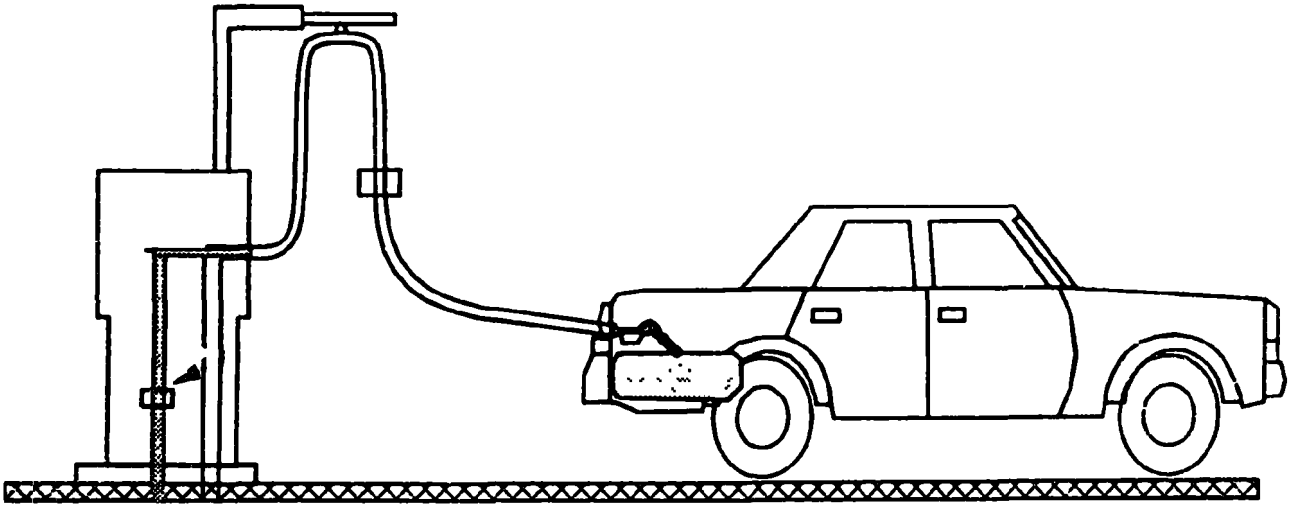
EPA SPONSORED

STAGE II VAPOR RECOVERY

IMPLEMENTATION WORKSHOP



PACIFIC ENVIRONMENTAL SERVICES, INC.

MARCH 1992
DALLAS

AGENDA
STAGE II VAPOR RECOVERY IMPLEMENTATION WORKSHOP

MARCH 23 AND 24, 1992
DALLAS,TX

Time Period	Title and Description of Section
MARCH 23	
8:00 - 8:30	Check in/Registration
8:30 - 8:45	Welcome/Introduction Introduction to workshop agenda and speakers, brief description of handout materials
8:45 - 9:15	Presentation of Technical Guidance Document Description of CAAA requirements, general preamble, and purpose and function of the document
9:15 - 9:45	Presentation of Enforcement Document More discussion of CAA requirements and Stage II citations, purpose and function of document
9:45 - 10:00	Break
10:00 - 10:45	Industry Description Industry description, gasoline throughput, model plants, and size distribution
10:45 - 12:00	Emissions and Control Techniques Emission points, emission factors, basic control techniques and their effectiveness
12:00 - 1:30	Lunch
1:30 - 3:00	Control Technology Description of types of systems, specific components of systems, problems with past equipment and corrections, hands-on equipment demonstration
3:00 - 3:15	Break
3:15 - 4:15	Costs Presentation of facility costs and comparison of St. Louis Stage II costs

AGENDA (CONTINUED)
STAGE II VAPOR RECOVERY IMPLEMENTATION WORKSHOP

Time Period	Title and Description of Section
MARCH 24	
8:00 - 8:15	Introduction to Day's Activities - Program Implementation
8:15 - 8:45	Planning and Public Awareness Discussion of Planning Considerations for a Stage II Program including the important aspect of public awareness.
8:45 - 9:45	Regulations/Equipment Requirements Discussion of equipment requirements including CARB certification, CARB Executive Orders, approved systems in other States, and their incorporation into regulations
9:45 - 10:00	Break
10:00 - 10:45	Other Regulation Elements Discussion of Exemption Levels, Compliance Schedules, Record keeping Requirements, and other aspects of Stage II Regulations. Includes presentation and discussion of existing Stage II regulations.
10:45- 11:15	Underground Piping/Test Methods Discussion of importance of underground piping and discussion of various tests (liquid blockage, pressure decay, etc.)
11:15 - 12:15	Permitting Discussion of permitting strategies for existing Stage II Programs.
12:15 - 1:30	Lunch
1:30 - 2:30	Inspection Techniques Discussion of inspection techniques including description of defects and penalties and inspector training
2:30 - 2:45	Break
2:45 - 3:15	Summary of Important Points of Stage II Program Overview of workshop with opportunity for additional questions/discussion
3:15 - 4:00	Discussion

STAGE II REQUIREMENTS IN THE 1990 CLEAN AIR ACT AMENDMENTS AND TITLE I GENERAL PREAMBLE

AND

INTRODUCTION TO THE TECHNICAL GUIDANCE DOCUMENT

STAGE II REQUIREMENTS IN THE 1990 CLEAN AIR ACT AMENDMENTS AND TITLE I GENERAL PREAMBLE

AND

INTRODUCTION TO THE TECHNICAL GUIDANCE DOCUMENT

OVERVIEW

- **1990 Clean Air Act Amendments**

- **General Preamble**

- **Introduction to Technical Guidance Document**

TITLE I: Section 182(b)(3) Gasoline Vapor Recovery

- **States must submit SIP by November 15, 1992**

- **Requiring Stage II Systems**

- **For moderate and above ozone nonattainment areas**

- **Optional - - Maximum Allowable Exemptions:**

  $\leq$ 50,000 gal/month *dispensed* for "independent small business marketers"

  $\leq$ 10,000 gal/month *dispensed* for all facilities

TITLE I: Section 182(b)(3)
Gasoline Vapor Recovery
(Continued)

Compliance Dates:

{Starting after State adoption}

6 months	**facilities constructed after Nov. 15, 1990**
one year	**$\geq$ 100,000 gal/month facilities**
two years	**for all others**

TITLE I: Section 184 Control of Interstate Ozone Air Pollution

- **Ozone Transport Region:**

  Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the Washington D.C. CMSA

- **EPA study required to identify control measures with *comparable emission reductions* achieved with Stage II -- due Nov. 1993**

- **States must implement Stage II or *comparable* measures within a year of the completed study**

TITLE II: Section 202(a)(6)
Onboard Vapor Recovery

- **Promulgate Onboard Controls by Nov. 15, 1991**

  After Consultation with DOT regarding safety issues

- **Phase-In Required - Beginning with the fourth Model Year Vehicles after promulgation**

- **<u>AFTER</u> Promulgation of Onboard Rule:**

  Stage II Shall NOT Apply In:

  1) **Moderate Areas**

  2) **By EPA rule, all other areas after EPA determines Onboard Emission Control Is Widespread**

Section 325 In 1977 CAAA
For Independent Small Business Marketer (independents)

a) **Provides for < 50,000 gal/month exemption for *independents***

Provides three-year phase for *independents*

b) **Allows any State to NOT adopt the < 50,000 exemption for *independents***

(Continued)

Section 325 In 1977 CAAA
For Independent Small Business Marketer (independents)

(Continued)

c) **Persons that are *independents*, unless such person:**

1) **A) is a refiner, or**

B) controls, is controlled by, or is under common control with, a refiner,

C) is otherwise directly or indirectly affiliated with A) or B), or

2) **receives less than 50 percent of annual income from refining or marketing of gasoline.**

GENERAL PREAMBLE
{ Implementation of Title I CAAA of 1990 }

- **Preamble provides preliminary views on how EPA interprets provisions in Title I**

- **Requires that Stage II systems be:**

  1) **capable of achieving at least 95 percent vapor control efficiency**

  2) **properly installed and operated**

GENERAL PREAMBLE (Con't)

- **Alternative to Testing Each Station For 95% Control:**

  1) Installed systems must be certified to achieve at least 95% either by:

  a. California ARB, or

  b. Using CARB Test Procedures and Methods, or

  c. Equivalent Test Procedures and Method Developed By the State and Submitted as a SIP Revision. AND,

  2) Systems must be tested for proper installation, and

  3) Perform all necessary enforcement.

GENERAL PREAMBLE (Con't)

- **Onboard reductions will not be realized until well after the moderate area attainment deadline of November 1996**

  Moderate areas may want to consider installing Stage II, even if onboard is required.

- **Notification That Stage II Guidance Is Issued by the Administrator:**

  Technical Guidance Document

  Enforcement Guidance Document

Technical Guidance -
Stage II Vapor Recovery Systems for Control of Vehicle Refueling Emissions at Gasoline Dispensing Facilities

Volume I: Chapters

EPA-450/3-91-022a

Volume II: Appendices

EPA-450/3-91-022b

TECHNICAL GUIDANCE DOCUMENT

PURPOSE AND FUNCTION

- **Both Guidance Documents Fulfill CAAA Requirements to:**

  "issue guidance as appropriate as to the effectiveness of such system"

- **Provide information and guidance to State and local agencies related to the planning, permitting, and implementation of Stage II vapor recovery programs**

TECHNICAL GUIDANCE DOCUMENT

SOURCES OF INFORMATION

- **Previous EPA Analyses**

- **Information From CARB**

- **Visits and Information from California Air Pollution Districts**

- **Visits and Information from State and Local Agencies with Stage II Programs**

- **Information from Equipment Manufacturers**

TECHNICAL GUIDANCE DOCUMENT

CONTENTS

- **Industry Description and Characterization**
- **Emission Sources and Estimates**
- **Control Technology, Effectiveness, and Costs**
- **Implementation Information from Current Programs**

HIGHLIGHTS

- **1990 CAAA requires Stage II :**

  In Particular Areas

  Optional & Allowable Exemption Levels

  Installation Dates

  Promulgation of Onboard Rule removes some requirements

- **General preamble:**

  Requires at least 95 percent efficient systems to be installed

  Alternative to Testing Each Station

  Announces Guidance Documents

- **Technical Guidance Document presents emission, control technology, costs, and implementation information**

GENERAL PREAMBLE

IMPLEMENTATION OF TITLE I

CLEAN AIR ACT AMENDMENTS

OF 1990

STAFF WORKING DRAFT

10/11/91

PREDECISIONAL MATERIALS
DO NOT CITE OR QUOTE

PREFACE

The purpose of this document is to provide guidance to assist States in preparing new State implementation plans pursuant to Title I of the 1990 Clean Air Act Amendments. The present document, a staff working draft version of the General Preamble for Title I, discusses all criteria pollutants (ozone, carbon monoxide, particulate matter, sulfur dioxide, lead, and nitrogen dioxide). This version is the result of the Agency work group process (closure on October 9, 1991) and has been submitted to OMB for review. The EPA plans to publish the final document in the FEDERAL REGISTER in late 1991.

SUMMARY: Title I of the Clean Air Act Amendments (CAAA) of 1990 revamped the requirements for areas that have not attained the national ambient air quality standards (NAAQS) for ozone, carbon monoxide (CO), particulate matter (PM-10), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and lead. In addition, Title I made numerous changes in the requirements for State implementation plans (SIP's) in general, including the provisions governing EPA's processing of SIP revisions, as well as the repercussions of State failures to meet the various SIP requirements. Many of these requirements call for early action by the States. For example, under Title I, States with pre-enactment ozone nonattainment areas were to begin submitting SIP revisions 6 months after enactment (May 15, 1991).

This General Preamble (preamble) principally describes EPA's preliminary views on how EPA should interpret various provisions of Title I, primarily those concerning SIP revisions required for nonattainment areas. Although the General Preamble includes various statements that States must take certain actions, these statements are made pursuant to EPA's preliminary interpretations, and thus do not bind the States and the public as a matter of law. In the near future, EPA will (i) begin to take action, pursuant to notice-and-comment rulemaking, on SIP revisions submitted by the States, and (ii) issue rules, pursuant to notice-and-comment rulemaking, on various Title I provisions. During the comment periods for those subsequent actions, members of the public will have the opportunity to comment on the relevant issues. This General Preamble is an advance notice of

how EPA generally intends, in those subsequent rulemakings, to take action on SIP submissions and to interpret various Title I provisions.

A Federal Register notice published on June 13, 1991 [56 FR 27257] announced the public availability of a draft version of this General Preamble. The notice also announced EPA's intent to conduct a 2-day public hearing to discuss issues, related to the preparation of new State implementation plans under Title I of the 1990 CAAA, that were raised in the draft preamble. The public meeting was held in Reston, Virginia on June 25 and 26, 1991. A public docket, No. A-91-35, was open until July 26, 1991 for written comments concerning issues raised in the General Preamble and/or at the public meeting. (Technical Support Document) on file in Docket No. A-91-35, contains a summary of the issues raised in the oral comments at the public meeting and in the written comments submitted to the Docket, along with EPA responses to certain issues. When preparing the final version of the General Preamble, EPA considered all of the issues raised by the public.

SUPPLEMENTARY INFORMATION(to be developed into FEDERAL REGISTER format prior to publication)

I. PURPOSE

The primary purpose of this preamble is to provide the public with advance notice of how EPA generally intends to interpret various requirements and associated issues that have arisen under Title I of the CAAA. The information provided in this preamble is therefore intended to guide States and to help

method could differ for a single source because the § 407 emission limits are specified as annual allowable rates whereas the § 182 limits must be protective of the hourly ozone standard.

It is also important to note that, in certain areas, States may require NO_x controls based on advanced control technologies rather than RACT if such controls are necessary to provide for expeditious attainment of the ozone NAAQS. In order to avoid or minimize potentially incremental or repetitive control requirements, States and regulated sources should consider in advance the implications of both sections.

g. Gasoline vapor recovery. (Stage II Vapor Recovery Systems). Section 182(b)(3) mandates that States submit a revised SIP by November 15, 1992, that requires owners or operators of gasoline dispensing systems to install and operate gasoline vehicle refueling vapor recovery ("Stage II") systems in ozone nonattainment areas designated as moderate and above. Private fueling facilities (such as government and company fleet fueling facilities) as well as retailers are subject to the Stage II requirements. Stage II is required at gasoline dispensing facilities that dispense more than 10,000 gallons of gasoline per month (or 50,000 gallons per month for the "independent small business marketers" defined under § 325). States must require Stage II to be effective under a specified phase-in schedule of (1) 6 months after the State adopts the required regulation for stations constructed after November 15, 1990; (2) 1 year after the adoption date for stations dispensing at least 100,000 gallons per month, based on the 2-year period

before the adoption date; and (3) 2 years after the adoption date for all other facilities required to install controls. Also, a- appropriate, EPA shall issue guidance concerning the effectiveness of Stage II systems.

Stage II systems have been installed and operated in California for over 10 years and in some other portions of the country for a shorter period. Areas with existing Stage II programs have been implementing their programs using the same approach used in California. The California Air Resources Board (CARB) has been testing and certifying systems for at least 95 percent vapor recovery using established test procedures and methods. Once a system has been certified, a station can install the same Stage II system design without needing to test for 95 percent control effectiveness. To ensure that they are properly installed and maintained, systems are tested with low-cost vapor leakage and blockage tests at installation and then subjected to periodic enforcement inspections.

The EPA intends to require all States to adopt a similar Stage II program approach. That is, States would be required to prescribe the use of Stage II systems that achieve at least 95 percent control of VOC's and that are properly installed and operated.

As an alternative to testing each station for 95 percent control effectiveness, States may require installed Stage II systems to be certified to achieve at least 95 percent either by CARB, or by using CARB test procedures and methods or equivalent test procedures and methods developed by the State and submitted

as a SIP revision. In addition, States must require the installed systems to be tested for proper installation and must perform all necessary enforcement.

Supporting and background material for developing, implementing, and enforcing this type of program is provided in technical and enforcement guidance that the Agency has issued. The Agency now notifies the public that this is guidance issued by the Administrator pursuant to § 182(b)(3)(A).

Additional Stage II provisions contained in § 202(a)(6) concern onboard (on-the-vehicle) vehicle refueling control standards, which are to be developed after consultation with the Secretary of Transportation regarding the safety of onboard systems. Under this section, States are not required to apply the Stage II requirements of § 182(b)(3), gasoline vapor recovery, to facilities located in moderate ozone areas if EPA promulgates onboard refueling control standards. The statutory deadline for promulgation of the onboard regulations is November 15, 1991. However, the CAAA require EPA to consult with the Department of Transportation (DOT) regarding safety, prior to promulgation of the regulations. This determination is well under way. DOT's National Highway Traffic Safety Administration (NHTSA) released a safety study in July 1991. A public hearing on the study and on the general issue of onboard safety was held on September 26 and 27, 1991. Written comments were received until October 27, 1991. Based on NHTSA's findings and the public record, EPA will make a determination as to promulgation of the onboard regulations.

Moderate areas may want to consider implementing the gasoline vapor recovery requirements to all or part of the potentially affected stationary sources even before EPA promulgates the onboard rules. The potential emission reductions achieved from the onboard rules will not be fully realized until after November 15, 1996, the attainment deadline for moderate areas. In contrast, emission reductions from Stage II gasoline vapor recovery requirements could be achieved within 2 years.

Basic I/M. Section 182(b)(4) requires moderate ozone nonattainment areas to implement basic I/M programs at least as stringent as those required in § 182(a)(2)(B) immediately upon enactment, regardless of whether an I/M program was previously required. Therefore, all moderate areas must either continue existing I/M programs and make corrections to programs required by existing policy or to programs committed to in the SIP in effect at enactment, whichever is more stringent; or develop basic I/M programs consistent with EPA guidance. These areas must also submit revisions addressing revised basic I/M program policy for new and existing programs once revised policy is published. The I/M programs are required in the urbanized area portions, as defined by the Bureau of the Census in 1980, of the nonattainment area.

