was busy, it also was noted for a call back if time allowed. Business numbers were excluded. In these three cases, the next tenth name was called for a response.

Approximately 1,200 calls were placed in order to obtain the required 300 + 10 responses. The calls were placed between 4:30 and 9:30 p.m., Mondays through Thursdays, in order to get maximum participation. An average of seven positive responses was obtained per interviewer per evening. Nine TRC staff members participated over the three weeks as telephone interviewers.

TABLE 6. PROJECTED AND ACTUAL TELEPHONE INTERVIEWS DISTRIBUTION BY TOWN

<u>TOWN</u>	<u>POPULATION</u>	<u>DISTRIBUTION FOR 300 RESPONSES</u>	<u>ACTUAL NUMBER OF RESPONSES</u>
<u>NEWPORT</u>	34,562	13	13
Jamestown	2,911	1	3
Middletown	29,290	11	6
Portsmouth	12,521	5	1
<u>NARRAGANSETT</u>	7,138	2	2
Kingston	11,200	4	4
Richmond	2,625	1	1
Wakefield	3,300	1	1
Wickford	29,793	10	10
<u>WESTERLY</u>	17,248	6	6
Charlestown	1,966	1	2
Hopkinton	5,392	2	2
<u>PAWTUCKET</u>	76,983	24	24
Central Falls	18,716	6	6
Cumberland	26,605	8	87
Lincoln	16,182	5	6
<u>WOONSOCKET</u>	46,820	15	15
Glocester	5,160	2	1
Burrillville	10,087	3	0
Manville	3,100	1	1
Pascoag	3,332	1	1
<u>PROVIDENCE</u>	179,116	57	58
Cranston	74,287	23	21
East Providence	48,207	15	15
Foster	2,626	1	2
Johnston	22,037	7	3
North Providence	24,337	8	4
Smithfield	13,468	4	4
Scituate	7,489	3	3
Barrington	17,554	6	6
Bristol	17,860	6	6
Warren	10,523	3	3
Coventry	22,947	7	10
East Greenwich	9,577	3	4
Warwick	83,694	27	27
West Warwick	24,323	8	8
<u>TOTAL</u>		300	292

SECTION 4

DISCUSSION

GENERAL

The questionnaire lengths were a little longer than ideal in terms of the overall time it took to administer them, but the information on them was felt to be essential and comprehensive. Some station personnel and vehicle owners did impatiently query the number of remaining questions about one-half to three-quarters of the way through some interviews. But in most cases, once the interviews were begun the respondents continued to answer the questions to the conclusion.

The inspection station personnel questionnaire, with a total of fifty-two desired responses, required forty-five minutes to complete on the average; the respondents frequently had to interrupt the interviews to attend to customers. The motor vehicle owner questionnaire, with forty-four desired responses, required twenty minutes on the average to answer.

The questionnaires were drafted by TRC and reviewed by EPA, RILA, DOT and DEM. They were revised once after the agency reviews and a second time after the preliminary assessments. The revisions included dropping some questions and/or repositioning, rewording, expanding and segmenting others. Questions were deleted when they appeared biased or when the information they were soliciting was being provided in the response to another question. The other revisions provided clarity to ambiguous questions, easier responses to multiple choice questions, and consideration of the general public's level of awareness of terms such as "emissions" and "compliance." As an example of consideration to terms, one question, "Are you aware that your car's exhaust emissions must be tested?" was changed to "Are you aware that your car's exhaust must be tested for air pollution?"

Through the revisions, the number of questions on the motor vehicle owner assessment questionnaire was increased from 22 to 25; on the inspection station personnel assessment questionnaire the number was increased from 28 to 34.

Tabulation and Analysis of Results

In the tabulation of responses (Tables 7, 8, 9 and 10) some of the responses total slightly less than 100%. The reason for this apparent discrepancy is that some respondents chose not to respond to a particular question or section.

TABLE 7. CHI² COMPUTATIONS FOR SELECTED QUESTIONS FROM THE MOTOR
VEHICLE INSPECTION STATION PERSONNEL ATTITUDINAL ASSESSMENT

<u>QUESTION NO.</u>	<u>χ²</u>	<u>Degrees Of Freedom</u>	<u>SIGNIFICANCE LEVEL</u>	<u>CONSIDERED PARAMETER</u>
13 Major cause of excessive emissions	20.75	12	.0555	Occupation
15a Duration of emis- sions and safety test	6.2	12	.9048	Occupation
22a Problems with voluntary report form	2.75	4	.6044	Occupation
13 Major cause of excessive emissions	2.71	3	.447	% Failure
15a Duration of emis- sions and safety test	2.5	4	.648	% Failure
15b Duration of emis- sions test only	2.8	3	.433	% Failure
22a Problems with voluntary report form	5.8	1	.01683	% Failure

TABLE 8. χ^2 COMPUTATIONS FOR SELECTED QUESTIONS FROM THE
MOTOR VEHICLE OWNER ATTITUDINAL ASSESSMENT

<u>QUESTION NO.</u>	<u>χ^2</u>	<u>Degrees Of Freedom</u>	<u>SIGNIFICANCE LEVEL</u>	<u>CONSIDERED PARAMETER</u>
10 Limit on repair costs	2.8	3	.4663	Income
13a \$4 fee reasonable	.831	3	.8413	Income
10 Limit on repair costs	4.3	4	.438	Age
13a \$4 fee reasonable	3.4	4	.4878	Age

TABLE 9. COMPARISON OF RESPONSES OF SIGNIFICANCE FROM INSPECTION STATION
PERSONNEL AT STATIONS WITH >10% AND <10% FAILURE RATES

QUESTION NUMBER	QUESTION	>10%				<10%			
		YES	NO	OTHER	TOTAL	YES	NO	OTHER	TOTAL
4	Do you feel the state's training program offered in the Fall of 1977 on emissions testing adequately trained you to perform the tests with confidence and accuracy?	80.2%	16.0%		78	38.9%	11.1%		18
5	Do you think certain areas of the training program need more emphasis?	46.2%	53.8%		78	33.3%	66.7%		18
8	Are there any aspects of the emissions testing program to which you object strongly?	29.6%	70.4%		81	16.7%	83.3%		18
10b	What was the cost of the instrument?			\$2,224 (avg)	78			\$1,805 (avg)	18
10e	Are you happy with it?	84.0%	16.0%		81	100%			
18c	Does the low fee encourage stations to shorten inspections?	49.4%	48.1%		79	61.1%	22.2%		
18d	Does the low fee encourage stations to make unnecessary repairs?	38.3%	59.2%		79	50.0%	33.3%		
25a	What percentage of your I/M business is from regular customers (those who patronize the station-gas, oil, repairs and routine servicing on a frequent basis)?			0-25 1.2% 26-50 5.6% 51-75 25.9% 75+ 61.7%				0-25 5.56% 26-50 0.00% 51-75 16.7% 75+ 72.2%	15 15

TABLE 10. MOTOR VEHICLE OWNER SURVEY, QUESTION #6
REASONS FOR NOT HAVING CAR INSPECTED

	<u>NO. OF RESPONSES</u>	<u>% OF TOTAL OF 70 VEHICLES NOT INSPECTED</u>
Not due yet	9	12.86
Have just been putting it off	1	1.43
Don't know about the program	14	20.00
Have a new car	13	18.57
Don't consider it important	4	5.71
To be inspected tomorrow	1	1.43
Car is registered out of state	2	2.86
TOTAL	<u>44</u>	

A confidence interval at the 95% level was computed for most of the questions in the tables. The confidence interval is a range of values "... with a stated degree of confidence that this stated range of values does include the value of the true mean of the population being sampled."¹

Chi-square tests were made for certain selected questions to see if there were any differences in responses to the telephone interviews based upon occupation or income. For the inspection station personnel interviews chi-square tests were made to determine if the position of the respondent as owner, manager, mechanic or any combination of those categories had a bearing upon the responses. The tests were also made to see if there was a difference between the stations with less than 10% failures and those with greater than 10% failures. (See Tables 7 and 8.) The chi-square test is used "... to evaluate whether or not frequencies which have been empirically obtained differ significantly from those which would be expected under a certain set of theoretical assumptions."²

Only Questions 13 and 22A of the inspection station personnel assessments had chi-square test results that were significant. Their respective chi-squares indicate that by chance 5.5% of the time in response to Question 13 and .6% of the time in response to Question 22A would you expect that the responses that were obtained in the assessment. For Question 13, "What do you see as the major cause of excessive auto emissions?,

_____ Poorly tuned engine
_____ Malfunctioning emissions control devices
_____ Carburetor
_____ Other,"

the respondents' position as an "owner," "manager," "mechanic," "owner-manager-mechanic" or "manager-mechanic" appears to affect the response to the question.