The statute requires these plans "immediately" after enactment, even though in a few cases such areas may be subject to this requirement for the first time. The EPA would normally provide at least 1 year for an area newly subject to such requirements to adopt and implement an I/M program. The EPA will

ENFORCEMENT GUIDANCE FOR STAGE II VEHICLE REFUELING CONTROL PROGRAMS

ENFORCEMENT GUIDANCE FOR STAGE II VEHICLE REFUELING CONTROL PROGRAMS

FIVE AREAS OF PROGRAM GUIDANCE

- TRAINING AND PUBLIC EDUCATION PROGRAMS
- A METHOD TO DETERMINE WHICH FACILITIES COMPRISE THE REGULATED UNIVERSE
- DATA COLLECTION AND REVIEW TO MONITOR COMPLIANCE AMONG REGULATED FACILITIES
- PERIODIC INSPECTION OF REGULATED FACILITIES TO INSURE COMPLIANCE WITH PROGRAM REQUIREMENTS
- A METHOD TO ENSURE REGULATED FACILITY COMPLIANCE WITH PROGRAM REQUIREMENTS THROUGH ENFORCEMENT MECHANISMS

SYNOPSIS OF STAGE II ENFORCEMENT GUIDANCE

- **Provides Information for Public Awareness and Effective Training**

- **Successful Implementation and Oversight**

- **Monitor All Program Operation**

- **Establish An Effective Enforcement Program**

POA TRAINING AND TESTING REQUIREMENTS FOR INSPECTORS

Training Program Should Cover the Following Subject Areas:

- **Purposes and Effects of Stage II Vapor Control Programs**
- **System Types, Parts, Operations, and Functions**
- **Inspection Requirements**
- **Visual and Functional Identification Techniques of System and Equipment Failures**
- **Record Review and Recording Procedures**
- **Enforcement Procedures**

FACILITY OWNER/OPERATOR TRAINING ON STAGE II EQUIPMENT

At Least One Owner/Operator From Each Facility Should Receive Training in the Following Areas:

- **Purposes and Effects of the Stage II Vapor Control Program**
- **Equipment Operation and Function**
- **Maintenance Schedules and Requirements**
- **Equipment Warranties**
- **Equipment Manufacturer Contacts for Parts and Service**

POA EDUCATION OF REGULATED FACILITIES

The POA Should Prepare and Distribute the Following Information on the Purposes and Benefits of Stage II Vapors Control to All Regulated Facilities:

- **The General Purposes and Benefits of the Stage II Vapor Control Program**
- **The Specific Program Requirements**
- **Potential Enforcement Consequences for Non-Compliance**
- **Information on the Program Oversight Agency**

PUBLIC AWARENESS PROGRAM

- **The purposes and benefits of the Stage II program**

- **A general explanation of how Stage II systems function**

- **The correct procedures for operation of Stage II systems**

- **Information on the program oversight agency**

DETERMINATION OF REGULATED UNIVERSE

- **The Agency must accurately determine which facilities must comply with the Stage II program requirements.**

- **The Agency must then develop and maintain a program to accurately track facilities in the regulated universe.**

FACILITY RECORDKEEPING

- **Permitting records**
- **Station Operating License**
- **System Installation and Testing Results**
- **Stage II Maintenance Records**
- **Inspection Records**
- **Compliance Records**
- **Training Certification**

POA RECORDKEEPING REQUIREMENTS

- General Station File

- Station Inspection Report File

- Station Enforcement File

FACILITY EQUIPMENT REQUIREMENTS FOR INSTALLATION AND TESTING

Infrastructure System Equipment

- All Stage II Underground Equipment Must Comply With All Stage II and Other Related Regulations

- The Regulated Facility Should Verify Proper Installation and Function of the Equipment

- Each Facility Should Recertify the Function of Stage II Equipment at Least Every Five Years or Upon Major System Replacement or Modification

FACILITY EQUIPMENT REQUIREMENTS FOR INSTALLATION AND TESTING (CONT'D)

Aboveground System Equipment

- **All equipment Must Meet the Requirements for a Certified System**

- **Facilities Conducting Substantial Repairs or Replacements Should Upgrade Facility Equipment**

- **The POA Should Establish a Mechanism for Testing and/or Approving Replacement or Rebuilt Replacement Parts Before Such Parts Are Installed**

EQUIPMENT REQUIREMENTS

- **Control systems required to achieve at least 95 percent control**

- **Systems must**

  1) **be certified by CARB, or**

  2) **be tested using CARB methods, or**

  3) **be tested and approved by an equivalent testing program**

PROGRAM OVERSIGHT AGENCY EQUIPMENT

The POA Should Possess and Utilize the Equipment Necessary to Verify Compliance by Regulated Parties.

REGULATED FACILITY INSPECTIONS GUIDANCE

- **Visual Inspection Requirements**

- **Functional Testing Requirements**

REQUIREMENTS FOR PROGRAM PENALTIES

- Notices of Violations
- Warnings
- Cease and Desist Orders
- Suspension of License or Permit to Operate
- Revocation of License or Permit to Operate
- Monetary Fines
- "Red Tagging" Equipment

REVIEW OF
FIVE AREAS OF PROGRAM GUIDANCE

- TRAINING AND PUBLIC EDUCATION PROGRAMS
- A METHOD TO DETERMINE WHICH FACILITIES COMPRISE THE REGULATED UNIVERSE
- DATA COLLECTION AND REVIEW TO MONITOR COMPLIANCE AMONG REGULATED FACILITIES
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INDUSTRY DESCRIPTION

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- Gasoline Marketing Facilities
- Gasoline Throughput
- Service Station Population
- Service Station Size Distribution

GASOLINE MARKETING FACILITIES

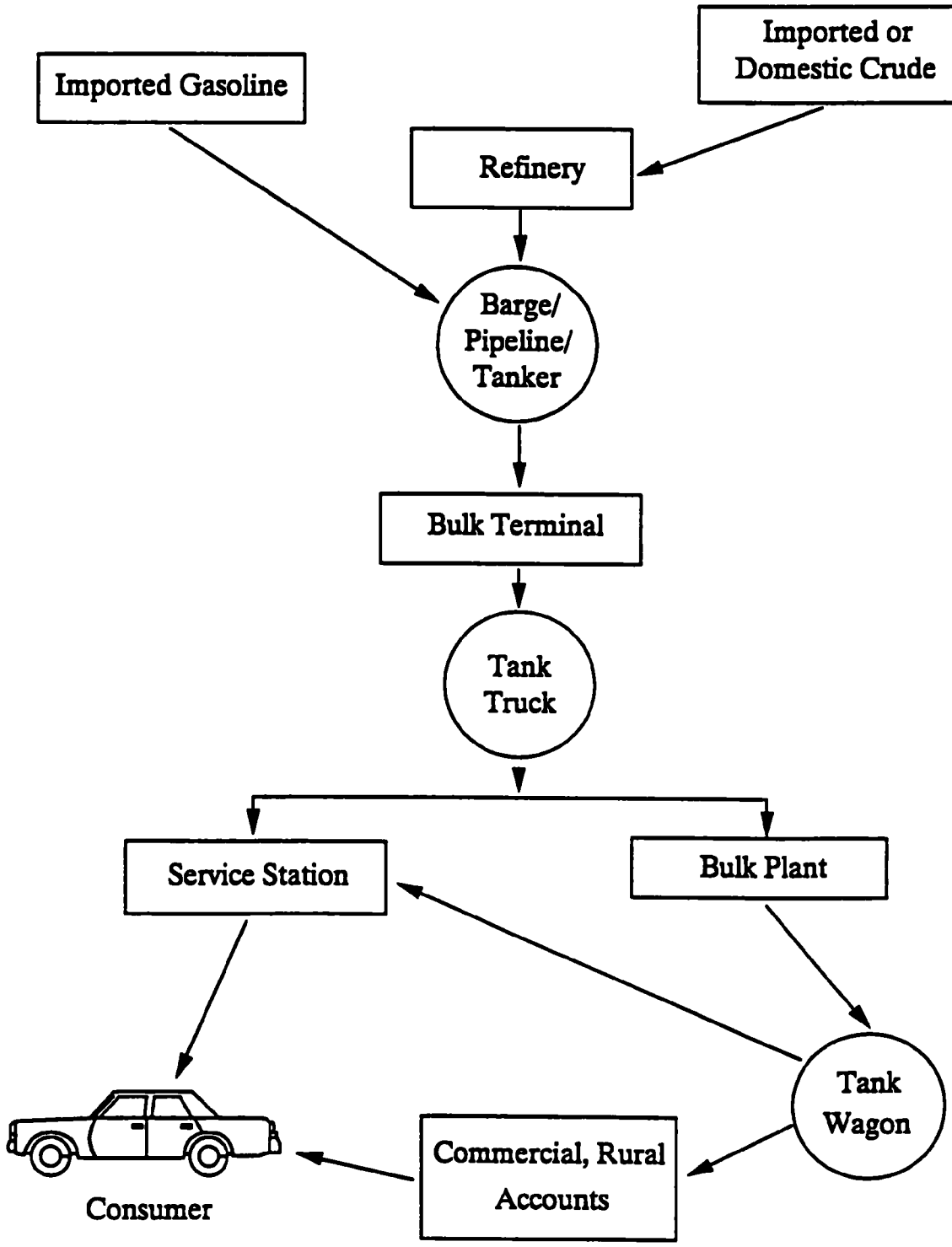


Figure 2-1. Gasoline Marketing In The United States

DEFINITION OF SERVICE STATION

"Any site where gasoline is dispensed to motor vehicle fuel tanks from stationary storage vessels"

TYPES OF SERVICE STATIONS

- **Public Facilities**

  Traditional service stations

  Pumpers

  Convenience Stores

- **Private Facilities**

  Government

  Fleets (taxis, rental cars, etc.)

  Trucking and local service

  School buses

  Agriculture

1990 Public Market Share Breakdown

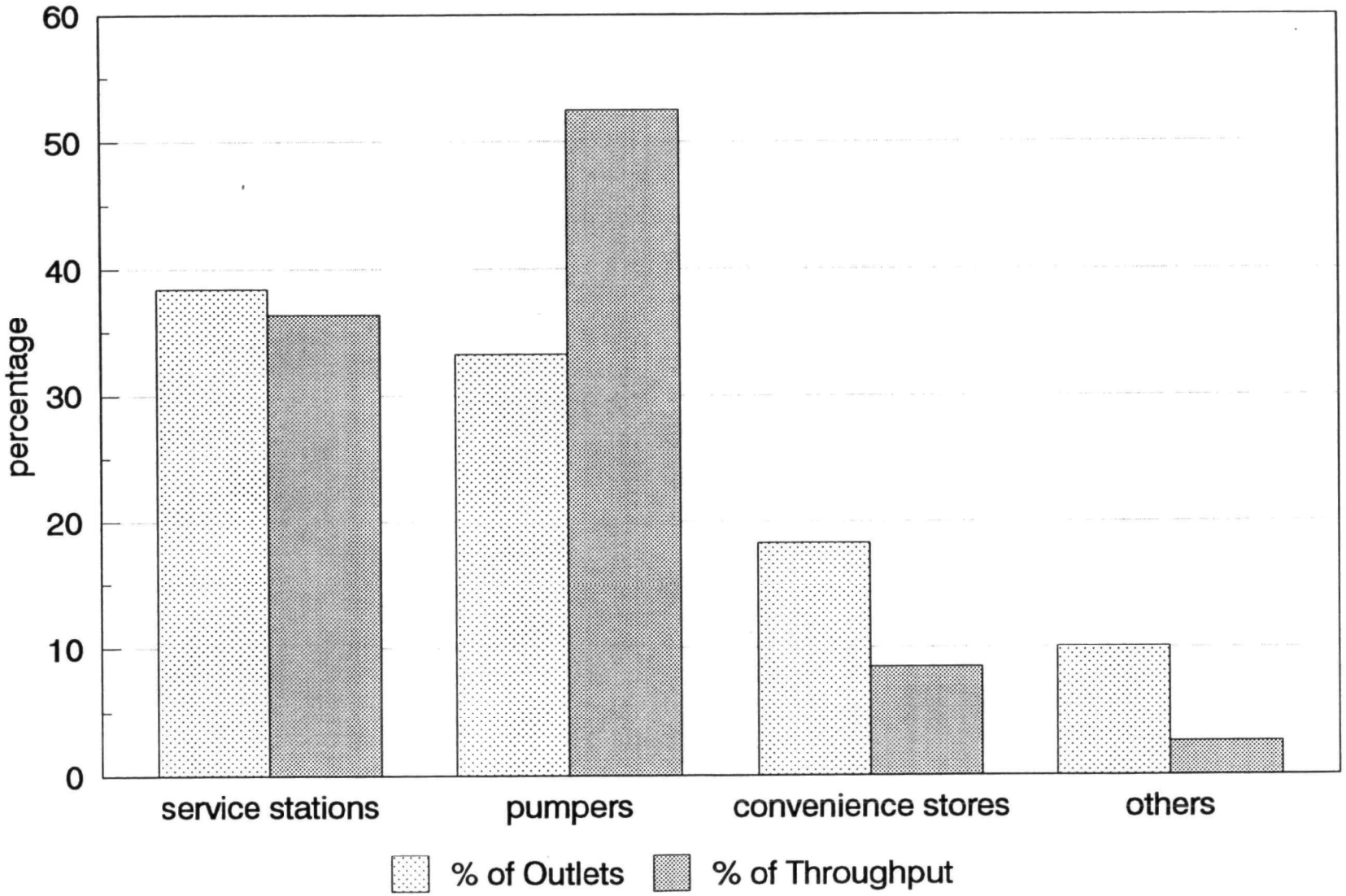


TABLE 2-7. 1990 MPSI MARKET SHARE BREAKDOWN

	Service Stations	Pumpers	Convenience Stores	Others	Total
Northeastern Region					
• % of Outlets	60.6	22.3	6.3	10.8	100.0
• % of Volume	54.7	39.2	3.6	2.5	100.0
• Avg. Monthly Volume (Gallons)	62,611	121,861	39,847	15,974	69,360
Midwestern Region					
• % of Outlets	35.9	43.7	9.2	11.2	100.0
• % of Volume	28.2	63.0	6.0	2.8	100.0
• Avg. Monthly Volume (Gallons)	59,220	108,706	42,642	18,802	74,782
Sunbelt Region					
• % of Outlets	22.0	34.5	33.2	10.3	100.0
• % of Volume	23.4	57.8	15.7	3.1	100.0
• Avg. Monthly Volume (Gallons)	55,613	101,853	28,735	18,343	58,798
Western Region					
• % of Outlets	45.6	34.2	12.4	7.8	100.0
• % of Volume	42.6	50.0	5.4	2.0	100.0
• Avg. Monthly Volume (Gallons)	70,428	127,931	38,252	22,593	82,356
Total United States					
• % of Outlets	38.4	33.2	18.3	10.1	100.0
• % of Volume	36.4	52.5	8.5	2.6	100.0
• Avg. Monthly Volume (Gallons)	62,479	112,230	32,220	18,524	69,036

Source: MPSI Inc., Tulsa, Oklahoma, reported in 1991 NPN factbook.

GASOLINE THROUGHPUT

GASOLINE THROUGHPUT

- **Emission Factors in units of weight/volume throughput**

- **Assume that total nationwide throughput is eventually loaded into vehicle fuel tank at a service station**

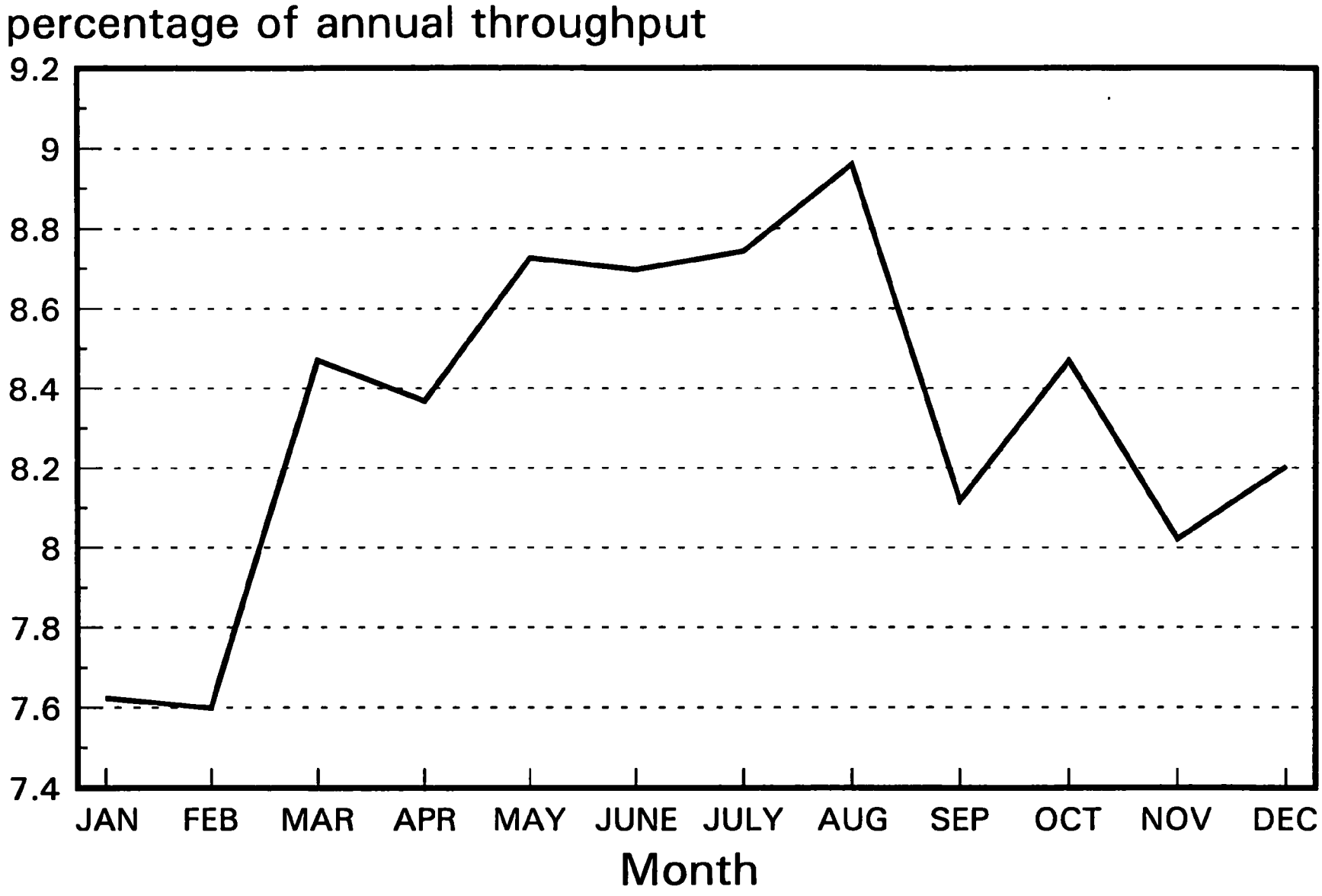
STATES WITH HIGHEST GASOLINE THROUGHPUT

STATE	Percent of Nationwide Throughput
California	11.4
Texas	7.6
Florida	5.3
New York	5.3
Ohio	4.9
Illinois	4.5
Pennsylvania	4.1
Michigan	3.8
Georgia	3.1
New Jersey	3.0

Nationwide throughput by State

STATE	1990 THROUGHPUT	PERCENT OF NATIONWIDE	STATE	1990 THROUGHPUT	PERCENT OF NATIONWIDE
ALABAMA	2,120,444	1.8%	MONTANA	444,349	0.4%
ALASKA	274,133	0.2%	NEBRASKA	795,515	0.7%
ARIZONA	1,678,470	1.4%	NEVADA	651,818	0.6%
ARKANSAS	1,264,427	1.1%	NEW HAMPSHIRE	510,137	0.4%
CALIFORNIA	13,304,359	11.4%	NEW JERSEY	3,547,006	3.0%
COLORADO	1,547,261	1.3%	NEW MEXICO	811,429	0.7%
CONNECTICUT	1,445,681	1.2%	NEW YORK	6,119,254	5.3%
DELAWARE	347,026	0.3%	NORTH CAROLINA	3,337,499	2.9%
DISTRICT OF COL.	175,799	0.2%	NORTH DAKOTA	352,200	0.3%
FLORIDA	6,212,149	5.3%	OHIO	5,765,788	4.9%
GEORGIA	3,571,616	3.1%	OKLAHOMA	1,712,492	1.5%
HAWAII	388,769	0.3%	OREGON	1,366,546	1.2%
IDAHO	491,663	0.4%	PENNSYLVANIA	4,733,852	4.1%
ILLINOIS	5,224,728	4.5%	RHODE ISLAND	381,057	0.3%
INDIANA	2,696,329	2.3%	SOUTH CAROLINA	1,618,044	1.4%
IOWA	1,376,510	1.2%	SOUTH DAKOTA	393,896	0.3%
KANSAS	1,251,101	1.1%	TENNESSEE	2,613,637	2.2%
KENTUCKY	1,850,610	1.6%	TEXAS	8,859,492	7.6%
LOUISIANA	2,024,455	1.7%	UTAH	734,344	0.6%
MAINE	611,394	0.5%	VERMONT	290,641	0.2%
MARYLAND	2,157,151	1.9%	VIRGINIA	3,027,842	2.6%
MASSACHUSETTS	2,433,953	2.1%	WASHINGTON	2,311,131	2.0%
MICHIGAN	4,371,053	3.8%	WEST VIRGINIA	835,298	0.7%
MINNESOTA	2,077,581	1.8%	WISCONSIN	2,123,146	1.8%
MISSISSIPPI	1,265,062	1.1%	WYOMING	262,113	0.2%
MISSOURI	2,752,483	2.4%			
			NATIONWIDE	116,513,000	

Nationwide Throughput by Month



Throughput by Nonattainment designation

(percentage of national throughput)

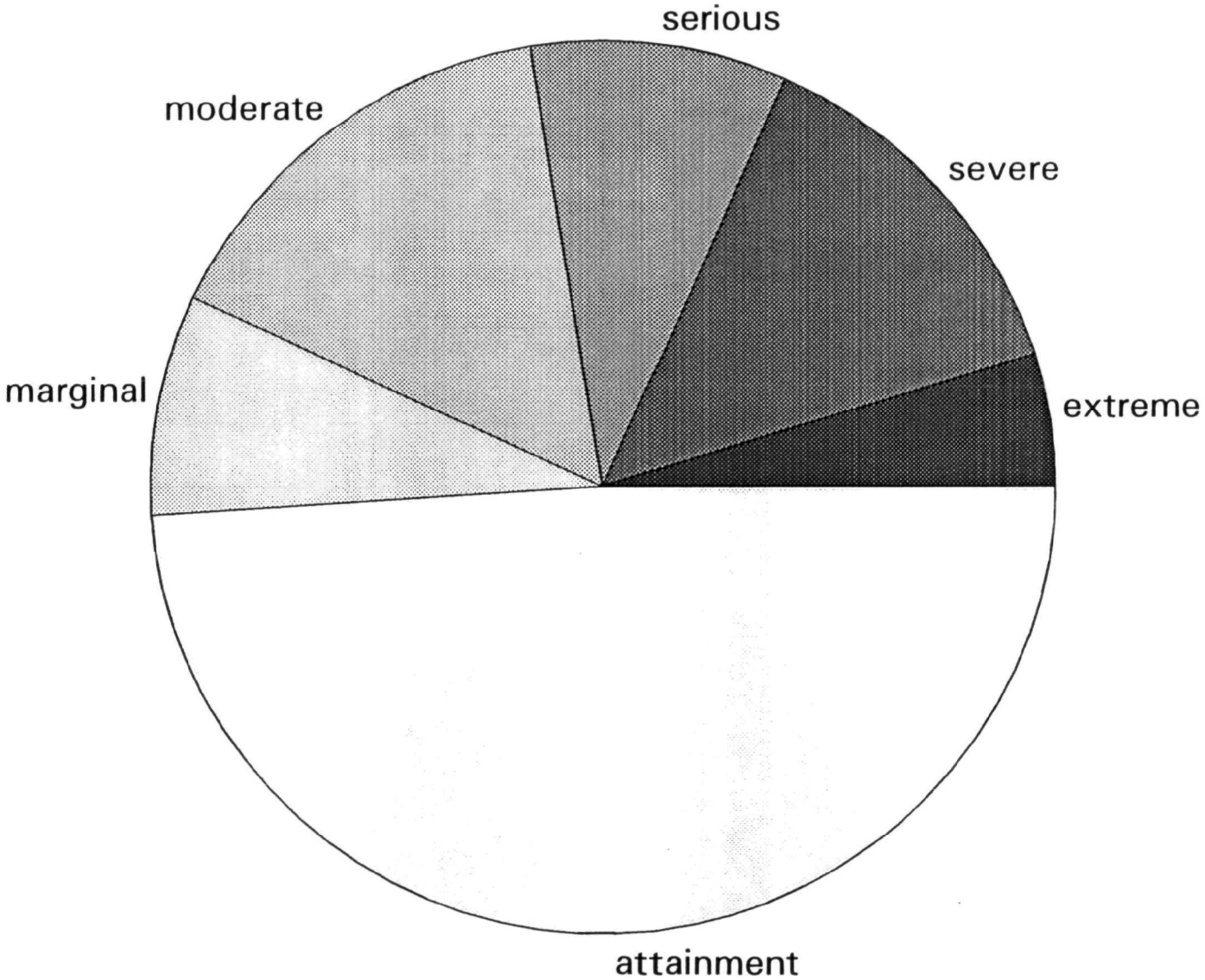


TABLE 2-2. GASOLINE THROUGHPUT PERCENTAGES OF NATIONAL TOTAL FOR OZONE NONATTAINMENT AREAS CLASSIFIED MODERATE OR ABOVE

Nonattainment Areas	Percentage of National Throughput	Nonattainment Areas	Percentage of National Throughput
	Extreme		
Los Angeles-South Coast Air Basin, CA	4.81		
	Severe		
Baltimore, MD	0.99	Philadelphia-Wilm-Trent, PA-NJ-DE-MD	1.91
Chicago-Gary-Lake County, IL-IN	2.52	Southeast Desert Modified AQMA, CA	a
Houston-Galveston-Brazoria, TX	1.64	San Diego, CA	0.86
Milwaukee-Racine, WI	0.52	Ventura Co, CA	0.23
New York-N New Jer-Long Is, NY-NJ-CT	4.97		
			13.64
	Serious		
Atlanta, GA	1.18		
Baton Rouge, LA	0.27	Portsmouth-Dover-Rochester, NH	0.13
Beaumont-Port Arthur, TX	0.18	San Joaquin Valley, CA	0.98
Boston-Lawrence-Worcester (E.MA), MA-NH	2.40	Providence (All RI), RI	0.35
		Sacramento Metro, CA	0.73
El Paso, TX	0.17	Sheboygan, WI	0.00
Greater Connecticut	1.26	Springfield (Western MA), MA	0.31
Muskegon, MI	0.05	Washington, DC-MD-VA	1.12
			9.13
	Moderate		
Atlantic City, NJ	0.12	Miami-Fort Lauderdale-W. Palm Beach, FL	1.52
Charleston, WV	0.12		
Charlotte-Gastonia, NC	0.25	Monterey Bay, CA	0.23
Cincinnati-Hamilton, OH-KY	0.60	Nashville, TN	0.37
Cleveland-Akron-Lorain, OH	1.10	Parkersburg, WV	0.07
Dallas-Fort Worth, TX	1.63	Phoenix, AZ	0.84
Dayton-Springfield, OH	0.35	Pittsburgh-Beaver Valley, PA	0.86
Detroit-Ann Arbor, MI	1.76	Portland, ME	0.17
Grand Rapids, MI	0.25	Raleigh-Durham, NC	0.26
Greensboro-Winston Salem-H Point, NC	0.30	Reading, PA	0.13
Huntington-Ashland, WV-KY	0.09	Richmond-Petersburg, VA	0.07
Kewaunee Co, WI	0.01	Salt Lake City, UT	0.30
Knox & Lincoln Cos, ME	0.03	San Francisco-Bay Area, CA	2.16
Lewiston-Auburn, ME	0.08	Santa Barbara-Santa Maria-Lompoc, CA	0.13
Louisville, KY-IN	0.34	St Louis, MO-IL	1.06
Manitowoc Co, WI	0.03	Toledo, OH	0.20
			15.50

Source: Nonattainment designations from 56 FR 56692 (See Table 1-1)
Gasoline consumption percentages estimated using 1985 NEDs fuel use report

[a] Gasoline consumption not reported because the consumption for this area and the LA South Coast Air Basin consumption cited above overlap, and sufficient information is not in the database to allow proportion this area's consumption from the LA consumption.

TABLE 2-3. ESTIMATED GASOLINE CONSUMPTION BY STATE FOR MODERATE AND ABOVE OZONE NONATTAINMENT AREAS

STATE	TOTAL 1990 THROUGHPUT (1000 gal) (1)	PERCENTAGE OF THROUGHPUT IN MODERATE AND ABOVE OZONE NONATTAINMENT AREAS (2)	MODERATE AND ABOVE OZONE NONATTAINMENT 1990 THROUGHPUT (1000 gal)
ALABAMA	2,120,444	0%	0
ALASKA	274,133	0%	0
ARIZONA	1,678,470	57%	964,833
ARKANSAS	1,264,427	0%	0
CALIFORNIA	13,304,359	94%	12,477,101
COLORADO	1,547,261	0%	0
CONNECTICUT	1,445,681	100%	1,445,681
DELAWARE	347,026	77%	266,202
DISTRICT OF COL.	175,799	100%	175,799
FLORIDA	6,212,149	31%	1,904,708
GEORGIA	3,571,616	40%	1,442,491
HAWAII	388,769	0%	0
IDAHO	491,663	0%	0
ILLINOIS	5,224,728	61%	3,197,686
INDIANA	2,696,329	12%	325,161
IOWA	1,376,510	0%	0
KANSAS	1,251,101	0%	0
KENTUCKY	1,850,610	26%	479,449
LOUISIANA	2,024,455	14%	286,315
MAINE	611,394	58%	353,101
MARYLAND	2,157,151	86%	1,849,060
MASSACHUSETTS	2,433,953	100%	2,433,953
MICHIGAN	4,371,053	55%	2,389,559
MINNESOTA	2,077,581	0%	0
MISSISSIPPI	1,265,062	0%	0
MISSOURI	2,752,483	34%	943,204
MONTANA	444,349	0%	0
NEBRASKA	795,515	0%	0
NEVADA	651,818	0%	0
NEW HAMPSHIRE	510,137	61%	312,603
NEW JERSEY	3,547,006	98%	3,482,556
NEW MEXICO	811,429	0%	0
NEW YORK	6,119,254	49%	3,020,510
NORTH CAROLINA	3,337,499	28%	948,253
NORTH DAKOTA	352,200	0%	0
OHIO	5,765,788	50%	2,860,051
OKLAHOMA	1,712,492	0%	0
OREGON	1,366,546	0%	0
PENNSYLVANIA	4,733,852	49%	2,315,213
RHODE ISLAND	381,057	100%	381,057
SOUTH CAROLINA	1,618,044	0%	0
SOUTH DAKOTA	393,896	0%	0
TENNESSEE	2,613,637	16%	417,739
TEXAS	8,859,492	45%	3,958,250
UTAH	734,344	45%	332,915
VERMONT	290,641	0%	0
VIRGINIA	3,027,842	13%	393,675
WASHINGTON	2,311,131	0%	0
WEST VIRGINIA	835,298	27%	224,213
WISCONSIN	2,123,146	35%	746,396
WYOMING	262,113	0%	0
NATIONWIDE	116,512,733	43%	50,327,735

SOURCES:
(1) Federal Highway Administration, Monthly Gasoline Reports As Reported in 1991 NPN Factbook
(2) Preliminary estimate based on 1987-89 design values or 1988-90 design values for a few areas

SERVICE STATION POPULATION

REGULATED UNIVERSE

- **The Program Oversight Agency "must establish a method to accurately determine which facilities must comply with the Stage II program requirements"**

REGULATED UNIVERSE

- **Facility Population**
- **Distribution by Throughput**

STATES WITH LARGEST PUBLIC SERVICE STATION POPULATION

STATE	Number of Service Stations
California	13,800
Texas	11,000
North Carolina	10,643
Florida	10,152
Illinois	10,100
Michigan	8,500
Missouri	7,200
Georgia	7,000
New York	6,800
Louisiana	6,600

TABLE 2-4. ESTIMATED 1990 RETAIL SERVICE STATION POPULATION

State	Number of Stations	State	Number of Stations
Alabama	6,500	Montana	1,400
Alaska	300	Nebraska	3,000
Arizona	4,010	Nevada	450
Arkansas	3,764	New Hampshire	1,050
California	13,800	New Jersey	3,860
Colorado	3,400	New Mexico	2,066
Connecticut	1,900	New York	6,800
Delaware	450	North Carolina	10,643
Dist. of Columbia	134	North Dakota	1,245
Florida	10,152	Ohio	6,205
Georgia	7,000	Oklahoma	4,700
Hawaii	392	Oregon	2,165
Idaho	1,123	Pennsylvania	6,000
Illinois	10,100	Rhode Island	602
Indiana	4,500	South Carolina	5,200
Iowa	4,169	South Dakota	1,245
Kansas	3,062	Tennessee	6,000
Kentucky	2,446	Texas	11,000
Louisiana	6,600	Utah	2,137
Maine	700	Vermont	856
Maryland	2,450	Virginia	6,000
Massachusetts	2,500	Washington	3,500
Michigan	8,500	West Virginia	2,800
Minnesota	3,598	Wisconsin	5,074
Mississippi	6,000	Wyoming	1,372
Missouri	7,200	NATIONWIDE TOTAL	210,120

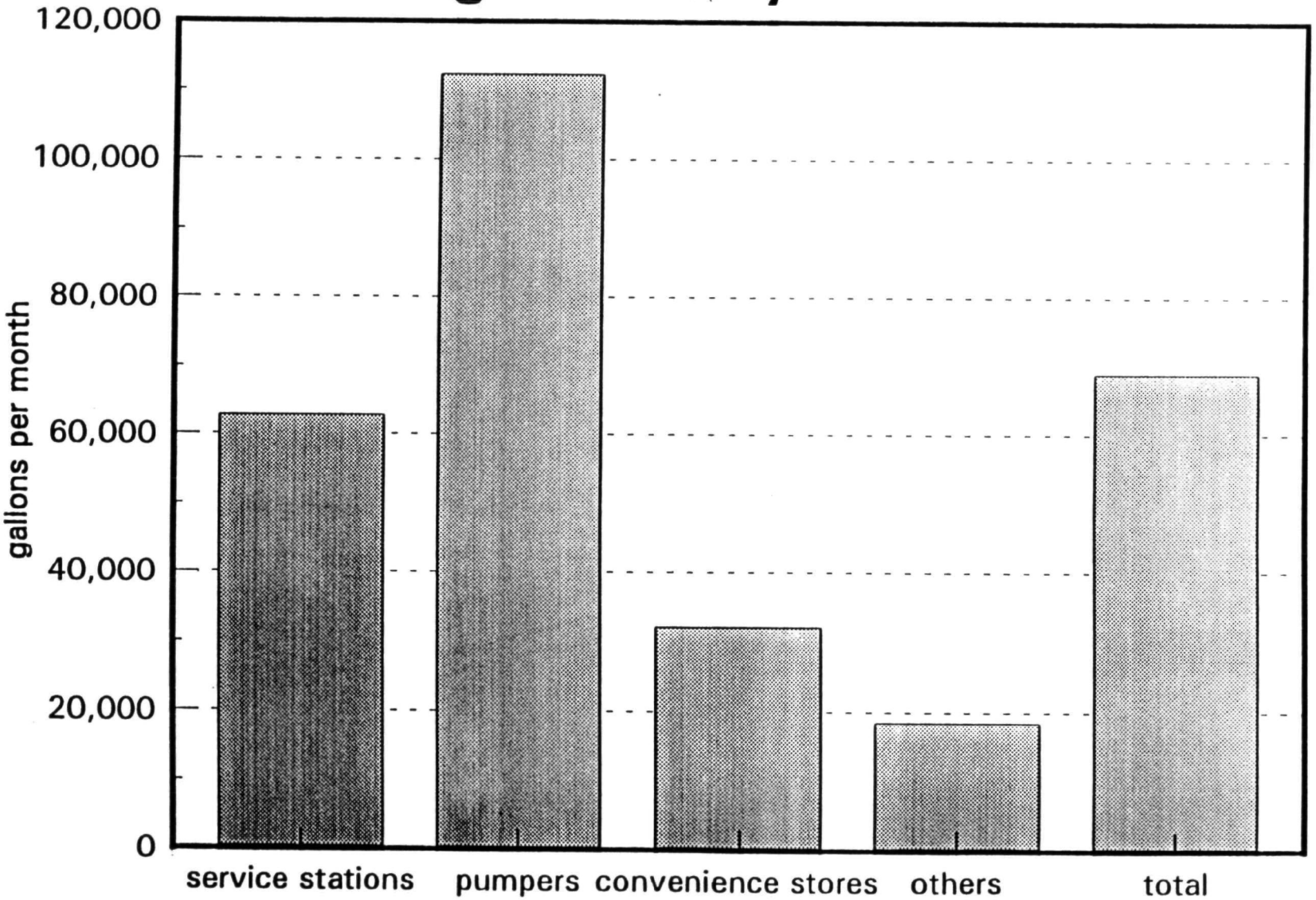
Source: National Petroleum News, "Counting Procedure Shows How Retail Outlet Population is Greater Than Expected," April 1991.