For Question 22A, "Did the voluntary emissions report form present any problem to complete?", the fact that the respondent was working at a station with a lower than 10% failure rate or a higher than 10% failure rate appears to be a factor.

For purposes of analysis, the preliminary questionnaire responses were dropped from the analysis because of the extent of the changes made to the questions for the principal interviews.

¹Woodrow W. Wyatt and Charles M. Bridges, Statistics For The Behavioral Sciences. Boston: D.C. Hath and Company, 1966, Pg. No. 105.

²Hubert M. Blalock, Jr. Social Statistics. New York: McGraw-Hill Book Company, 1972, Pg. No. 275.

FINDINGS AND RECOMMENDATIONS

When the responses of the 10% or less stations were compared with the stations which had a greater than 10% failure rate, some differences were noticed which, for operational or attitudinal reasons, may account for overall differences in the cars passed. (See Table 9.)

A small percentage (88%) of the personnel at stations with failure rates above 10% felt that their 1977 emissions testing training was adequate compared to 89% of the personnel at stations with failure rates below 10%. Thirteen percent more of the high-failure station personnel felt certain areas of the training program needed more emphasis and 13% more of the same group had objections to some aspects of the training program.

The stations with the greater than 10% failure rates paid, on the average, \$400 more for their analyzers than did the lower-failure stations. In spite of the higher costs, 16% of their numbers expressed dissatisfaction with the analyzers as opposed to no expression of analyzer dissatisfaction from the other group.

Twelve percent less of the personnel at high-failure stations compared with personnel at low failure stations feel that the low fee encourages shortened inspections and unnecessary repairs.

Eleven percent more of the stations with the lower failure rates derive 75% or more of their I/M business from regular customers than the higher failure rate stations.

A common sentiment among the station personnel who felt that "hot stickers" were available was that although they did not know personally where to obtain them they felt "hot stickers" were available from the cars they had seen on the road with valid stickers and apparently non-compliant emissions spewing from their exhaust systems.

It appears from the assessment that publicity should be increased for the Challenge Station. Only 27.6% of people questioned were aware of its existence and purpose. Eighty-eight percent of those interviewed were of the opinion that the Challenge Station should issue the sticker rather than having the motorist return to the original inspection station.

The recommendation that an official and uniform means of notification for the I/M inspections should be implemented stems from the facts that a significant portion, 14%, of the motoring public was unaware of the inspection requirement and that only 35% of the motor vehicle owners who knew of the inspection requirement learned of it through official channels -- 9% from a DOT notification and 26% from having had their cars inspected during the 1978 voluntary program. The remaining 65% learned of the program through a variety of sources with newspapers providing notification for 34%.

The recommendation of initiating an inspection fee study is based upon the responses of 75% of the inspection station personnel who feel that the fee is inadequate to cover the costs of the inspections. Although 95% of the motor vehicle operators were satisfied with the current fee they were willing to pay, on the average, an amount increased to \$5.20. The average amount that the inspection personnel wanted the fee increased to was \$8.40. Those personnel who volunteered comments on the amount want to recover the costs of the analyzer and the expense for the time of a qualified mechanic to conduct the tests. Two inspection personnel who felt the fee was adequate commented that repairs usually compensated for the fee. The public comments on the fee were a range of willingness to pay as much as fifty dollars to the expressed opinion, in several cases, that the inspection should be free.

METHODOLOGY, TASK I - ATTITUDINAL ASSESSMENT OF MOTOR VEHICLE INSPECTION STATION PERSONNEL

Ninety-nine inspection station personnel were interviewed, nineteen at stations with a less than 10% failure rate and eighty at stations with a greater than 10% failure rate. The interviews covered personnel at eighty-two service stations, eleven new-car dealerships, five autobody shops and one tire wholesaler. Sixteen of the inspection stations were Class A (authorized to inspect vehicles over and under 8,000 lbs.) and eighty-four were Class B (authorized to inspect vehicles under 8,000 lbs). Stations in twenty-seven towns were visited to complete the interviews.

The reason for identifying and targeting a proportionate number of stations which had failed 10% or less of their cars for emissions during the 1978 voluntary emissions inspection program was because this was identified as one of the program's problem areas by the RILA. A fact sheet which they had published indicated that 19% of the inspection stations in 1978 had a failure rate of 10% or less while the overall failure rate was 21%.

The stations selected for the preliminary interviews were all in the Providence area, and were selected on an arbitrary basis. This was done to insure that as many of the ten preliminary interviews could be completed in the two days allotted for them.

METHODOLOGY, TASK II - ATTITUDINAL ASSESSMENTS OF MOTOR VEHICLE OWNERS

Approximately 1,200 telephone calls were placed to obtain two-hundred ninety-two positive responses to the public opinion I/M questionnaire. Thirty-five cities and towns were used in the survey to obtain opinions from rural, suburban and urban populations. Because of the unavailability of a DOT list of motor vehicle owners, telephone directories were used for the selection process. The number of calls per city/town was allocated in proportion to the population. The distribution of calls was not realized for seven cities/towns due to the random distribution of cities and towns in the telephone directories. In some cases, additional towns were called; in other cases, extra

calls were made to several cities and towns to compensate for the ones with fewer than projected responses. People who had not had their cars inspected for the reasons listed in Table 10 were not asked to complete the entire questionnaire; they were asked only to complete Questions 1 through 6.

Ages of people interviewed ranged from twenty years to eighty-three years with the average age of forty-six. The majority of the people interviewed had gross annual incomes in the 0 to \$20,000 ranges. A full range of occupations was sampled - from students to unemployed people to professional people to retirees (see Table 11). Professional and retired people had the most responses, with eighteen and sixteen percent, respectively. A plurality, approximately 41 percent of the people interviewed, drive automobiles in the 1973-76 model year range. Annual mileages ranged from 1,000 to 35,000 miles. The maximum distance people were willing to travel for the inspection ranged from 0 miles to 40 miles. The maximum fee for the inspection that people were willing to pay ranged from no charge to \$50. Appendix F contains the list of automobile types owned by the respondents.