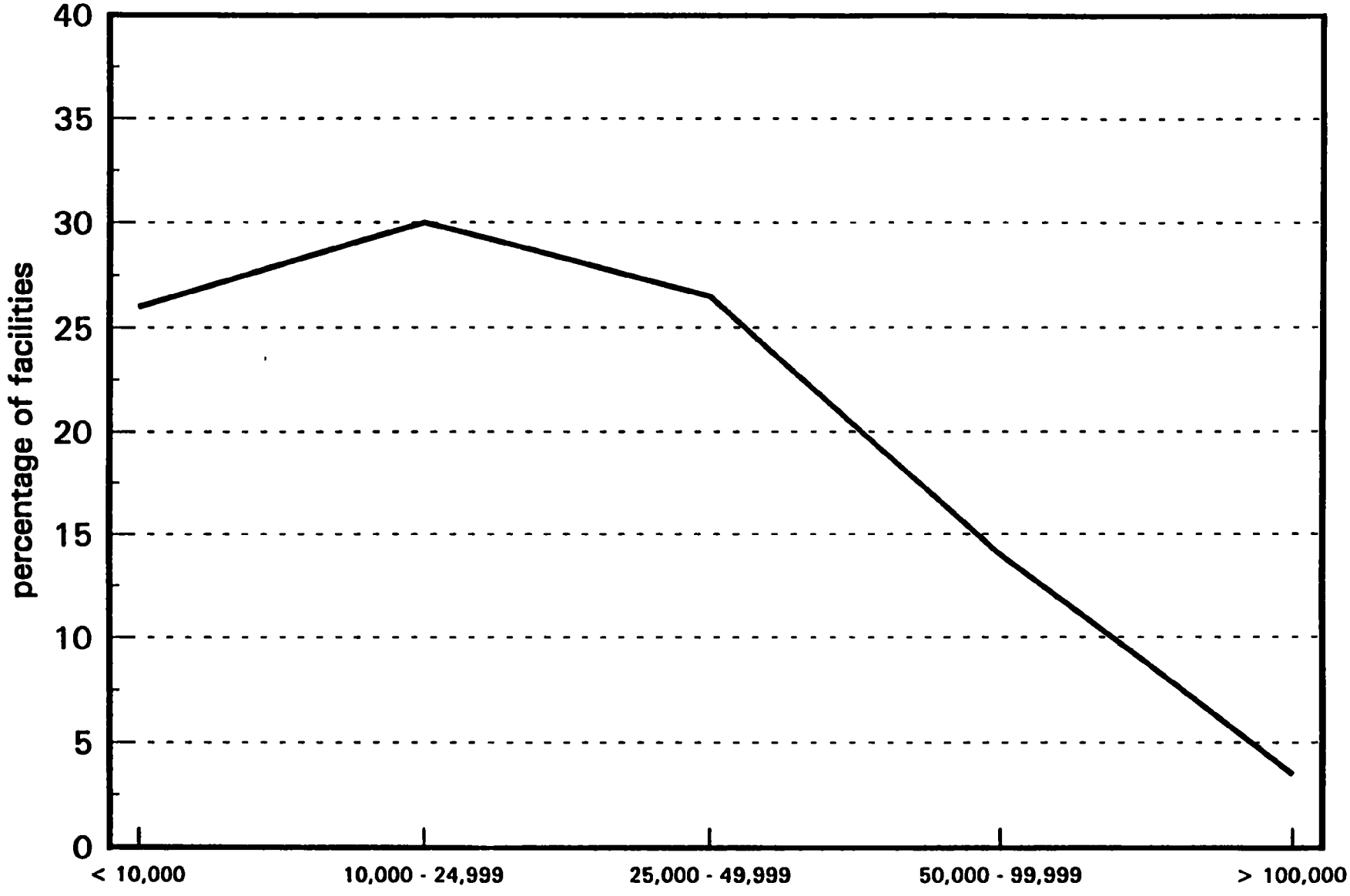
SERVICE STATION SIZE DISTRIBUTION

1990 CLEAN AIR ACT AMENDMENTS STAGE II EXEMPTION LEVELS

- $\leq$ 10,000 gallons per month
- $\leq$ 50,000 gallons per month for independent small business marketers

Average Monthly Volume



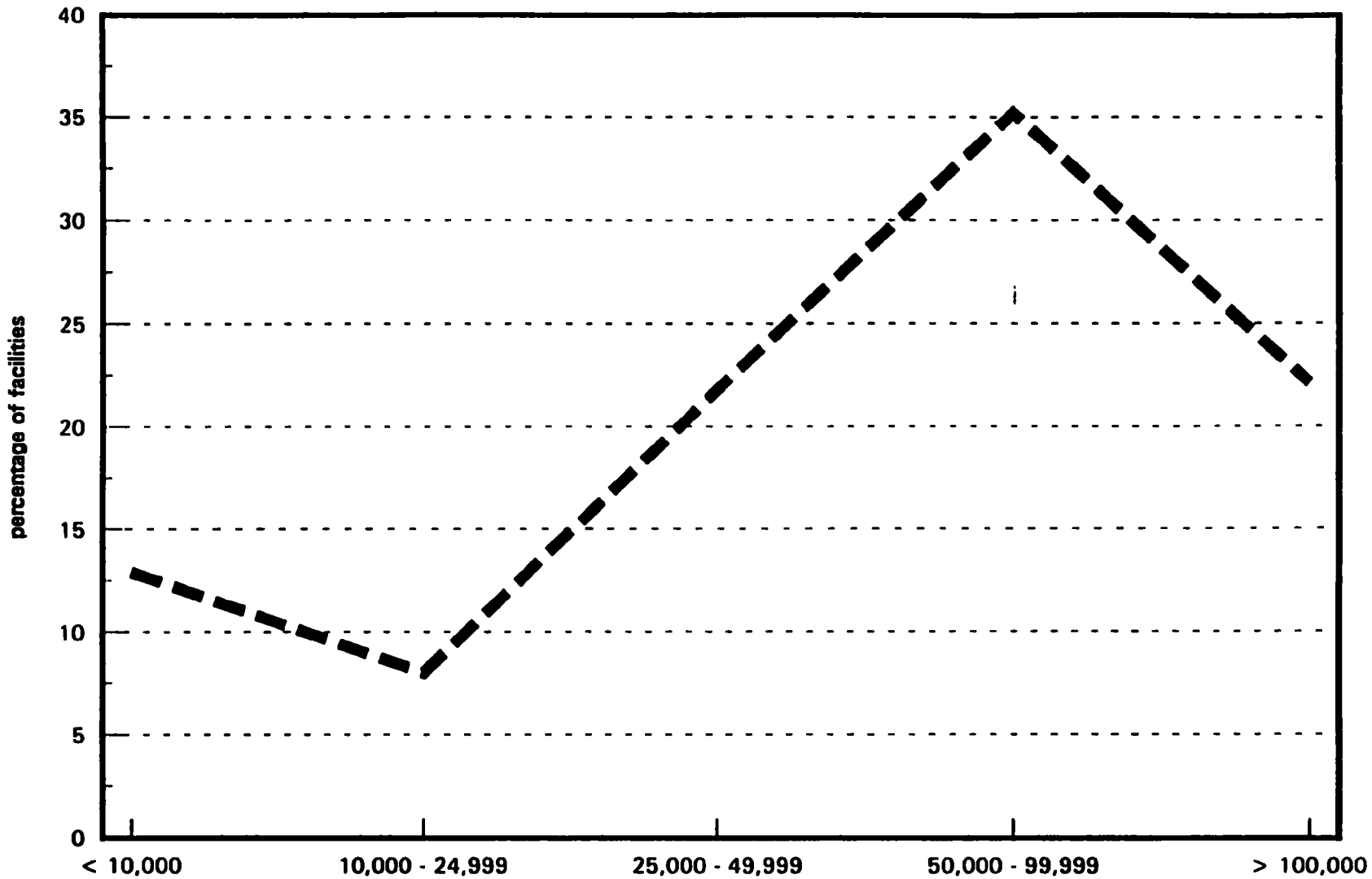


EPA Nationwide Public Service Station Distribution

TABLE 2-6. NATIONWIDE RETAIL SERVICE STATION DISTRIBUTION ESTIMATED BY EPA

Gasoline Throughput Range (gallons/month)	Percentage of Retail Service Stations
0 - 9,999	26
10,000 - 24,999	30
25,000 - 49,999	26.5
50,000 - 99,999	14
> 100,000	3.5

Source: "Draft RIA: Proposed Refueling Emission Regulations for Baseline Motor Vehicles - Volume I Analysis of Gasoline Marketing Regulatory Strategies," EPA-450/3-87-001a.

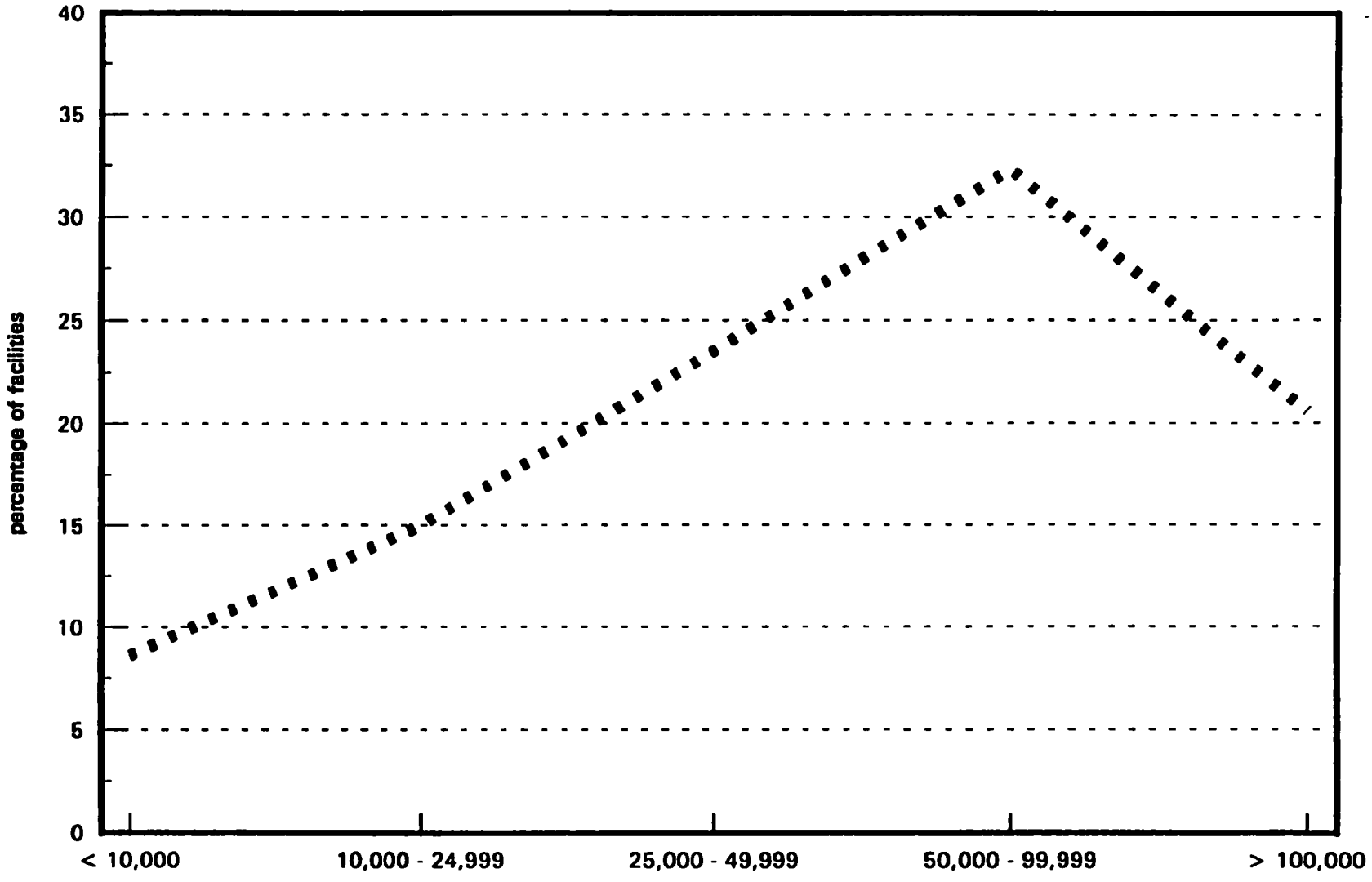


Sierra Research Los Angeles Public Service Station Distribution

TABLE 2-8. LOS ANGELES RETAIL
SERVICE STATION DISTRIBUTION REPORTED BY SIERRA RESEARCH

Gasoline Throughput Range (gallons/month)	Percentage of Service Stations
0 - 9,999	12.9
10,000 - 24,999	8.0
25,000 - 49,999	21.8
50,000 - 99,999	35.2
> 100,000	22.0

Source: Sierra Research, "An Analysis of Stage II and Onboard Refueling Emissions Control", November 30, 1988.

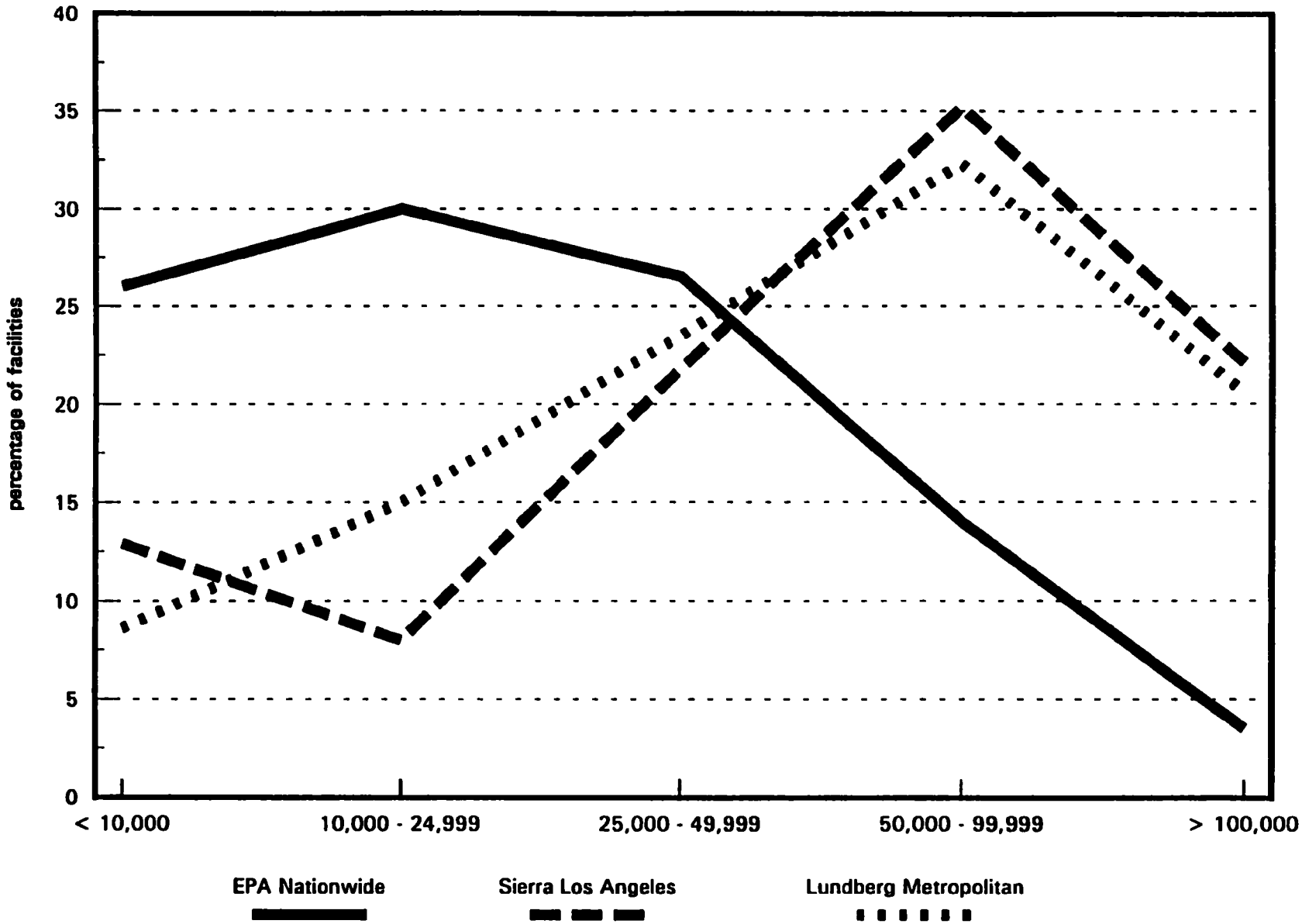


Lundberg Data Metropolitan Public Service Station Distribution

TABLE 2-9. RETAIL SERVICE STATION DISTRIBUTION BASED ON LUNDBERG DATA FROM 16 METROPOLITAN AREAS

Gasoline Throughput Range (gallons/month)	Percentage of Service Stations
0 - 5,999	3.8
6,000 - 9,999	4.8
10,000 - 24,999	15.0
25,000 - 49,999	23.5
50,000 - 99,999	32.3
100,000 - 199,999	18.2
> 200,000	2.4

Source: Lundberg Survey, Incorporated.