TABLE 11. OCCUPATIONAL DISTRIBUTION OF MOTOR VEHICLE OWNERS

<u>OCCUPATIONAL TYPE</u>	<u>#</u>	<u>%</u>
Student	5	2.3
Unemployed	5	2.3
Unskilled Labor	16	7.5
Skilled Labor	30	14.0
Clerical	29	13.6
Self-Employed	28	13.1
Businessman	16	7.5
Professional	39	18.2
Craftsman	6	2.8
Retired	35	16.4

APPENDIX A

MOTOR VEHICLE INSPECTION STATION
PERSONNEL QUESTIONNAIRE

This attitude assessment is being conducted by TRC through the U.S. EPA Region I Office for the Rhode Island Lung Association. TRC will maintain the confidentiality of the responses by reporting results in summary form to the Rhode Island Lung Association. RILA Contacts - Bob Jones or Kim Allsup - Phone 401-421-6487

1. Respondent is: manager ____; owner ____; mechanic ____ manager-mechanic ____; owner-manager-mechanic ____	Station # _____
2. Do you feel automotive pollution is a threat to the health of RI residents? Yes ____ No ____ Comment: _____	Station Classification _____
3. Do you feel the IM program is an important step in curbing auto emissions? Yes ____ No ____ Comment: _____	Station Address (Street & Town) _____
4. Do you feel the state's training program offered in the Fall of 1977 on emissions testing adequately trained you to perform the tests with confidence and accuracy? Yes ____ No ____ Comment: _____	Date _____
5. Do you think certain areas of the training program need more emphasis? Yes ____ No ____ If Yes, what are they? _____	Time _____
6A. How would you feel about having to take a test after the course to demonstrate your ability to do emissions testing before being licensed by the state? Comment: _____	Interviewer _____
B. How would you feel about an annual recertification test? Comment: _____	
7. Do you think courses should be conducted on repair problems which cause vehicle inspection failure? Yes ____ No ____ Comment: _____	
8. Are there any aspects of the emission testing program to which you object strongly? Yes ____ No ____ Comment: _____	

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9A How many qualified people do you have to run the tests? _____

B. Do only personnel who have taken the emissions testing course conduct emissions tests?

Yes _____ No _____ Comment: _____

10A What make and model of instrument do you use for your emissions testing? _____

B What was the cost of the instrument? _____

C How long is the instrument warmed up before you proceed with the inspection?

0-5 _____; 6-10 _____; 11-20 _____; 20+ minutes _____ Left on all day _____

D How frequently do you calibrate it? _____

E Are you happy with it? Yes _____ No _____ Comment: _____

11. On a scale of 1-5, from very easy to very difficult to use, rate your instrument?

1 _____ 2 _____ 3 _____ 4 _____ 5 _____

12. When a car which you failed is passed by the "Challenge Station" whom would you prefer to issue the sticker, your garage or the "Challenge Station"? _____

13. What do you see as the major cause of excessive auto emissions?

- _____ Poorly tuned engine
- _____ Malfunctioning emissions control devices
- _____ Broken valves/rings
- _____ Carburetor
- _____ Other

14. If you feel a minor adjustment will allow a vehicle to pass the emissionstest, will you make the adjustment without having reported the vehicle as having initially failed?

Yes _____ No _____

15A How long does it take to perform an emissions and safety test and record the results?

0-10 _____; 11-20 _____; 21-30 _____; 30-60 _____; 60+ minutes _____

B Emissions only? 0-3 _____; Minutes 4-5 _____; 5-10 _____; 11+ minutes _____

16. What percentage of your inspections are handled by appointment? _____%

Comment: _____

17A Does the station set a time limit for the inspection test?

Yes _____ No _____

B If yes, how much? _____

18. Is the \$4.00 fee adequate to cover the cost of the emission/safety inspection?

Yes _____ No _____

If not, what should it be? Comment: _____

Does the low fee encourage stations to shorten inspections? _____

Does the low fee encourage stations to make unnecessary repairs? Comment: _____

19. When was the last time a DOT inspector paid you a visit?

Comment: _____

20A How frequently do DOT inspectors check your station? Comment: _____

B How do you perceive the competence of the DOT inspectors ? Comment: _____

21A Do you issue a failure report with the results to the owner of a vehicle which has failed the emissions test?

Yes _____ No _____ Comment: _____

B Do you keep a record of these failures?

Yes _____ No _____ Comment: _____

22A Did the voluntary emissions report form present any problems to complete? Comment: _____

B If in the future, the state requires documentation of the test, how would you improve the form? Comment: _____

23. What approach would you prefer to the inspections and repairs?

- a. Inspection by State-owned stations with private garages handling the repairs? _____
- b. Inspection by contractors to the state with private garages handling the repairs? _____
- c. Inspections and repairs by private garages? _____

Comment: _____

24. Does IM interfere with other activities? Yes _____ No _____ Comment: _____

25A What percentage of your IM business is from regular customers (those who patronize the station-gas, oil, repairs and routine servicing on a frequent basis)?

0-25 _____; 26-50 _____; 51-75 _____; 75+ % _____

B How much of your business comes from emissions repair work? _____ %

26. Has IM been responsible for more business, less business or the same amount?

Comment: _____

27. Are your inspections more or less stringent now that the program is mandatory?

More _____; Less _____; Same _____

28. Is the industry more lenient with regular customers than with infrequent customers?

Yes _____ No _____

29. If you know or feel a customer's registration plate will be suspended if you issue a failure report, will you be more lenient with their inspection, or more reluctant to fill out a report?

Yes _____ No _____ Comment: _____

30. How easy is it for a person to obtain an improper or "hot sticker" for a car that fails an emissions test or is not inspected? Comment: _____

31. How many people who fail emissions inspections have their repairs performed here? _____ %

32A Have you received the Green IM card? Yes _____ No _____

B Are you distributing them to your customers? Yes _____ No _____

C. How useful is the card? Comment: _____

33. Is there anything else you would like to comment on? Comment: _____

34. Interviewer's Comments: _____

APPENDIX B

COMMENTS BY MOTOR VEHICLE INSPECTION STATION PERSONNEL

APPENDIX B

COMMENTS BY MOTOR VEHICLE INSPECTION STATION PERSONNEL

5. DO YOU THINK CERTAIN AREAS OF THE TRAINING PROGRAM NEED MORE EMPHASIS?

Yes___ No___ If yes, what are they?_____

- One respondent believes that the training program needs more emphasis on fuel injection.
- Three respondents think the training program should dwell more on running and setting analyzers.
- Three respondents feel that the training program should cover everything more thoroughly. They feel that not enough time was spent to make the program worthwhile.
- Two respondents feel review courses after the original training program would be helpful.
- Three respondents would like to see the training course put more emphasis on maintenance problems and what to do about them.

6a. HOW WOULD YOU FEEL ABOUT HAVING TO TAKE A TEST AFTER THE COURSE TO DEMONSTRATE YOUR ABILITY TO DO EMISSIONS TESTING BEFORE BEING LICENSED BY THE STATE? COMMENT:

- Twenty respondents feel a test after taking the training course to demonstrate their ability to do emissions testing before they could be licensed by the state would be unnecessary. They said that they are already licensed mechanics and the Department of Transportation is always checking.
- Forty-nine respondents wouldn't mind demonstrating their ability to do the emissions testing before being licensed by the state.
- Ten respondents feel that being tested to demonstrate their ability to do emissions testing before being licensed by the state is necessary.
- One respondent does not see how you can be tested on the training course when it is only four hours long.

6b. HOW WOULD YOU FEEL ABOUT AN ANNUAL RECERTIFICATION TEST? COMMENT:

- Forty-nine respondents feel an annual recertification test to demonstrate their ability to do emissions testing would not be necessary.
- Ten respondents think it would be too much of a bother to take a recertification test to demonstrate their ability to do emissions testing every year.
- Eleven respondents think an annual recertification test to demonstrate their ability to do emissions testing is necessary.
- Twenty-one would agree to taking an annual recertification test to demonstrate their ability to do emissions testing.
- Three respondents think a recertification test every two or three years would be better.