Comparison of EPA Nationwide, Sierra L.A., and Lundberg Metropolitan

INDEPENDENT SMALL BUSINESS MARKETER CAA SECTION 326

Persons that are not indepedent small business marketers:

(1) (A) refiners, or

(B) those that control, is controlled by, or is under common control with, a refiner,

(C) those that are otherwise directly or indirectly affiliated with (A) or (B),

(2) those that receive less than 50 percent of annual income from refining or marketing of gasoline.

Percentage of Independents

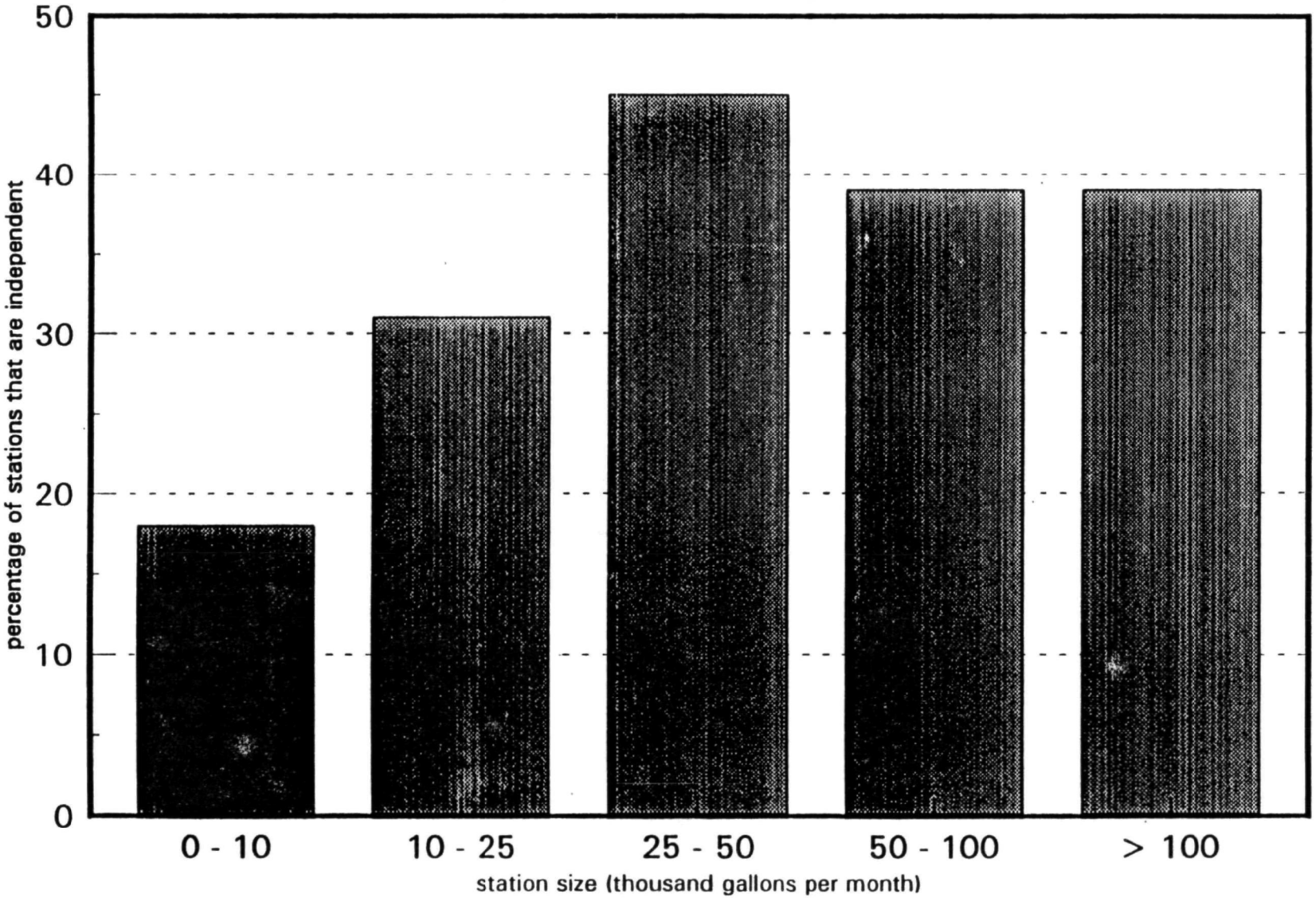


TABLE 2-10. CONSUMPTION DISTRIBUTION FOR NATIONWIDE AND METROPOLITAN AREA SCENARIOS

Facility Throughput Range (gallons/month)	Percent Consumption	
	Nationwide Distribution	Metropolitan Distribution
0 - 5,999	4.7	2.4
6,000 - 9,999	4.1	0.4
10,000 - 24,999	17.8	5.0
25,000 - 49,999	27.5	12.4
50,000 - 99,999	27.2	29.1
> 100,000	18.8	50.6

TABLE 2-11. ESTIMATED PERCENTAGE OF RETAIL STATIONS THAT ARE INDEPENDENTS BY THROUGHPUT CLASSIFICATION

Throughput Range (gallons/month)	Percentage of Independents
0 - 9,999	18%
10,000 - 24,999	31%
25,000 - 49,999	45%
50,000 - 99,999	39%
> 100,000	39%

PERCENT CONSUMPTION EXCLUDED WITH VARIOUS STAGE II EXEMPTION SCENARIOS

EXEMPTION SCENARIO	PERCENT CONSUMPTION EXCLUDED FROM REGULATION
EXEMPT STATIONS 2,000 GAL/MON	2.4%
EXEMPT STATIONS < 10,000 GAL/MON	2.8%
EXEMPT STATIONS < 10,000 GAL/MON AND INDEPENDENTS < 50,000 GAL/MON	10.0%

TABLE 4-3. PERCENT CONSUMPTION EXCLUDED WITH VARIOUS STAGE II EXEMPTION SCENARIOS

EXEMPTION SCENARIO	PERCENT CONSUMPTION EXCLUDED FROM REGULATION
EXEMPT STATIONS 2,000 GAL/MON	2.4%
EXEMPT STATIONS < 10,000 GAL/MON	2.8%
EXEMPT STATIONS < 10,000 GAL/MON AND INDEPENDENTS < 50,000 GAL/MON	10.0%

Exemption values based on metropolitan area throughput by model plant shown in Table 2-9, since most, if not all, nonattainment areas are metropolitan areas. Table 2-10 was used to estimate exemptions for independents. The following assumptions were used:

- < 2,000 gal/mon = Model Plant 1a
- < 10,000 gal/mon = Model Plant 1
- < 10,000 gal/mon non-independents, < 50,000 gal/mon independents = Model Plant 1 plus independents in Model Plants 2 and 3

SUMMARY

- Accurately determine facility population

- Distribution of Stations by gasoline throughput

- Best approach is to obtain area-specific information

- Technical guidance document provides information to estimate in absence of area-specific information

APPENDIX A

LUNDBERG SURVEY INCORPORATED INDIVIDUAL COUNTY SIZE DISTRIBUTION

The Lundberg Survey information discussed in Chapter 2 provided the number of service stations in each of the following counties along with the average monthly gasoline throughput.

Syracuse, NY	Houston-Galveston-Brazoria, TX
Phoenix, AZ	St. Louis, MI-IL
San Diego, CA	Portland-Vancouver, OR-WA
Detroit-Ann Arbor, MI	Milwaukee-Racine, WI
Lansing, MI	New York-Newark-Long Island, NY-NJ-CT
Grand Rapids, MI	Providence-Pawtucket-Fall River, MA-RI
El Paso, TX	Madison, WI
Orlando, FL	Santa Barbara-Santa Maria-Lompoc, CA

There were approximately 11,000 individual service stations in the database. For each individual county, the service stations were placed into seven categories according to monthly gasoline throughput. The distribution for all of these areas combined was given in Table 2-8 and is restated in Table A-1. However, the distribution for each county was also calculated. In order to provide comparisons between these counties, the counties were then sorted according to population and number of service stations. These distributions are shown in Tables A-2 and A-3, respectively.

TABLE A-1. RETAIL SERVICE STATION DISTRIBUTION BASED ON LUNDBERG DATA FROM 16 METROPOLITAN AREAS

GASOLINE THROUGHPUT RANGE (gallons/month)	PERCENTAGE OF SERVICE STATIONS
0 - 5,999	3.8
6,000 - 9,999	4.8
10,000 - 24,999	15.0
25,000 - 49,999	23.5
50,000 - 99,999	32.3
100,000 - 199,999	18.2
> 200,000	2.4

Source: Lundberg Survey, Incorporated.

TABLE A-2

SIZE DISTRIBUTIONS OF COUNTIES SORTED BY POPULATION

Lundberg Survey
Incorporated Census Data
Gasoline Throughput For U.S.Environmental Protection Agency

COUNTY	POPULATION	SIZE1	SIZE2	SIZE3	SIZE4	SIZE5	SIZE6	SIZE7
MONROE, IL	22365	13.3	6.7	33.3	40.0	6.7	0.0	0.0
WALLER, TX	23150	22.0	9.8	24.4	19.5	17.1	7.3	0.0
CLINTON, IL	33455	12.9	25.8	19.4	32.3	6.5	3.2	0.0
BRISTOL, RI	48288	0.0	14.3	4.8	42.9	28.6	9.5	0.0
LIBERTY, TX	52241	12.0	12.0	34.7	26.7	12.0	2.7	0.0
YAMHILL, OR	65307	0.0	3.2	38.7	29.0	29.0	0.0	0.0
LAPEER, MI	74340	27.5	13.7	15.7	17.6	15.7	7.8	2.0
FRANKLIN, MO	80413	13.4	5.2	13.4	46.6	17.5	4.1	0.0
OSCEOLA, FL	104104	1.1	2.3	17.2	29.9	39.1	9.2	1.1
WASHINGTON, RI	108003	1.6	4.7	14.1	31.3	31.3	15.6	1.6
LIVINGSTON, MI	114958	13.3	4.4	11.1	17.8	22.2	15.6	15.6
MACOMB, IL	117206	0.7	1.3	5.7	14.3	40.3	30.0	7.7
SUSSEX, NJ	129633	1.3	5.1	15.4	26.9	39.7	10.3	1.3
KENT, RI	159900	1.0	1.9	12.5	28.8	37.5	17.3	1.0
JEFFERSON, MO	170254	4.7	3.8	7.5	27.4	42.5	13.2	0.9
MONTGOMERY, TX	180394	9.9	11.5	28.1	27.1	13.5	8.3	1.6
BRAZORIA, TX	190891	10.7	12.6	34.0	27.9	13.0	1.9	0.0
GALVESTON, TX	216175	3.8	10.9	35.9	25.0	18.5	6.0	0.0
FORT BEND, TX	224751	12.5	10.6	17.3	29.8	20.2	9.6	0.0
CLARK, WA	237277	1.9	4.9	14.6	29.1	34.0	15.5	0.0
SOMERSET, NJ	239188	0.8	1.7	11.7	19.2	48.3	17.5	0.8
MADISON, IL	246762	2.4	4.8	18.2	41.8	28.5	4.2	0.0
CLACKAMAS, OR	277791	4.2	2.5	10.1	21.0	37.0	21.8	3.4
WASHTENAW, MI	280222	4.9	4.9	10.6	9.8	44.7	22.0	3.3
SEMINOLE, FL	285213	0.7	2.0	20.5	18.5	35.1	18.5	4.6
WASHINGTON, OR	309883	0.0	2.4	6.1	14.6	40.2	35.4	1.2
RICHMOND, NY	349549	5.1	2.5	14.4	33.1	29.7	13.6	1.7
MORRIS, NJ	419456	1.6	2.4	9.8	28.9	37.0	19.1	1.2
OCEAN, NJ	429076	3.0	1.2	15.1	25.3	28.3	19.3	7.8
PASSIAC, NJ	442895	1.7	3.9	16.7	29.6	36.5	11.2	0.4
UNION, NJ	490000	2.8	6.0	15.5	21.6	31.4	21.6	1.1
HUDSON, NJ	533598	7.4	5.5	12.9	23.9	30.1	17.8	2.5
MONMOUTH, NJ	548793	0.8	2.7	7.0	23.4	39.1	25.0	2.0
MULTINOMAH, OR	580029	3.2	0.8	7.9	26.5	40.3	19.0	2.4
PROVIDENCE, RI	585763	3.5	5.5	14.8	33.5	27.7	13.9	1.0
MIDDLESEX, NJ	667761	4.3	4.8	12.1	31.5	26.1	18.0	3.2
ORANGE, FL	670213	2.8	3.3	13.9	23.6	37.1	17.3	1.9
ESSEX, NJ	749355	1.1	9.9	19.1	23.2	36.8	9.6	0.4
BERGEN, NJ	818237	3.0	5.1	16.5	24.5	35.6	14.0	1.3
OAKLAND, MI	1076234	1.8	2.0	5.7	13.3	39.8	33.0	4.3
BRONX, NY	1203789	5.1	3.3	16.7	27.0	27.9	18.1	1.9
NEW YORK, NY	1420702	2.5	1.3	5.0	17.5	28.8	30.0	15.0
QUEENS, NY	1881375	5.3	5.9	18.8	27.7	27.7	13.8	0.8
WAYNE, MI	2049294	2.1	3.2	5.8	11.3	46.6	28.1	2.9
KINGS, NJ	2300664	4.6	4.8	18.0	24.5	30.0	16.1	1.9
SAN DIEGO, CA	2465961	2.5	1.2	6.8	14.3	33.1	34.4	7.8
HARRIS, TX	2791102	4.2	6.8	21.0	25.2	27.7	14.3	0.8

TABLE A-3

SIZE DISTRIBUTIONS OF COUNTIES SORTED BY THE NUMBER OF SERVICE STATIONS

Lundberg Survey
Incorporated Census Data
Gasoline Throughput For U.S.Environmental Protection Agency