8. ARE THERE ANY ASPECTS OF THE EMISSIONS TESTING PROGRAM TO WHICH YOU OBJECT STRONGLY?

- One respondent objects to unlicensed garages being certified in the emissions testing program.
- One respondent objects to paying for the gas to calibrate the analyzer to do the emissions testing. He thinks that the state should pay for it.
- Four respondents object to the large investment in the analyzer which is necessary for the emissions testing program and its upkeep.
- Two respondents object to the fact that it is so easy to cheat on the emissions test.
- One respondent objects to the fact that some stations use a cheaper type of analyzer to do the emissions testing.
- Three respondents object to the fact that the emissions testing program is performed by private garages; they feel it should be done by the state.
- One respondent feels that the emissions testing program would be better if more spot checks were made.
- Three respondents object to the price of the emissions test. They feel that the fee paid for services rendered is not fair.
- Four respondents object to the standards of the emissions testing program, one feels they are too high and three feel they are too low.

- One respondent objects to the unfamiliarity of the program inspectors with the analyzers.

22a. DID THE VOLUNTARY EMISSIONS REPORT FORM PRESENT ANY PROBLEMS TO COMPLETE? COMMENT:

- Thirty-four respondents feel that filling out the voluntary emissions report form for every test is too much paper work. They feel that it should only be filled out for test failures.
- One respondent feels that filling out the voluntary emissions report form takes too long for the fee being paid to take the test.
- Two respondents feel that filling out the voluntary emissions report form is useless.
- Six respondents feel that filling out the voluntary emissions report form is time consuming.

22b. IF IN THE FUTURE THE STATE REQUIRES DOCUMENTATION OF THE TEST, HOW WOULD YOU IMPROVE THE FORM? COMMENT:

- Thirty-seven respondents feel that if in the future the state requires documentation of the test, no improvements would be necessary.
- Twenty-seven respondents feel that if in the future the state requires documentation of the test, the emissions report form should be made shorter by deleting the corrections.
- Ten respondents feel that the state should not require documentation of the test.
- Twelve respondents feel that if the state requires documentation of the emissions test a section for emissions should be included in the inspection sticker book.
- One respondent feels that if in the future the state requires documentation of the emissions test the additional corrections on maintenance problems on the present form should be made more specific.

30. HOW EASY IS IT FOR A PERSON TO OBTAIN AN IMPROPER OR "HOT STICKER" FOR A CAR THAT FAILS AN EMISSIONS TEST OR IS NOT INSPECTED? COMMENT:

- Fifteen respondents feel that it's impossible to get a "hot sticker" for a car that has failed or not taken the emissions test.

- Sixteen respondents feel that it's very hard to get a "hot sticker" for a car that has not taken the emissions test or failed it.
- Eighteen respondents feel that it is possible to get a "hot sticker" for a car that has not taken or failed the emissions test.
- Nineteen respondents feel it is easy to get a "hot sticker" for a car that had failed or not taken the emissions test.
- Seven respondents say that "hot stickers," for cars that either failed or did not take the emissions test, were available in certain places but not at that station.
- Nine respondents say that "hot stickers," for cars that either failed or did not take the emissions test, are around but are becoming harder to find.
- Two respondents never heard of anyone obtaining a "hot sticker" for a car that either failed or did not take the emissions test.

33a. IS THERE ANYTHING ELSE YOU WOULD LIKE TO COMMENT ON? COMMENT:

- One respondent feels the program is not 100% effective in that "hot stickers" are obtainable though not at his station. He also feels that if a car fails the emissions test, the person is free to go to numerous stations until one is found that will let them pass without being within compliance.
- Two respondents feel that emissions inspections should be done twice a year.
- One respondent feels the state should not come out with a longer form for future documentation. He feels the sticker book should be the only form.
- Two respondents feel the emission testing is a good idea.
- One respondent suggests stricter guidelines for how things should be under the hood. He states that a car with 8 cylinders can easily pass the emissions inspection running on only 6 cylinders. The state doesn't mention that all 8 cylinders must be working.
- One respondent feels the emissions criteria should be altered so that cars will run well and stay within the limits.
- One respondent suggests training the police to spot check cars for emissions and safety items. He says they should be stricter with violators and people with "hot stickers."

- One respondent complains that he has to stop whatever work he is doing when the state inspector arrives. He says that he doesn't like the hassles from the state; he was told to send to them the license number of any car he sees that should be inspected and hasn't been. He feels this should be the inspector's job.
- One respondent feels that specific makes of cars should have the emission testing done at the respective dealerships to protect the car owner.
- One respondent suggests a follow-up on cars that failed the emissions inspection and that a more in-depth training course would be good since most mechanics might not quite be knowledgeable about emissions testing.
- Two respondents feel the state should be totally responsible for the emissions testing.
- One respondent feels that of all the different inspection programs to date, the present one is the best one.
- Two respondents feel the program is a waste of time. They have more important things to think of than automotive emissions.
- Four respondents feel the fee for the emission inspection is a problem and that it should be raised to \$6-10.
- One respondent feels the only way to get the emissions inspections done right is for the state to take over the inspections. He hopes that the \$1 that goes to the state will be used in the future to enable the state to do all inspections.
- One respondent feels that the \$4 fee for the emissions inspection is sufficient because he inspects mostly regular customers who will come back for service in the future.
- Two respondents like the fact that the emissions inspections are being done year around instead of just during the summer as in the past.
- One respondent feels that the fee for emissions inspection should be higher because the state requires that when original tools are outdated, you have to purchase new ones. At \$4 an inspection, it is not worth it.
- One respondent feels the state as well as the police are not doing their job to enforce the inspection/maintenance program on the road. The state should remind the people of the emissions inspection and its importance; the inspection time should be advertised clearly in the paper or on the radio.

- Two respondents complain that the state does not send out notifications to inform their customers that they are due for their emissions inspection.
- One respondent feels the automobile manufacturers could come up with cars that don't pollute.
- One respondent, who says his was the first safety inspection station in the State of Rhode Island, says he will stop doing emissions inspections if the \$4 fee does not go up.
- One respondent feels that since the emission inspection requires factory components for safety equipment that different manufacturers should make the parts interchangeable.
- One respondent is glad to see the emissions inspections getting more stringent; he thinks that it's a very important program.
- One respondent thinks the state is doing a great job with the inspection/maintenance program.
- One respondent feels the standards for the emission inspection/maintenance program should be flexible considering the gas problem.
- One respondent feels that older cars have cleaner emissions than new ones and can be made to run cleaner.
- One respondent complains that there are too many cars on the road that shouldn't be. He says the police in Rhode Island are lazy and they won't check people to see if they have been inspected because that will mean more paper work for them. He says the state should run all the inspection stations; that way they would be the only ones responsible.
- One respondent complains about having to pay \$350 a year for liability insurance and you have to have this insurance to do the emission inspections.
- One respondent feels the emission inspections standards are not low enough.
- One respondent feels the inspections system is good but the emissions test is not really necessary and that the \$4 inspection fee for both is too low.
- One respondent feels the state manual on the emissions inspection program is not detailed enough. He says it leaves too many decisions up to the garage.

- One respondent feels the garage should keep a carbon copy of the emission and maintenance inspection report for their own personal files and the original should be sent to the state.
- One respondent feels the people involved in the inspection/maintenance program are doing their best. However, the inspection fee should be higher to compensate for the work done.
- One respondent feels that the manufacturers are to blame for the bad emissions and maintenance problems on cars and is sorry the consumer must pay the price. The newer cars give out more pollution than the old ones.
- One respondent suggests that cars be analyzed for emissions under various conditions like at 40 miles per hour.
- One respondent feels the inspection/maintenance program is a good one. It got rid of the klunkers, is curbing pollution and helps cars get better mileage. However, some older cars, he says, have visible smoke and since the regulations for HC and CO are high for older cars these cars can pass. He says the regulations shouldn't be this lenient.
- One respondent feels there should be an itemized bill on the repair work for emission and maintenance inspection which should be sent to the state for a record. He says this would be included on the final emission inspection report form. The state and media should remind people of the importance of the inspection and time once a week prior to the inspection and spot check the inspection stations. He says some of the inspection stations should show more courtesy to the public.
- One respondent feels there should be more concern about emissions in the city than out in the country.
- One respondent feels the emissions inspection/maintenance program is a benefit to the station.
- One respondent feels the state inspectors for the emission inspection program are incompetent as far as doing their job properly.
- One respondent feels more emphasis should be put on maintenance inspection rather than emission inspection.
- One respondent feels the state should handle the whole inspection/maintenance program by itself and train their own men to do the tests. He is upset with the way the state is handling the maintenance portion of the inspection. He did not like having to buy new tools to do the "same old job."

- One respondent feels the \$4 fee is not enough to cover the cost of the equipment needed to do the emissions inspection.
- One respondent would like to see the state take over the emissions and maintenance inspections and send the cars to private garages for repairs.
- One respondent feels everyone should use just one type of analyzer for the emissions inspection.
- One respondent feels the state should be more careful choosing inspectors for the emissions and maintenance program.
- One respondent feels the emissions/inspection programs standards are too low.

APPENDIX C
LIST OF AUTO EMISSIONS ANALYZERS

LIST OF AUTO EMISSION ANALYZERS

<u>INSTRUMENT</u>	<u>TOTAL</u>	<u>AVERAGE COST</u>
GMIR	1	\$1,500
DELTA	1	1,500
HORIBA	8	2,071
ALLEN	11	3,678
MARQUETTE	9	2,100
SON	9	3,500
BARNES	10	2,070
AC IR	21	1,351
CAL. EQUIP.	11	1,285
FOX 1800	10	1,900
SNAP ON	4	2,848
STEWART WARNER	1	2,300
FMC	1	1,300
NAPA	1	1,500

APPENDIX D
MOTOR VEHICLE OWNER QUESTIONNAIRE

INTRODUCTION:

Hello Mr., Mrs. Ms. _____. My name is _____
of The Research Corporation of New England. My company has been
contracted by the Rhode Island Lung Association to conduct a sur-
vey of the Rhode Island public with relation to the new safety/
exhaust emissions inspection program. I am calling because we
would like your opinion on how we can improve the program.
Would you be willing to give me about five minutes to answer
some questions. (If you require verification, you can call the --
R.I. Lung Association and ask for Mr. Bob Jones or Ms. Kim Allsup
at 421-6487).

NAME OF INTERVIEWER: _____
NAME OF INTERVIEWEE: _____
CITY _____
PHONE # _____

1. Do you own and drive a registered automobile? Yes _____ No _____ Comments: _____

2a. What is the make of the vehicle? _____

b. What model year is it? 1979 _____; 1977-78 _____; 1973-76 _____; 1970-72 _____; earlier than 1970 _____

3a. What is the car's present mileage? _____

b. What is your average annual mileage? _____

4. Are you aware that your car's exhaust must be tested for air pollution? Yes _____ No _____

IF YES, How did you become aware of the emissions inspection program?

_____ by having car inspected
_____ word of mouth
_____ newspaper
_____ gas station

_____ radio
_____ TV
_____ DOT notice
_____ Other

5. Do you think that exhaust emissions tests on automobiles are important?

Yes _____ No _____ Don't Care _____

6. Has your car been inspected since January of this year? Yes _____ No _____

IF NO, WHY NOT? Don't know about program _____ Don't consider this important _____
Have a new car _____

*IF YES, Did you get the results? Yes _____ No _____

Would you like to know the results of the test? Yes _____ No _____

7a How far did you travel for the emission test?

Less than 5 miles _____
5-10 miles _____
10-15 miles _____
More than 15 miles _____

b What is the maximum distance you should have to travel for this test? _____

8a Did your car pass or fail the initial test? P _____ F _____

b If the car failed, how many tests were required before the car passed? _____

9a Have you ever suspected that unnecessary repairs were made on your car as a result of an inspection?

Yes _____ No _____

b If your car was adjusted to pass the test, have you had any problems with the car's performance?

Yes _____ No _____

10. Do you think that the State should set a limit for repair costs to get the car to pass the inspection?

Yes _____ No _____

11. Do you think it's possible for someone to get a sticker for a car that failed the test?

Yes _____ No _____

12a Was the inspection conducted at a garage which you patronize frequently, infrequently or never?

Frequently _____
 Infrequently _____
 Never _____

b Do you feel that the inspection personnel were competent? Yes _____ No _____ Don't know _____ Other _____

13a Do you think the \$4 inspection fee is reasonable? Yes _____ No _____

b What is the most you should have to pay for the inspection? _____

c Do you think the \$4 fee is so low that it encourages stations to shorten inspections? Yes ____ No ____
 Don't know _____

14. Do you think the inspection program has increased the problem of auto repair fraud or unnecessary repairs?

Yes _____ No _____ Don't Know _____

15. How long did you have to wait to have your car inspected?

done immediately _____	$\frac{1}{2}$ hr to 1 hr _____
less than 15 min. _____	more than 1 hr _____
15 min. to $\frac{1}{2}$ hr. _____	left the car all day _____

16. How long did the actual inspection take?

15 min or less _____
15 min to ½ hr _____
½ hr to 1 hr _____
longer than 1 hr _____
Don't know _____

17a (Several states have had the inspection program working for some time. Some states have found that state-run inspection stations are effective, while others are satisfied with the work of private contractors or independent garages.) If you had a choice, who would you rather have your car inspected by:

State-run garage _____
private garager _____
A 3rd party hired by the state that would not make repairs _____

b Would you feel more protected if the testing was separated from repair work? Yes _____ No _____

18a Are you aware of the state run "Challenge Station" where you can double check the results of a garage inspection?

Yes _____ No _____

b If you wanted to get your car checked by an "Challenge Station" would it be convenient for you to get there between 7:30 a.m. to 3:30 p.m., Monday through Friday? Yes _____ No _____ Other Time _____

19. Do you think the "Challenge Station" should issue the sticker if you pass the test, rather than having to go back to the inspection garage? Yes _____ No _____

20. Do you think that 14 days is enough time to have your car repaired and retested?

Yes _____ No _____

21a Do you, a relative or anyone you know have a respiratory illness aggravated by air pollution?

Yes _____ No _____

b Who do you think is most responsible for cleaning up the air?

Private citizen _____

Industry _____

Government _____

c What do you think contributes most to air pollution? Cars _____ Buses and Trucks _____ Industry _____ Other _____

22. How would you describe the seriousness of Rhode Island's air quality problem?

no problem _____

moderate problem _____

slight problem _____

severe _____

23. Do you believe that the Inspection Maintenance Program will save you money by increasing gas mileage as well as decreasing air pollution?

Yes _____ No _____

24. This program has been labeled "improved". Do you think that this year's inspection system is better than last year's?

better _____

worse _____

same _____

don't know _____

25. What do you like & dislike about the program. Like: _____

Dislike: _____

26a If you had to classify your household income before taxes would it be:

0-\$9,999 ____; \$10,000-19,999 ____; \$20,000-49,999 ____; Above \$50,000 ____

b What is your age (how old are you)? _____

c What is your occupation? _____

APPENDIX E
COMMENTS BY MOTOR VEHICLE INSPECTION OWNERS

APPENDIX E

COMMENTS BY MOTOR VEHICLE INSPECTION OWNERS

LIKES

- What 20 people questioned liked about the inspection/maintenance program was that the Government was finally coming down on motorists for air pollution control. They feel the inspection program keeps bad cars off the road and cuts down on pollution.
- Thirteen people liked the feeling of security they get from knowing their car is in good shape. Most people wouldn't have their cars inspected on their own but do so because the inspection/maintenance program makes it mandatory.
- Ten people like the inspection/maintenance program's new system of alphabetical scheduling. They say it makes the inspections go much smoother without long waiting lines.
- Two people like the equipment the inspection stations are using. They feel it is better than the previous equipment used to do the inspections and think it was interesting to watch.
- Two people like the fact that private garages are handling the emission inspections and they are doing a good job.