COUNTY	STATIONS	SIZE1	SIZE2	SIZE3	SIZE4	SIZE5	SIZE6	SIZE7
MONROE, IL	15	13.3	6.7	33.3	40.0	6.7	0.0	0.0
BRISTOL, RI	21	0.0	14.3	4.8	42.9	28.6	9.5	0.0
CLINTON, IL	31	12.9	25.8	19.4	32.3	6.5	3.2	0.0
YAMHILL, OR	31	0.0	3.2	38.7	29.0	29.0	0.0	0.0
WALLER, TX	41	22.0	9.8	24.4	19.5	17.1	7.3	0.0
LIVINGSTON, MI	45	13.3	4.4	11.1	17.8	22.2	15.6	15.6
LAPEER, MI	51	27.5	13.7	15.7	17.6	15.7	7.8	2.0
WASHINGTON, RI	64	1.6	4.7	14.1	31.3	31.3	15.6	1.6
LIBERTY, TX	75	12.0	12.0	34.7	26.7	12.0	2.7	0.0
SUSSEX, NJ	78	1.3	5.1	15.4	26.9	39.7	10.3	1.3
NEW YORK, NY	80	2.5	1.3	5.0	17.5	28.8	30.0	15.0
WASHINGTON, OR	82	0.0	2.4	6.1	14.6	40.2	35.4	1.2
OSCEOLA, FL	87	1.1	2.3	17.2	29.9	39.1	9.2	1.1
FRANKLIN, MO	97	13.4	5.2	13.4	46.6	17.5	4.1	0.0
CLARK, WA	103	1.9	4.9	14.6	29.1	34.0	15.5	0.0
KENT, RI	104	1.0	1.9	12.5	28.8	37.5	17.3	1.0
FORT BEND, TX	104	12.5	10.6	17.3	29.8	20.2	9.6	0.0
JEFFERSON, MO	106	4.7	3.8	7.5	27.4	42.5	13.2	0.9
RICHMOND, NY	118	5.1	2.5	14.4	33.1	29.7	13.6	1.7
CLACKAMAS, OR	119	4.2	2.5	10.1	21.0	37.0	21.8	3.4
SOMERSET, NJ	120	0.8	1.7	11.7	19.2	48.3	17.5	0.8
WASHTENAW, MI	123	4.9	4.9	10.6	9.8	44.7	22.0	3.3
SEMINOLE, FL	151	0.7	2.0	20.5	18.5	35.1	18.5	4.6
HUDSON, NJ	163	7.4	5.5	12.9	23.9	30.1	17.8	2.5
MADISON, IL	165	2.4	4.8	18.2	41.8	28.5	4.2	0.0
OCEAN, NJ	166	3.0	1.2	15.1	25.3	28.3	19.3	7.8
GALVESTON, TX	184	3.8	10.9	35.9	25.0	18.5	6.0	0.0
MONTGOMERY, TX	192	9.9	11.5	28.1	27.1	13.5	8.3	1.6
BRONX, NY	215	5.1	3.3	16.7	27.0	27.9	18.1	1.9
BRAZORIA, TX	215	10.7	12.6	34.0	27.9	13.0	1.9	0.0
PASSIAC, NJ	233	1.7	3.9	16.7	29.6	36.5	11.2	0.4
MORRIS, NJ	246	1.6	2.4	9.8	28.9	37.0	19.1	1.2
MULTINOMAH, OR	253	3.2	0.8	7.9	26.5	40.3	19.0	2.4
MONMOUTH, NJ	256	0.8	2.7	7.0	23.4	39.1	25.0	2.0
ESSEX, NJ	272	1.1	9.9	19.1	23.2	36.8	9.6	0.4
UNION, NJ	283	2.8	6.0	15.5	21.6	31.4	21.6	1.1
MACOMB, IL	300	0.7	1.3	5.7	14.3	40.3	30.0	7.7
PROVIDENCE, RI	310	3.5	5.5	14.8	33.5	27.7	13.9	1.0
MIDDLESEX, NJ	372	4.3	4.8	12.1	31.5	26.1	18.0	3.2
KINGS, NJ	416	4.6	4.8	18.0	24.5	30.0	16.1	1.9
ORANGE, FL	423	2.8	3.3	13.9	23.6	37.1	17.3	1.9
OAKLAND, MI	442	1.8	2.0	5.7	13.3	39.8	33.0	4.3
QUEENS, NY	506	5.3	5.9	18.8	27.7	27.7	13.8	0.8
BERGEN, NJ	534	3.0	5.1	16.5	24.5	35.6	14.0	1.3
SAN DIEGO, CA	774	2.5	1.2	6.8	14.3	33.1	34.4	7.8
WAYNE, MI	822	2.1	3.2	5.8	11.3	46.6	28.1	2.9
HARRIS, TX	1801	4.2	6.8	21.0	25.2	27.7	14.3	0.8

These tables could be used to predict a distribution for an area where data are not available to actually calculate this distribution. For example, assume a county has a population of approximately 225,000. From Table A-2, the counties of Galveston, TX, Fort Bend, TX, Clark WA, and Somerset, NJ have similar populations. An average size distribution could be calculated using this information and the number of stations from Table A-3. This could then be used as an estimate of the size distribution for the example county.

An NPN Exclusive

Counting Procedure Shows How Retail Outlet Population Is Greater than Suspected

By Richard J. Shaner
Executive Editor
and *NPN* Staff

A comprehensive, up-to-the-minute survey conducted by *National Petroleum News* indicates that the retail gasoline outlet population currently exceeds 200,000 and may have stabilized, after years of retrenchment, within hailing distance of the old peak set in 1972.

Simply stated, the new counting concept focuses on the number of places where motorists can buy gasoline for their vehicles at retail pumps. It includes conventional "service stations," convenience stores, unattended outlets, truckstops, car washes, garages, etc., anywhere and everywhere that gasoline is sold to the public.

It provides marketers with a comparable and much more confirmable universe figure rather than the hodgepodge of guesses that have been commonplace in recent years.

It's quite probable that when a new survey is made by *NPN* early next year, the gap between the 1991 count and the 1972 record will have narrowed considerably and may be just a memory. Right now, it's relatively close. *NPN's* 1991 population total is 210,120 compared with 1972's 226,459. This is only about 16,000 below the old high water mark.

This, in itself, is surprising because the general feeling has been that the number of places where motorists can purchase gasoline has been on a frightening downhill ski ride for 15-20 years. There is no question that thousands of retail stations have gone belly-up in the last decade or so, forced out by the economics of staying alive or by being displaced and gobbled up by big stations that absorbed the efforts of several smaller ones in given neighborhoods. Environmental requirements, including underground storage tanks, insurance and Stage II requirements were particularly troublesome in 1989 and 1990.

But many of these losses have been made up by the expansion of convenience

Pump Prices Reflect Growth And Turmoil

A half-century ago, retail gasoline taxes—federal and state—cost consumers less than .06¢ gal. Even with them, pump prices for regular ran only 18¢ gal. Today, federal and state tax averages are in the 30¢ gal. range and pump prices (regular grade) in 1990 averaged $1.15 gal. for the year and hit as high as $1.40 gal. in the final quarter.)

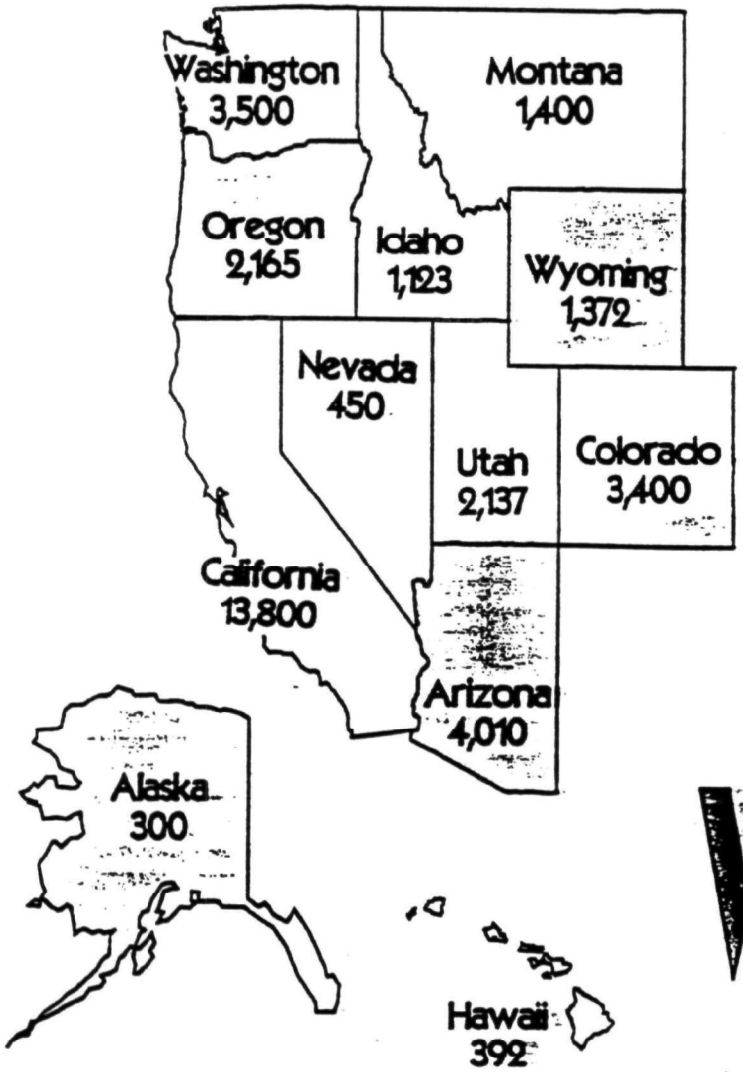
Here's an overview for the past 50 years. It must be remembered, however, that unleaded gasoline was not a marketing factor until 1978 when it was mandated by the federal government as a replacement for leaded gasoline. Today that turnover process is virtually completed with leaded gasoline sales down to about 5% of total consumption.

Retail Gasoline Prices: A Half-Century of Changes

	Leaded Regular	Unleaded Regular
1990	$1.150	$1.170
1989	0.997	1.022
1988	0.900	0.946
1987	0.897	0.948
1986	0.857	0.927
1985	1.115	1.203
1984	1.129	1.212
1983	1.157	1.241
1982	1.222	1.296
1981	1.311	1.378
1980	1.191	1.245
1975	0.572	*
1972	0.361	*
1970	0.356	*
1960	0.311	*
1950	0.267	*
1940	0.184	*

* Unleaded not in marketplaces.

Source: American Petroleum Institute, Petroleum Basic Data Book, 1990.



WEST

The Top 10 Across the Board

	Total Outlets in 1991(a)		Winners' Increases '91 v. '72(b)		Losers' Decreases '91 v. '72(c)
California	13,800	N. Carolina	+3,697	Texas	-6,118
Texas	11,000	Mississippi	+3,273	California	-5,713
N.Carolina	10,643	Louisiana	+2,679	Ohio	-5,518
Florida	10,152	Alabama	+1,990	Pennsylvania	-5,256
Illinois	10,100	Arizona	+1,653	New York	-4,559
Michigan	8,500	Iowa	+1,556	Massachusetts	-2,198
Missouri	7,200	S. Carolina	+1,480	New Jersey	-1,908
Georgia	7,000	Virginia	+1,352	Indiana	-1,735
New York	6,800	Florida	+953	Kentucky	-1,457
Louisiana	6,600	Missouri	+920	Minnesota	-987

(a) 1991 NPN telephone survey; (b), (c) 1991 NPN telephone survey v. NPN Factbook, 1972 Census Bureau data.

More Top 10's—Gallonage and Brand Names

	Total Gallonage (add 000) 1989(a)		Top Mkt. Shrs. (bil.gal.)(b)
California	13,339	Shell	10.1
Texas	8,749	Chevron	9.6
New York	6,770	Exxon	8.9
Florida	6,138	Texaco	8.6
Ohio	5,425	Mobil	8.5
Illinois	4,994	Amoco	8.4
Pennsylvania	4,710	BP America	6.6
Michigan	4,376	Marathon	5.8
Georgia	3,574	Citgo	5.1
New Jersey	3,531	Sun	5.1

(a) Federal Highway Administration; (b) NPN Factbook 1990.

for counting purposes only, retail gasoline stations from other types of business.

This includes the motor vehicle departments, the licensing departments and the tax divisions in more than half of the states in the country.

As a matter of fact, it's easier to find out the number of underground storage tanks in almost any state than it is to determine the number of service stations above them.

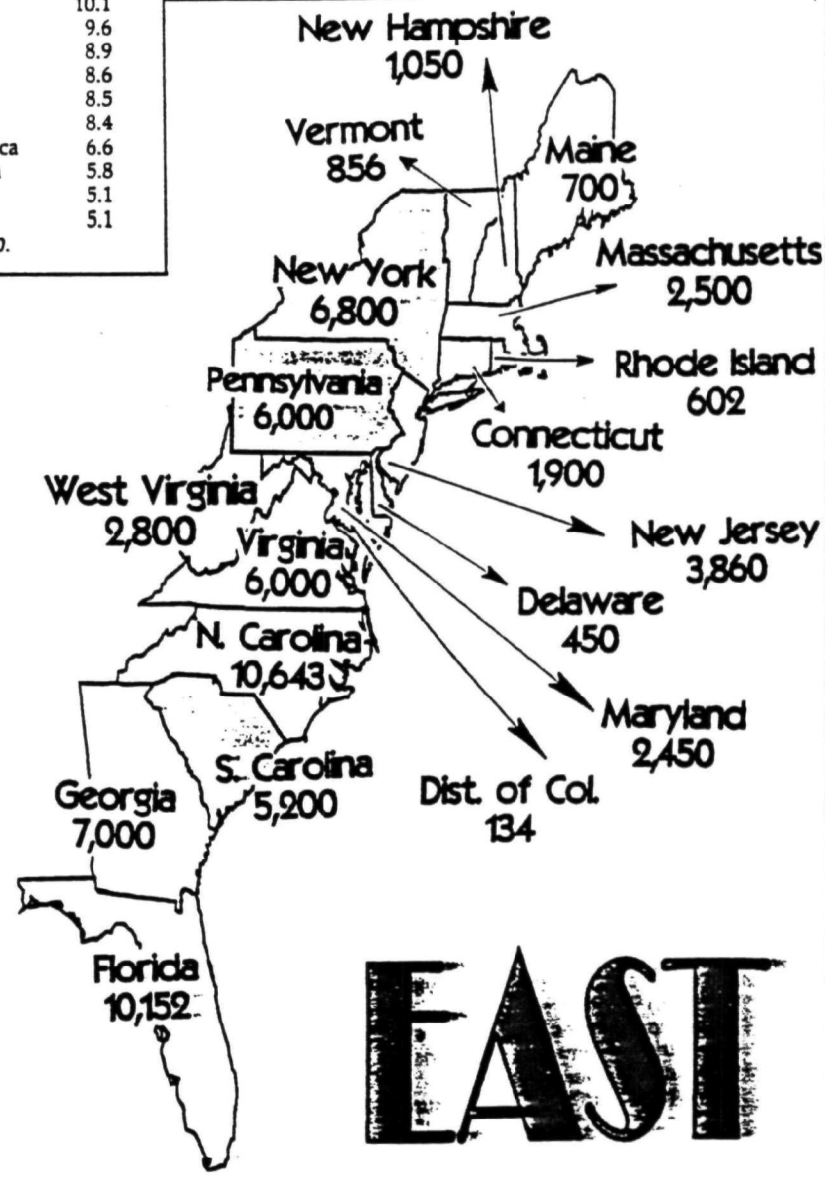
That's because federal law mandated establishment of environmental offices in each state, and the collection of appropriate data, including county-by-county inventories of UST facilities, so that federal and state regulations can be administrated. Since the mandate specified only storage tanks, no one apparently gave a hoot about the number of stations above them.

The lack of "official" tallies forced the *NPN* staffers to track down other responsible sources in state administrations who might have reasonable knowledge of the gasoline marketplaces and are in a position to make reliable estimates. These included weights and measures departments which, while not responsible for totals, were responsible for the accuracy of every retail pump in business. Key trade associations were contacted, too, because of their specialized knowledge.

About two-thirds of the numbers gathered by *NPN* are "hard" numbers, i.e., figures based on registration, licensing and tax division compilations. The remaining one-third ranges from "unofficial" estimates and in a couple of cases "guesstimates" based on the best available knowledge.

The totals for about half of the states indicate their gasoline outlet populations today are greater than they were in 1972. That was surprising in its own right because the general assumption had been that all 50 states had declined, that none was better off now than 20 years ago.

Some of the state totals seem exaggerated and out of step with reality. Take North Carolina, for example. It gave its retail outlet population as 10,643, which makes it the third greatest in the nation—bigger than Florida, Illinois and other populous areas that have much higher gasoline consumption totals. But North Carolina has an annual reporting proce-



20-Year Overview: The Way We Are Now, the Way We Were Then

	Total Outlets (Add 000)			Gasoline Gallonage (Add 000,000)		
	1991(a)	1987(b)	1972(c)	1989(a)	1987(b)	1972(c)
Alabama	6,500	2,229	4,510	2,122	2,084	1,796
Alaska	300	214	241	239	243	112
Arizona	4,010	1,241	2,357	1,755	1,683	1,094
Arkansas	3,764	1,357	3,144	1,274	1,242	1,113
California	13,800	9,812	19,513	13,339	12,543	9,996
Colorado	3,400	1,568	3,170	1,535	1,566	1,296
Connecticut	1,900	1,671	2,798	1,387	1,485	1,309
Delaware	450	279	557	349	338	290
Dist. of Col.	134	115	318	183	181	232
Florida	10,152	5,933	9,199	6,138	5,915	3,899
Georgia	7,000	3,273	6,730	3,573	3,421	2,680
Hawaii	392	355	480	392	385	253
Idaho	1,123	558	1,193	490	462	451
Illinois	10,100	4,655	10,211	4,994	4,772	4,837
Indiana	4,500	2,854	6,235	2,675	2,746	2,741
Iowa	4,169	2,020	2,613	1,410	1,370	1,653
Kansas	3,062	1,576	3,609	1,294	1,266	1,428
Kentucky	2,446	2,058	3,921	1,862	1,855	1,626
Louisiana	6,600	1,934	3,921	2,043	2,063	1,658
Maine	700	673	1,224	628	607	518
Maryland	2,450	1,846	3,012	2,158	2,068	1,775
Massachusetts	2,500	2,738	4,698	2,520	2,492	2,276
Michigan	8,500	4 164	8,919	4,377	4,288	4,537
Minnesota	3,598	2,289	4,585	2,102	2,033	2,061
Mississippi	6,000	1,374	2,727	1,258	1,270	1,203
Missouri	7,200	3,119	6,280	2,758	2,754	2,646
Montana	1,400	548	1,190	444	441	427
Nebraska	3,000	1,163	2,265	801	776	884
Nevada	450	441	798	633	568	366
New Hampshire	1,050	534	888	527	514	391
New Jersey	3,860	3,791	5,768	3,531	3,586	3,170
New Mexico	2,066	696	,831	821	813	647
New York	6,800	5,982	11,359	6,770	6,169	6,027
N. Carolina	10,643	3,547	6,946	3,369	3,318	2,714
North Dakota	1,245	471	910	361	381	423
Ohio	6,205	5,362	11,723	5,024	5,012	4,960
Oklahoma	4,700	1,705	4,153	1,678	1,773	1,516
Oregon	2,165	1,352	2,828	1,366	1,313	1,192
Pennsylvania	6,000	5,192	11,256	4,710	4,590	4,769
Rhode Island	602	487	901	385	397	401
S. Carolina	5,200	1,833	3,720	1,829	1,681	1,398
South Dakota	1,245	556	1,171	398	393	464
Tennessee	6,000	2,491	5,157	2,633	2,755	2,104
Texas	11,000	8,568	17,118	8,749	8,866	6,888
Utah	2,137	849	1,504	751	764	595
Vermont	856	369	596	284	282	243
Virginia	6,000	2,740	4,648	3,043	2,994	2,165
Washington	3,500	2,003	3,945	2,316	2,215	1,648
West Virginia	2,800	1,013	2,156	837	829	735
Wisconsin	5,074	2,735	5,182	2,122	2,047	2,147
Wyoming	1,372	415	772	326	313	279
Total U.S.	210,120	114,748	226,459	115,558	113,930	100,069

(a) This compilation embraces all outlets where gasoline is sold at retail; it includes service stations, convenience stores, car washes, etc.; a universe, in effect, of retail gasoline outlets; the survey was completed in January 1991.
(b) These are the U.S. Bureau of Census figures for 1987 but include only those service stations which have employees and payrolls and generate more than half of their income from gasoline sales. Automatically excluded are convenience stores, car washes, etc.
(c) These are the U.S. Bureau of Census figures for 1972 and are generally considered a "universe count" because only a handful of places, beyond orthodox service stations, sold gasoline at retail at that time.