DISLIKES

- Nine people dislike the inspection/maintenance program, complaining that it is not very effective and that many people don't get inspected. They felt if a person does not have proof of being inspected, his/her registration should be revoked.
- Seven people dislike the inspection/maintenance program because they feel it causes repair fraud.
- Six people dislike the inspection/maintenance program because they feel it is all politics or a money making gimmick that wastes time and accomplishes nothing.
- Five people dislike the inspection/maintenance program because they feel it costs too much; they think it should be free.
- Four people dislike the fact that if their car fails the emission or maintenance inspection they have only 14 days to have the car repaired and retested. They feel the time allowed should depend on what is wrong.

- Four people dislike the fact that the emission and maintenance inspections are not thorough enough.
- Two people dislike the inspection/maintenance program because it is mandatory. They do not like having to have their cars inspected.
- Two people dislike the fact that there are not more challenge stations around where the results of the garage emission and maintenance tests can be double checked.
- Two people dislike the fact that they have to wait so long to take the emission and maintenance tests.
- Three people dislike the inspection/maintenance program because it is so easy to cheat. People take off air pollution control devices after they have been inspected. One man suggests that compression tests should be given to guard against people using S.T.P. just before the test to give nice clear emission results.
- Two people dislike the fact that the emission and maintenance inspection was done only once a year. They feel inspections should be given twice a year or at least a follow-up should be made on the first one.
- Two people dislike the inspection/maintenance program because it puts too much emphasis on emissions and not enough on safety features such as brakes and lights. They feel that the air pollution problem is being blown out of proportion.
- Two people dislike the inspection/maintenance program because they feel the government is after the wrong people. They think the government should get after the automobile manufacturers about the emissions problem and also about gas mileage.
- One person dislikes the auto repair fraud involved with the inspection/maintenance program. He feels that if an inspection garage fails someone who passes the inspection when he has the garage results double-checked at a challenge station, the inspection garage should be reported to the state and possibly closed down.
- One person dislikes the staggered alphabet system the inspection/maintenance program is using.
- One person doesn't like the fact that there are so many inspection stations. He thinks there would be more control if there were just a few.
- One person feels that the people doing the inspections for the inspection/maintenance program are incompetent.
- One person does not like the inspection/maintenance program this year because they did not send out notices when cars were due to be inspected as they did last year.

- One person dislikes the fact that he was scheduled to have his car inspected for emissions and maintenance in January. He feels that winter isn't a good time of the year to have a car inspected.
- One person dislikes the inspection/maintenance program because a complete explanation of the entire procedure was not given. She was not aware that the stubs from the car repairs were to be sent to the Department of Transportation until they sent a letter asking for them. She feels she should have been told this sooner.

APPENDIX F

DISTRIBUTION OF AUTOMOBILE MAKES FOR MOTOR VEHICLE OWNERS

DISTRIBUTION OF AUTOMOBILER MAKES FOR MOTOR VEHICLES

<u>MAKE</u>	<u>#</u>	<u>%</u>
AMC	14	4.79
BMW	2	.68
Buick	16	5.48
Cadillac	2	.68
Chevrolet	67	22.95
Dodge	30	10.27
Datsun	4	1.37
Ford	48	16.44
Honda	1	.34
Lincoln-Mercury	9	3.08
Mazda	3	1.03
Mercedes	2	.68
Plymouth	30	10.27
Pontiac	14	4.79
Peugeot	1	.34
Renault	1	.34
Rolls Royce	1	.34
Saab	1	.34
Subaru	2	.68
Toyota	9	3.08
Volvo	5	1.71
Volkswagen	13	4.45
Chrysler	6	2.05
Oldsmobile	16	5.48

APPENDIX G
RANDOM NUMBERS TABLE

Table B Random numbers

10 09 73 25 33	76 52 01 35 86	34 67 35 48 76	80 95 90 91 17	39 29 27 49 45
37 54 20 48 05	64 89 47 42 96	24 80 52 40 37	20 63 61 04 02	00 82 29 16 65
08 42 26 89 53	19 64 50 93 03	23 20 90 25 60	15 95 33 47 64	35 08 03 36 06
99 01 90 25 29	09 37 67 07 15	38 31 13 11 65	88 67 67 43 97	04 43 62 76 59
12 80 79 99 70	80 15 73 61 47	64 03 23 66 53	98 95 11 68 77	12 17 17 68 33
66 06 57 47 17	34 07 27 68 50	36 69 73 61 70	65 81 33 98 85	11 19 92 91 70
31 06 01 08 05	45 57 18 24 06	35 30 34 26 14	86 79 90 74 39	23 40 30 97 32
85 26 97 76 02	02 05 16 56 92	68 66 57 48 18	73 05 38 52 47	18 62 38 85 79
63 57 33 21 35	05 32 54 70 48	90 55 35 75 48	28 46 82 87 09	83 49 12 56 24
73 79 64 57 53	03 52 96 47 78	35 80 83 42 82	60 93 52 03 44	35 27 38 84 35
98 52 01 77 67	14 90 56 86 07	22 10 94 05 58	60 97 09 34 33	50 50 07 39 98
11 80 50 54 31	39 80 82 77 32	50 72 56 82 48	29 40 52 42 01	52 77 56 78 51
83 45 29 96 34	06 28 89 80 83	13 74 67 00 78	18 47 54 06 10	68 71 17 78 17
88 68 54 02 00	86 50 75 84 01	36 76 66 79 51	90 36 47 64 93	29 60 91 10 62
99 59 46 73 48	87 51 76 49 69	91 82 60 89 28	93 78 56 13 68	23 47 83 41 13
65 48 11 76 74	17 46 85 09 50	58 04 77 69 74	73 03 95 71 86	40 21 81 65 44
80 12 43 56 35	17 72 70 80 15	45 31 82 23 74	21 11 57 82 53	14 38 55 37 63
74 35 09 98 17	77 40 27 72 14	43 23 60 02 10	45 52 16 42 37	96 28 60 26 55
69 91 62 68 03	66 25 22 91 48	36 93 68 72 03	76 62 11 39 90	94 40 05 64 18
09 89 32 05 05	14 22 56 85 14	46 42 75 67 88	96 29 77 88 22	54 38 21 45 98
91 49 91 45 23	68 47 92 76 86	46 16 28 35 54	94 75 08 99 23	37 08 92 00 48
80 33 69 45 98	26 94 03 68 58	70 29 73 41 35	53 14 03 33 40	42 05 08 23 41
44 10 48 19 49	85 15 74 79 54	32 97 92 65 75	57 60 04 08 81	22 22 20 64 13
12 55 07 37 42	11 10 00 20 40	12 86 07 46 97	96 64 48 94 39	28 70 72 58 15
63 60 64 93 29	16 50 53 44 84	40 21 95 25 63	43 65 17 70 82	07 20 73 17 90
61 19 69 04 46	26 45 74 77 74	51 92 43 37 29	65 39 45 95 93	42 58 26 05 27
15 47 44 52 66	95 27 07 99 53	59 36 78 38 48	82 39 61 01 18	33 21 15 94 66
94 55 72 85 73	67 89 75 43 87	54 62 24 44 31	91 19 04 25 92	92 92 74 59 73
42 48 11 62 13	97 34 40 87 21	16 86 84 87 67	03 07 11 20 59	25 70 14 66 70
23 52 37 83 17	73 20 88 98 37	68 93 59 14 16	26 25 22 96 63	05 52 28 25 62
04 49 35 24 94	75 24 63 38 24	45 86 25 10 25	61 96 27 93 35	65 33 71 24 72
00 54 99 76 54	64 05 18 81 59	96 11 96 38 96	54 69 28 23 91	23 28 72 95 29
35 96 31 53 07	26 89 80 93 54	33 35 13 54 62	77 97 45 00 24	90 10 33 93 33
59 80 80 83 91	45 42 72 68 42	83 60 94 97 00	13 02 12 48 92	78 56 52 01 06
46 05 88 52 36	01 39 09 22 86	77 28 14 40 77	93 91 08 36 47	70 61 74 29 41
32 17 90 05 97	87 37 92 52 41	05 56 70 70 07	86 74 31 71 57	85 39 41 18 38
69 23 46 14 06	20 11 74 52 04	15 95 66 00 00	18 74 39 24 23	97 11 89 63 38
19 56 54 14 30	01 75 87 53 79	40 41 92 15 85	66 67 43 68 06	84 96 28 52 07
45 15 51 49 38	19 47 60 72 46	43 66 79 45 43	59 04 79 00 33	20 82 66 95 41
94 86 43 19 94	36 16 81 08 51	34 88 88 15 53	01 54 03 54 56	05 01 45 11 76

SOURCE: The RAND Corporation, *A Million Random Digits*, Free Press, Glencoe, Ill., 1955, pp. 1-3, with the kind permission of the publisher.

Table B Random numbers (Continued)

41 84 98 45 47	46 85 05 23 28	34 67 75 83 00	74 91 06 43 45	19 32 58 15 49
46 35 23 30 49	69 24 89 34 60	45 30 50 75 21	61 31 83 18 55	14 41 37 09 51
11 08 79 62 94	14 01 33 17 92	59 74 76 72 77	76 50 33 45 13	39 66 37 75 44
52 70 10 83 37	56 30 38 73 15	16 52 06 96 76	11 65 49 98 93	02 18 16 81 61
57 27 53 68 98	81 30 44 85 85	68 65 22 73 76	92 85 25 58 66	88 44 80 35 84
20 85 77 31 56	70 28 42 43 26	79 37 59 52 20	01 15 96 32 67	10 62 24 83 91
15 63 38 49 24	90 41 59 36 14	33 52 12 66 65	55 82 34 76 41	86 22 53 17 04
92 69 44 82 97	39 90 40 21 15	59 58 94 90 67	66 82 14 15 75	49 76 70 40 37
77 61 31 90 19	88 15 20 00 80	20 55 49 14 09	96 27 74 82 57	50 81 69 76 16
38 68 83 24 86	45 13 46 35 45	59 40 47 20 59	43 94 75 16 80	43 85 25 96 93
25 16 30 18 89	70 01 41 50 21	41 29 06 73 12	71 85 71 59 57	68 97 11 14 03
65 25 10 76 29	37 23 93 32 95	05 87 00 11 19	92 78 42 63 40	18 47 76 56 22
36 81 54 36 25	18 63 73 75 09	82 44 49 90 05	04 92 17 37 01	14 70 79 39 97
64 39 71 16 92	05 32 78 21 62	20 24 78 17 59	45 19 72 53 32	83 74 52 25 67
04 51 52 56 24	95 09 66 79 46	48 46 08 55 58	15 19 11 87 82	16 93 03 33 61
83 76 16 08 73	43 25 38 41 45	60 83 32 59 83	01 29 14 13 49	20 36 80 71 26
14 38 70 63 45	80 85 40 92 79	43 52 90 63 18	38 38 47 47 61	41 19 63 74 80
51 32 19 22 46	80 08 87 70 74	88 72 25 67 36	66 16 44 94 31	66 91 93 16 78
72 47 20 00 08	80 89 01 80 02	94 81 33 19 00	54 15 58 34 36	35 35 25 41 31
05 46 65 53 06	93 12 81 84 64	74 45 79 05 61	72 84 81 18 34	79 98 26 84 16
39 52 87 24 84	82 47 42 55 93	48 54 53 52 47	18 61 91 36 74	18 61 11 92 41
81 61 61 87 11	53 34 24 42 76	75 12 21 17 24	74 62 77 37 07	58 31 91 59 97
07 58 61 61 20	82 64 12 28 20	92 90 41 31 41	32 39 21 97 63	61 19 96 79 40
90 76 70 42 35	13 57 41 72 00	69 90 26 37 42	78 46 42 25 01	18 62 79 08 72
40 18 82 81 93	29 59 38 86 27	94 97 21 15 98	62 09 53 67 87	00 44 15 89 97
34 41 48 21 57	86 88 75 50 87	19 15 20 00 23	12 30 28 07 83	32 62 46 86 91
63 43 97 53 63	44 98 91 68 22	36 02 40 09 67	76 37 84 16 05	65 96 17 34 88
67 04 90 90 70	93 39 94 55 47	94 45 87 42 84	05 04 14 98 07	20 28 83 40 60
79 48 50 41 46	52 16 29 02 86	54 15 83 42 43	46 97 83 54 82	59 36 29 59 38
91 70 43 05 52	04 73 72 10 31	75 05 19 30 29	47 66 56 43 82	99 78 29 34 78

Table B Random numbers (Continued)