Sources: NPN state-by-state telephone survey for 1991; U.S. Census Bureau, Censuses of Retail Trade, 1987 and 1972.

stores into gasoline marketing, and by th construction/modernization programs o the majors and big independents

The new counting concept make. p to the inadequacies of the U.S. Censu Bureau s *Survey of the Retail Trades* which is made every five years, and for th fragility of another key U.S. Commerc Dept. report, *Franchising in the U S Economy*, which had been used as a basi for providing interim service station to tals.

The new approach counts in, instead o ignoring, the tens of thousands of reta units with gasoline service that have bee a growing part of the convenience stor world since the late '70s. It looks at ther as full-fledged members of the gasolin marketing scene, peer equals for servic stations.

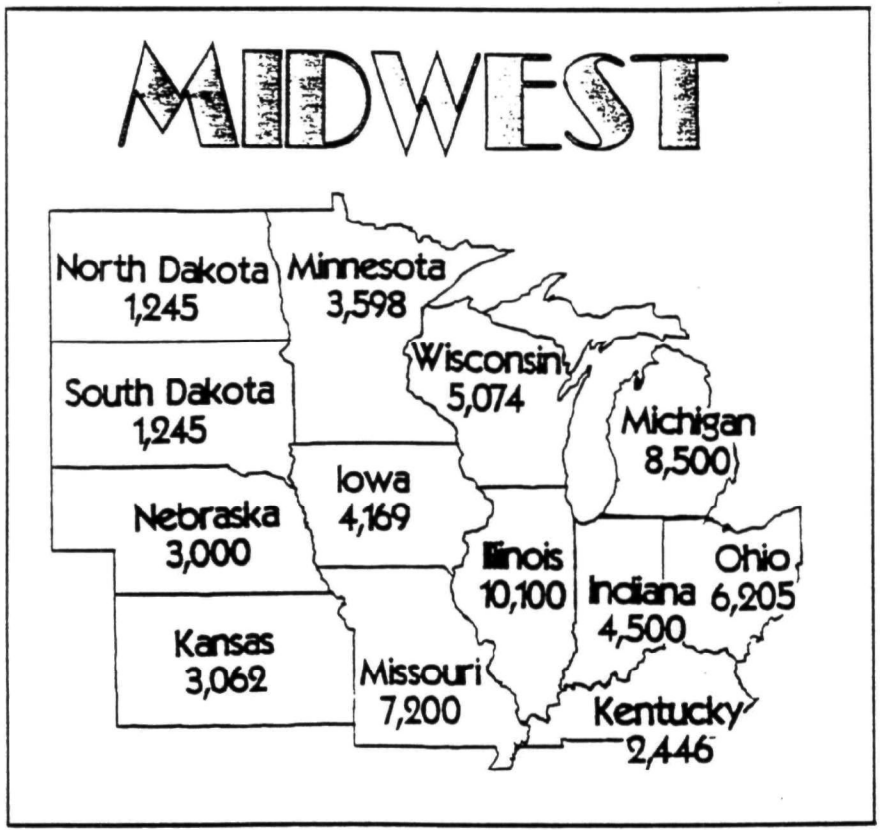
The problem with the so-called "offi cial" Census Bureau survey is that th collection signals and data bases wer changed several times in recent years s the figures were no longer comparabl with prior years. For example, in 197 about the only place that a motorist coul buy gasoline was at a "service station." I 1972, the Census Bureau said there wer 226,459 of them and this total, in effec represented the "universe." C-stores wer almost meaningless in the gasoline busi ness at that time.

In 1982 and 1987, the Census ea eliminated Mom-and-Pop stations and tal lied only those which had employees an formal payrolls. They classified as "ser vice stations" only those which generate 50% or more of their income fron gasoline sales. In 1987, the Census Bureau came up with a national total of 114,00 service stations, which was sad indeed b comparison with 1972's 226,000. But th figures were not comparable because on was a universe and the other a bobtaile count.

During the late '70s and all through th '80s, the convenience store industry bur geoned by the thousands to the curren total of an estimated 80,000, of which tw out of three or three out of four (take you pick) have gasoline facilities. This create such a gray area that only generalization could be used to estimate the retail outle population. At best, few marketers though the total for all outlets was more thar 200,000, let alone hard on the heels of th all-time high of yesteryear.

NPN's approach was nationwide i scope and, in effect, a repackaging of th numbers so that each state would be responsible for its own statistics. *NPN* staff members contacted every state in th union and the District of Colur to make sure every voice was heard.

At the outset, it must be realized that many states do not have so-called "official" figures or procedures for isolating.



dure that counts its retail gasoline outlets county by county.

"We have a lot of small ones down here, probably more than any other state," says a state association executive. "They're just about everyplace. I wouldn't be surprised at all at the number of 10,000 gal./mo. and 20,000 gal./mo. outlets we have, the kind you don't often find in most places anymore."

California, with the most outlets in the country, was a real problem child in getting an estimate. In 1972, California had almost 20,000 outlets. Today its Equalization Board can come up with a figure for true service stations, but confesses it has "no idea" how many convenience store types with gasoline there are. Secondary sources were used to get an acceptable (and authoritative) total for California.

A Washington state official says she had been trying for a year to get a retail gasoline station population total for her state by contacting state department officials she thought should know. No one, she says, had anything. Completely frustrated, she's now in the process of making her own count and hopes to have it completed this month or next.

Texas was another state that provided a total for true service stations but said it didn't know how many C-stores sold gasoline, even though most sources in the Lone Star State say it would be easier to count those that don't than those that do.

The importance of convenience stores as gasoline marketers cannot be ignored. Collectively, they sell billions of gallons of gasoline annually, perhaps as much as 20-25% of the national total. Realistically, it's virtually impossible to get specific statistics. There are no state-by-state breakouts on population totals, there are only guesses.

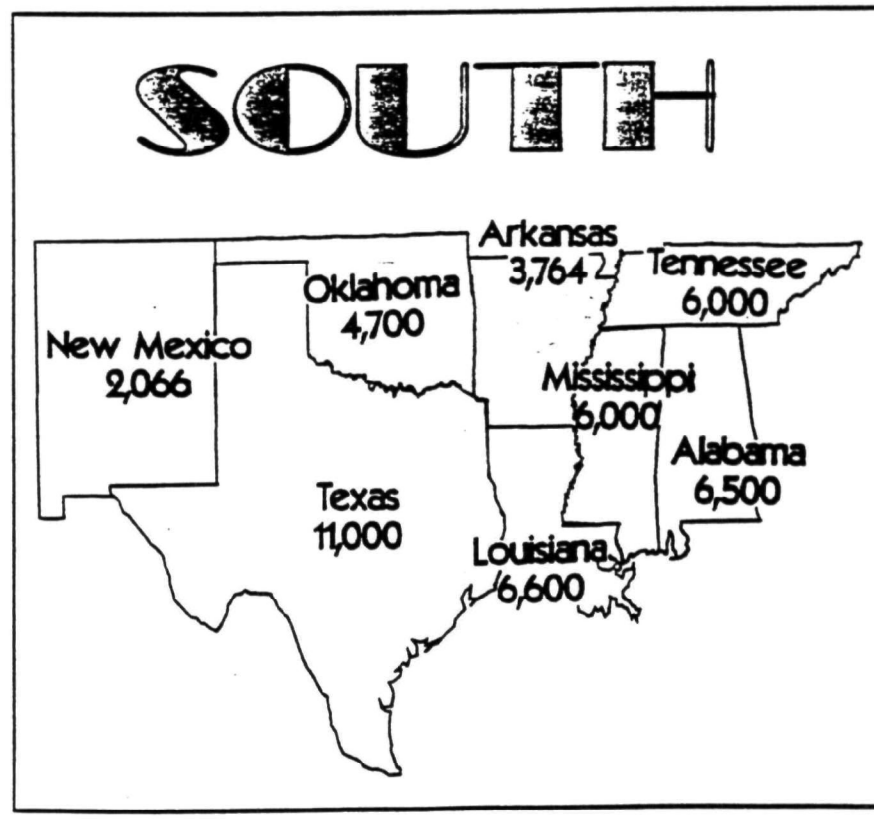
States that have kept up with their retail gasoline outlet populations in recent years include North Carolina, Florida, Iowa, Kansas and Maryland, to name a few.

States that now have more outlets than they did in 1972 include North Carolina, Mississippi, Louisiana, Alabama, Arizona, Iowa, South Carolina, Virginia, Florida and Missouri.

States that have lost ground include Texas, California, Ohio, Pennsylvania, New York, Massachusetts, New Jersey, Indiana, Kentucky and Minnesota. Texas' total is off 6,000, while California, Ohio and Pennsylvania's are down by at least 5,000.

"Somewhere, somehow, the federal government, the state governments or petroleum marketers themselves will have to do something about this," says one state official. "With all the licensing, tax, UST, Stage II and other regulations we have to live with, isn't it ironic we can't even tell you how many business places we have in the individual states and nationally? It's like saying we have a church full of people but no one knows how many parishioners are in the place."

As a service to the industry and to enhance its reputation as a source of factual petroleum marketing data, *NPN* plans to update its state-by-state scoreboard in 1992 and in subsequent years. Inasmuch as some states are already moving in the direction of better counting procedures, it may be assumed that the *NPN* count will become more accurate with each passing year. **NPN**



SOURCES OF EMISSIONS

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SOURCES OF EMISSION

- Refueling Emission Sources
- Factors Influencing Emissions
- Emission Estimates
- Other Emission Sources

SOURCES OF EMISSIONS

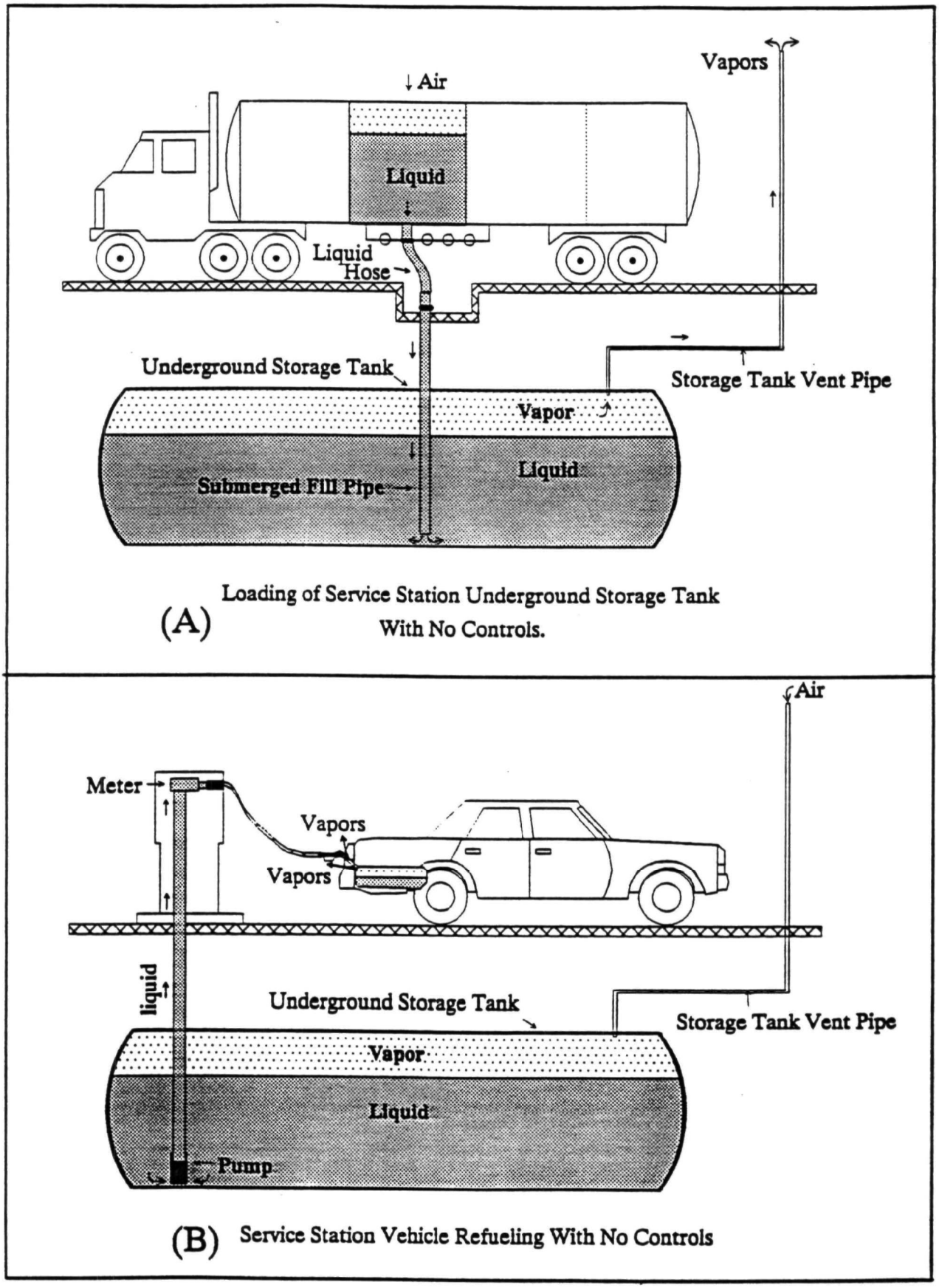


Figure 3-1. Uncontrolled Service Station Operations

STAGE I VERSUS STAGE II ACTIVITIES AT SERVICE STATIONS

- **Emissions Essentially Independent**
- **Control Effectiveness Dependent**

TABLE 3-1. EXAMPLE COMPOSITION OF GASOLINE VAPORS

Compound	Weight Percent
N-Propane	4.6
Isobutane	19.0
N-Butane	21.4
Isopentane	28.3
N-Pentane	5.3
2-2-Dimethyl Butane	0.6
2-3-Dimethyl Butane	1.0
2-Methyl Pentane	4.0
3-Methyl Pentane	2.3
N-Hexane	1.1
3-3-Dimethyl Pentane	1.1
3-Methyl Hexane	0.7
Methyl Cyclopentane	1.2
Cis-2-Pentene	0.6
Benzene	0.7
Toluene	1.0
Other[a]	7.1
	100

[a] Other hydrocarbons with individual weight percent less than 0.5.

Source: Furey, Robert and Nagel, Bernard. Composition of Vapor Emitted From a Vehicle Gasoline Tank During Refueling. SAE Technical Paper Series #860086, February 1986.

TABLE 3-2. GASOLINE HAZARDOUS AIR POLLUTANT VAPOR PROFILE

Hazardous Air Pollutant	HAP Content HAP/VOC wt percentage ratio	
	Arithmetic Average Normal Fuel	Estimated Reformulated Fuel
Hexane	1.6	1.4
Benzene	0.9	0.4
Toluene	1.3	1.1
2,2,4 Trimethylpentane (iso-octane)	0.8	0.7
Xylenes	0.5	0.4
Ethylbenzene	0.1	0.1
Naphthalene	0.5	0.0
Cumene	0.1	0.0
MTBE		8.7
TOTAL HAPS[a]	4.8	13

[a] Columns do not add to totals. Total HAPs as well as individual HAPs were calculated for each data point in the normal fuel analysis, and thus the totals are not simply sums of the individual components. Adjustments were made to this normal fuel based on the reformulated gasoline requirements to predict a reformulated profile.

Source: Preliminary Estimates from EPA Stage I NESHAP project on gasoline marketing.