59 58 00 64 78	75 56 97 88 00	88 83 55 44 86	23 76 80 61 56	04 11 10 84 08
38 50 80 73 41	23 79 34 87 63	90 82 29 70 22	17 71 90 42 07	95 95 44 99 53
30 69 27 06 68	94 68 81 61 27	56 19 68 00 91	82 06 76 34 00	05 46 26 92 00
65 44 39 56 59	18 28 82 74 37	49 63 22 40 41	08 33 76 56 76	96 29 99 08 36
27 26 75 02 64	13 19 27 22 94	07 47 74 46 06	17 98 54 89 11	97 34 13 03 58
91 30 70 69 91	19 07 22 42 10	36 69 95 37 28	28 82 53 57 93	28 97 66 62 52
68 43 49 46 88	84 47 31 36 22	62 12 69 84 08	12 84 38 25 90	09 81 59 31 46
48 90 81 58 77	54 74 52 45 91	35 70 00 47 54	83 82 45 26 92	54 13 05 51 60
06 91 34 51 97	42 67 27 86 01	11 88 30 95 28	63 01 19 89 01	14 97 44 03 44
10 45 51 60 19	14 21 03 37 12	91 34 23 78 21	88 32 58 08 51	43 66 77 08 83
12 88 39 73 43	65 02 76 11 84	04 28 50 13 92	17 97 41 50 77	90 71 22 67 69
21 77 83 09 76	38 80 73 69 61	31 64 94 20 96	63 28 10 20 23	08 81 64 74 49
19 52 35 95 15	65 12 25 96 59	86 28 36 82 58	69 57 21 37 98	16 43 59 15 29
67 24 55 26 70	35 58 31 65 63	79 24 68 66 86	76 46 33 42 22	26 65 59 08 02
60 58 44 73 77	07 50 03 79 92	45 13 42 65 29	26 76 08 36 37	41 32 64 43 44
53 85 34 13 77	36 06 69 48 50	58 83 87 28 59	49 36 47 33 31	96 24 04 36 42
24 63 73 87 36	74 38 48 93 42	52 62 30 79 92	12 36 91 86 01	03 74 28 38 73
83 08 01 24 51	38 99 22 28 15	07 75 95 17 77	97 37 72 75 85	51 97 23 78 67
16 44 42 43 34	36 15 19 90 73	27 49 37 09 39	85 13 03 25 52	54 84 65 47 59
60 79 01 81 57	57 17 86 57 62	11 16 17 85 76	45 81 95 29 79	65 13 00 48 60
03 99 11 04 61	93 71 61 68 94	66 08 32 46 53	84 60 95 82 32	88 61 81 91 61
38 55 59 55 54	32 88 65 97 80	08 35 56 08 60	29 73 54 77 62	71 29 92 38 53
17 54 67 37 04	92 05 24 62 15	55 12 12 92 81	59 07 60 79 36	27 95 45 89 09
32 64 35 28 61	95 81 90 68 31	00 91 19 89 36	76 35 59 37 79	80 86 30 05 14
69 57 26 87 77	39 51 03 59 05	14 06 04 06 19	29 54 96 96 16	33 56 46 07 80
24 12 26 65 91	27 69 90 64 94	14 84 54 66 72	61 95 87 71 00	90 89 97 57 54
61 19 63 02 31	92 96 26 17 73	41 83 95 53 82	17 26 77 09 43	78 03 87 02 67
30 53 22 17 04	10 27 41 22 02	39 68 52 33 09	10 06 16 88 29	55 98 66 64 85
03 78 89 75 99	75 86 72 07 17	74 41 65 31 66	35 20 83 33 74	87 53 90 88 23
48 22 86 33 79	85 78 34 76 19	53 15 26 74 33	35 66 35 29 72	16 81 86 03 11
60 36 59 46 53	35 07 53 39 49	42 61 42 92 97	01 91 82 83 16	98 95 37 32 31
83 79 94 24 02	56 62 33 44 42	34 99 44 13 74	70 07 11 47 36	09 95 81 80 65
32 96 00 74 05	36 40 98 32 32	99 38 54 16 00	11 13 30 75 86	15 91 70 62 53
19 32 25 38 45	57 62 05 26 06	66 49 76 86 46	78 13 86 65 59	19 64 09 94 13
11 22 09 47 47	07 39 93 74 08	48 50 92 39 29	27 48 24 54 76	85 24 43 51 59
31 75 15 72 60	68 98 00 53 39	15 47 04 83 55	88 65 12 25 96	03 15 21 92 21
88 49 29 93 82	14 45 40 45 04	20 09 49 89 77	74 84 39 34 13	22 10 97 85 08
30 93 44 77 44	07 48 18 38 28	73 78 80 65 33	28 59 72 04 05	94 20 52 03 80
22 88 84 88 93	27 49 99 87 48	60 53 04 51 28	74 02 28 46 17	82 03 71 02 68
78 21 21 69 93	35 90 29 13 86	44 37 21 54 86	65 74 11 40 14	87 48 13 72 20

Table B Random numbers (*Continued*)

98 08 62 48 26	45 24 02 84 04	44 99 90 88 96	39 09 47 34 07	35 44 13 18 80
33 18 51 62 32	41 94 15 09 49	89 43 54 85 81	88 69 54 19 94	37 54 87 30 43
80 95 10 04 06	96 38 27 07 74	20 15 12 33 87	25 01 62 52 98	94 62 46 11 71
79 75 24 91 40	71 96 12 82 96	69 86 10 25 91	74 85 22 05 39	00 38 75 95 79
18 63 33 25 37	98 14 50 65 71	31 01 02 46 74	05 45 56 14 27	77 93 89 19 36
74 02 94 39 02	77 55 73 22 70	97 79 01 71 19	52 52 75 80 21	80 81 45 17 48
54 17 84 56 11	80 99 33 71 43	05 33 51 29 69	56 12 71 92 55	36 04 09 03 24
11 66 44 98 83	52 07 98 48 27	59 38 17 15 39	09 97 33 34 40	88 46 12 33 56
48 32 47 79 28	31 24 96 47 10	02 29 53 68 70	32 30 75 75 46	15 02 00 99 94
69 07 49 41 38	87 63 79 19 76	35 58 40 44 01	10 51 82 16 15	01 84 87 69 38
09 18 82 00 97	32 82 53 95 27	04 22 08 63 04	83 38 98 73 74	64 27 85 80 44
90 04 58 54 97	51 98 15 06 54	94 93 88 19 97	91 87 07 61 50	68 47 66 46 59
73 18 95 02 07	47 67 72 52 69	62 29 06 44 64	27 12 46 70 18	41 36 18 27 60
75 76 87 64 90	20 97 18 17 49	90 42 91 22 72	95 37 50 58 71	93 82 34 31 78
54 01 64 40 56	66 28 13 10 03	00 68 22 73 98	20 71 45 32 95	07 70 61 78 13
08 35 86 99 10	78 54 24 27 85	13 66 15 88 73	04 61 89 75 53	31 22 30 84 20
28 30 60 32 64	81 33 31 05 91	40 51 00 78 93	32 60 46 04 75	94 11 90 18 40
53 84 08 62 33	81 59 41 36 28	51 21 59 02 90	28 46 66 87 95	77 76 22 07 91
91 75 75 37 41	61 61 36 22 69	50 26 39 02 12	55 78 17 65 14	83 48 34 70 55
89 41 59 26 94	00 39 75 83 91	12 60 71 76 46	48 94 97 23 06	94 54 13 74 08
77 51 30 38 20	86 83 42 99 01	68 41 48 27 74	51 90 81 39 80	72 89 35 55 07
19 50 23 71 74	69 97 92 02 88	55 21 02 97 73	74 28 77 52 51	65 34 46 74 15
21 81 85 93 13	93 27 88 17 57	05 68 67 31 56	07 08 28 50 46	31 85 33 84 52
51 47 46 64 99	68 10 72 36 21	94 04 99 13 45	42 83 60 91 91	08 00 74 54 49
99 55 96 83 31	62 53 52 41 70	69 77 71 28 30	74 81 97 81 42	43 86 07 28 34
33 71 34 80 07	93 58 47 28 69	51 92 66 47 21	58 30 32 98 22	93 17 49 39 72
85 27 48 68 93	11 30 32 92 70	28 83 43 41 37	73 51 59 04 00	71 14 84 36 43
84 13 38 96 40	44 03 55 21 66	73 85 27 00 91	61 22 26 05 61	62 32 71 84 23
56 73 21 62 34	17 39 59 61 31	10 12 39 16 22	85 49 65 75 60	81 60 41 88 80
65 13 85 68 06	87 64 88 52 61	34 31 36 58 61	45 87 52 10 69	85 64 44 72 77
38 00 10 21 76	81 71 91 17 11	71 60 29 29 37	74 21 96 40 49	65 58 44 96 98
37 40 29 63 97	01 30 47 75 86	56 27 11 00 86	47 32 46 26 05	40 03 03 74 38
97 12 54 03 48	87 08 33 14 17	21 81 53 92 50	75 23 76 20 47	15 50 12 95 78
21 82 84 11 34	47 14 33 40 72	64 63 88 59 02	49 13 90 64 41	03 85 65 45 52
73 13 54 27 42	95 71 90 90 35	85 79 47 42 06	08 78 98 81 56	64 69 11 92 02
07 63 87 79 29	03 06 11 80 72	96 20 74 41 56	23 82 19 95 38	04 71 36 69 94
60 52 38 34 41	07 95 41 98 14	59 17 52 06 95	05 53 35 21 39	61 21 20 64 55
83 59 63 56 55	06 95 89 29 83	05 12 80 97 19	77 43 35 37 83	92 30 15 04 98
10 85 06 27 46	99 59 91 05 07	13 49 90 63 19	53 07 57 18 39	06 41 01 93 62
39 82 09 89 52	43 62 26 31 47	64 42 18 08 14	43 80 00 93 51	31 02 47 31 67