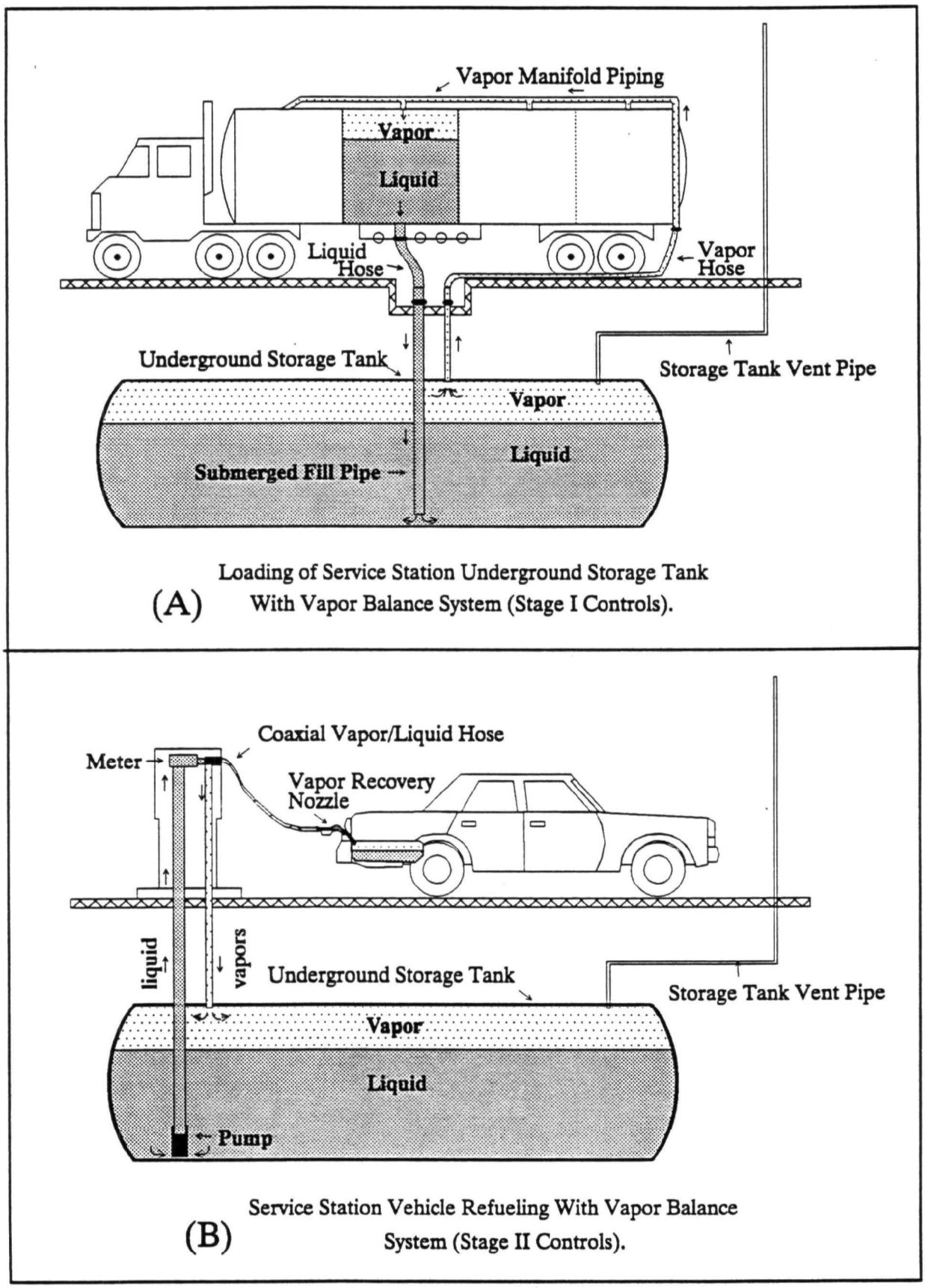


Figure 3-2. Controlled Service Station Operations (Stage I and Stage II)

FACTORS INFLUENCING EMISSIONS

FACTORS INFLUENCING REFUELING EMISSIONS

- Reid Vapor Pressure (RVP)
- Liquid Gasoline Temperature
- Temperature Difference Between Liquid Gasoline Dispensed and Vehicle Tank Temperature

TABLE 3-3. 1992 AND BEYOND RVP LIMITS BY MONTH AND BY GEOGRAPHIC LOCATION

	Reid Vapor Pressure (psi)												Weighted Average		
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Summer (Apr-Sep)	Winter (Oct-Mar)	Annual
ALABAMA	13.5	13.5	12.5	11.5	9.0	7.8	7.8	7.8	7.8	11.5	12.5	13.5	8.6	12.8	10.6
ALASKA	15.0	15.0	15.0	15.0	14.2	13.5	13.5	13.5	14.2	15.0	15.0	15.0	13.9	15.0	14.3
ARIZONA	13.5	12.5	10.8	10.0	9.0	7.8	7.8	7.8	7.8	9.5	10.8	12.5	8.4	11.6	10.0
ARKANSAS	14.2	13.5	12.5	11.5	9.0	7.8	7.8	7.8	7.8	12.5	13.5	14.2	8.5	13.5	10.7
CALIFORNIA	13.6	13.4	12.6	11.6	9.0	7.8	7.8	7.8	7.8	10.5	12.1	13.6	8.6	12.6	10.6
COLORADO	15.0	14.2	12.5	11.5	9.0	7.8	7.8	7.8	7.8	10.8	12.5	14.2	8.6	13.1	10.7
CONNECTICUT	15.0	15.0	14.2	13.5	9.0	9.0	9.0	9.0	9.0	13.5	14.2	15.0	9.7	14.5	12.0
DELAWARE	15.0	15.0	14.2	13.5	9.0	9.0	9.0	9.0	9.0	12.5	14.2	15.0	9.7	14.3	11.9
DIST. OF COL.	15.0	14.2	13.5	12.5	9.0	7.8	7.8	7.8	7.8	12.5	14.2	15.0	8.8	14.1	11.4
FLORIDA	13.5	13.5	12.5	11.5	9.0	7.8	7.8	7.8	7.8	11.5	12.5	13.5	8.7	12.9	10.7
GEORGIA	13.5	13.5	12.5	11.5	9.0	7.8	7.8	7.8	7.8	11.5	12.5	13.5	8.6	12.8	10.7
HAWAII	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
IDAHO	15.0	14.2	13.5	12.5	9.0	9.0	9.0	9.0	9.0	10.8	12.5	14.2	9.5	13.2	11.3
ILLINOIS	15.0	15.0	14.2	13.0	9.0	9.0	9.0	9.0	9.0	12.5	13.9	14.6	9.7	14.2	12.0
INDIANA	15.0	15.0	14.2	13.5	9.0	9.0	9.0	9.0	9.0	12.5	14.2	15.0	9.7	14.3	11.9
IOWA	15.0	15.0	14.2	12.5	9.0	9.0	9.0	9.0	9.0	12.5	14.2	15.0	9.6	14.2	11.8
KANSAS	15.0	14.2	12.5	11.5	9.0	7.8	7.8	7.8	7.8	10.8	12.5	14.2	8.6	13.1	10.8
KENTUCKY	15.0	14.2	13.5	12.5	9.0	9.0	9.0	9.0	9.0	12.5	14.2	15.0	9.6	14.0	11.7
LOUISIANA	13.5	13.5	12.5	11.5	9.0	7.8	7.8	7.8	7.8	11.5	12.5	13.5	8.6	12.8	10.6
MAINE	15.0	15.0	14.2	13.5	9.0	9.0	9.0	9.0	9.0	13.5	14.2	15.0	9.6	14.5	11.9
MARYLAND	15.0	15.0	14.2	13.5	9.0	7.8	7.8	7.8	7.8	12.5	14.2	15.0	9.0	14.3	11.6
MASSACHUSETTS	15.0	15.0	14.2	13.5	9.0	9.0	9.0	9.0	9.0	13.5	14.2	15.0	9.7	14.5	12.0
MICHIGAN	15.0	15.0	14.2	13.5	9.0	9.0	9.0	9.0	9.0	13.5	14.2	15.0	9.7	14.5	12.0
MINNESOTA	15.0	15.0	14.2	13.5	9.0	9.0	9.0	9.0	9.0	12.5	14.2	15.0	9.7	14.3	11.8
MISSISSIPPI	13.5	13.5	12.5	11.5	9.0	7.8	7.8	7.8	7.8	11.5	12.5	13.5	8.6	12.8	10.7
MISSOURI	15.0	14.2	13.5	12.5	9.0	7.8	7.8	7.8	7.8	12.5	13.5	14.2	8.7	13.8	11.1
MONTANA	15.0	15.0	14.2	12.5	9.0	9.0	9.0	9.0	9.0	12.5	14.2	15.0	9.5	14.3	11.7
NEBRASKA	15.0	15.0	14.2	12.5	9.0	9.0	9.0	9.0	9.0	10.8	12.5	14.2	9.5	13.5	11.4
NEVADA	14.2	13.4	12.2	11.2	9.0	7.8	7.8	7.8	7.8	10.2	11.6	13.4	8.5	12.5	10.4
NEW HAMPSHIRE	15.0	15.0	14.2	13.5	9.0	9.0	9.0	9.0	9.0	13.5	14.2	15.0	9.7	14.5	12.0
NEW JERSEY	15.0	15.0	14.2	13.5	9.0	9.0	9.0	9.0	9.0	13.5	14.2	15.0	9.7	14.4	12.1
NEW MEXICO	13.9	12.2	11.6	10.4	9.0	7.8	7.8	7.8	7.8	10.8	12.5	13.5	8.5	12.4	10.3
NEW YORK	15.0	15.0	14.2	13.5	9.0	9.0	9.0	9.0	9.0	13.5	14.2	15.0	9.7	14.5	12.0

TABLE 3-3. 1992 AND BEYOND RVP LIMITS BY MONTH AND BY GEOGRAPHIC LOCATION (CONTINUED)

	Reid Vapor Pressure (psi)												Weighted Average		
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Summer (Apr-Sep)	Winter (Oct-Mar)	Annual
NORTH CAROLINA	14.2	13.5	13.5	12.5	9.0	7.8	7.8	7.8	7.8	12.5	13.5	14.2	8.8	13.6	11.1
NORTH DAKOTA	15.0	15.0	14.2	13.5	9.0	9.0	9.0	9.0	9.0	12.5	14.2	15.0	9.7	14.2	11.7
OHIO	15.0	15.0	14.2	13.5	9.0	9.0	9.0	9.0	9.0	12.5	14.2	15.0	9.7	14.3	11.9
OKLAHOMA	14.2	13.5	12.5	11.5	9.0	7.8	7.8	7.8	7.8	10.8	12.5	14.2	8.6	12.9	10.7
OREGON	15.0	14.2	13.5	13.5	9.0	7.8	7.8	7.8	7.8	12.5	13.9	14.6	9.0	13.9	11.2
PENNSYLVANIA	15.0	15.0	14.2	13.5	9.0	9.0	9.0	9.0	9.0	13.5	14.2	15.0	9.7	14.5	12.0
RHODE ISLAND	15.0	15.0	14.2	13.5	9.0	9.0	9.0	9.0	9.0	13.5	14.2	15.0	9.7	14.5	12.1
SOUTH CAROLINA	13.5	13.5	13.5	12.5	9.0	7.8	7.8	7.8	7.8	12.5	13.5	13.5	9.0	13.3	11.0
SOUTH DAKOTA	15.0	15.0	14.2	12.5	9.0	9.0	9.0	9.0	9.0	10.8	12.5	14.2	9.5	13.5	11.3
TENNESSEE	14.2	13.5	13.5	12.5	9.0	7.8	7.8	7.8	7.8	12.5	13.5	14.2	8.8	13.6	11.1
TEXAS	13.5	13.0	11.6	10.8	9.0	7.8	7.8	7.8	7.8	10.8	12.5	13.5	8.5	12.5	10.4
UTAH	15.0	14.2	13.5	12.5	9.0	7.8	7.8	7.8	7.8	10.8	12.5	14.2	8.7	13.3	10.9
VERMONT	15.0	15.0	14.2	13.5	9.0	9.0	9.0	9.0	9.0	13.5	14.2	15.0	9.6	14.5	12.0
VIRGINIA	15.0	14.2	13.5	12.5	9.0	7.8	7.8	7.8	7.8	12.5	14.2	15.0	8.8	14.0	11.3
WASHINGTON	15.0	15.0	14.2	13.5	9.0	9.0	9.0	9.0	9.0	12.5	14.2	15.0	9.7	14.3	11.9
WEST VIRGINIA	15.0	15.0	14.2	13.5	9.0	9.0	9.0	9.0	9.0	12.5	14.2	15.0	9.7	14.3	11.9
WISCONSIN	15.0	15.0	14.2	13.5	9.0	9.0	9.0	9.0	9.0	12.5	14.2	15.0	9.7	14.3	11.9
WYOMING	15.0	15.0	14.2	12.5	9.0	9.0	9.0	9.0	9.0	10.8	12.5	14.2	9.5	13.6	11.5

Source : Fax communication from Bob Johnson, EPA/OMS, April 10, 1991.
and June 11, 1990 and May 29, 1991 FEDERAL REGISTERS

Nationwide Annual Average:	9.4	11.4
Nonattainment Annual Average:	9.2	11.3

TABLE 3-4 MONTHLY AVERAGE DISPENSED LIQUID TEMPERATURE

	Dispensed Liquid Temperature (degrees F)												Weighted Average		
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Summer (Apr-Sep)	Winter (Oct-Mar)	Annual
National Average	51	54	54	58	69	76	82	81	76	70	62	54	74	58	66
Region 1	43	45	48	53	66	74	78	78	72	66	59	46	70	51	61
Region 2	69	74	73	80	84	87	90	91	78	85	83	73	85	76	81
Region 3	54	57	61	67	76	82	83	84	79	76	67	54	79	62	70
Region 4	50	51	41	47	63	74	88	85	83	75	63	52	74	56	65
Region 5	54	-	-	-	72	77	83	83	79	74	67	58	79	63	72
Region 6	-	48	49	53	59	63	-	73	71	60	49	42	64	50	57

Source : McAnally, Michael and Dickerman, J.C. Summary and Analysis of Data From Gasoline Temperature Survey Conducted By American Petroleum Institute. Radian Corporation, May 1976.

Regional boundaries defined in Figure 3.3.

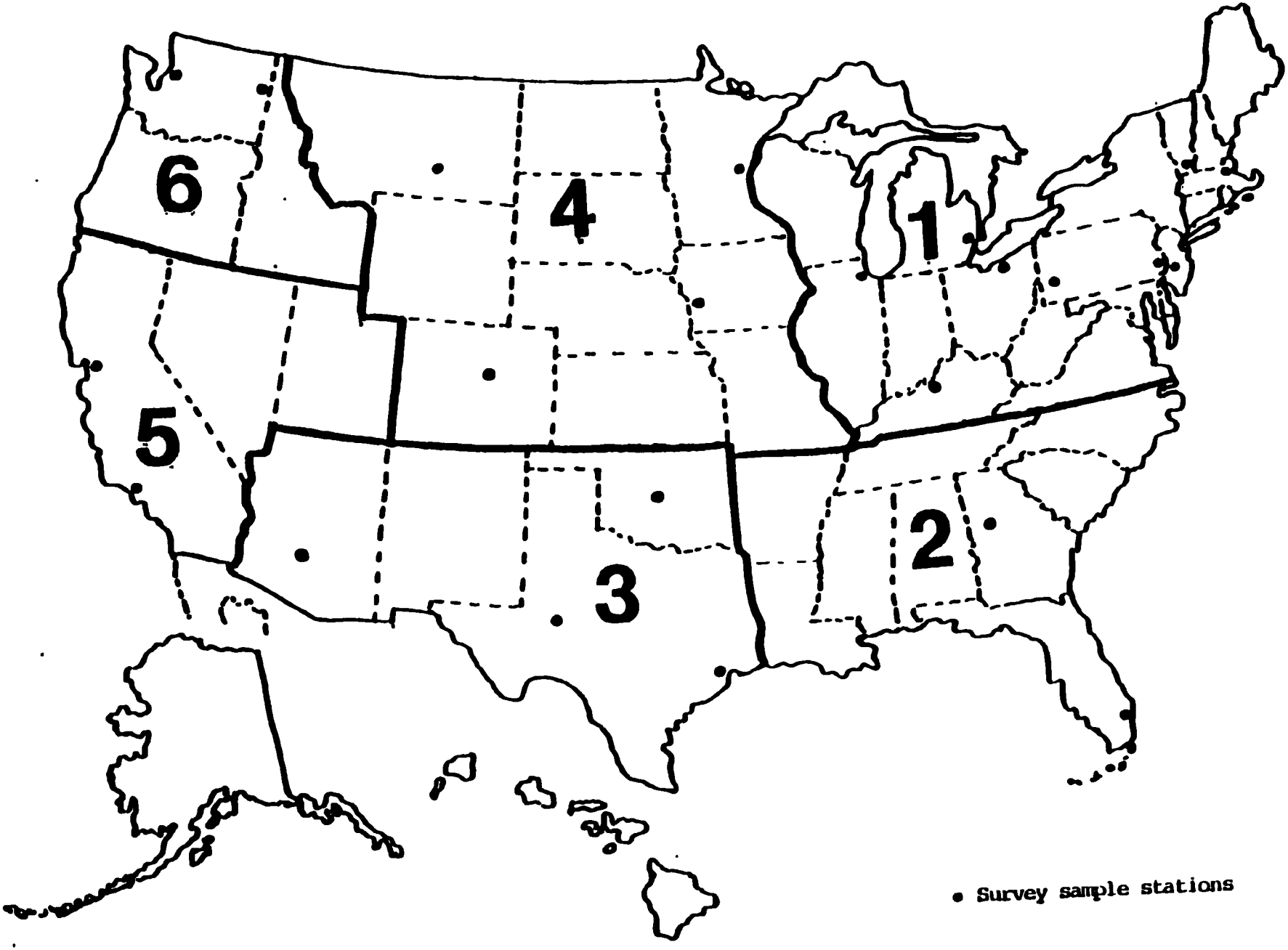


Figure 3-3. Region Boundaries

TABLE 3-5. SEASONAL VARIATION FOR TEMPERATURE DIFFERENCE BETWEEN DISPENSED FUEL AND VEHICLE FUEL TANK (ΔT), °F

	Temperature Difference (degrees F)				
	Average Annual	Summer (Apr-Oct)	Winter (Oct-Mar)	5-Month Ozone Season (May-Sep)	2-Month Ozone Season (Jul-Aug)
National Average	4.4	8.8	-0.8	9.4	9.9
Region 1	5.7	10.7	-0.3	11.5	12.5
Region 2	4.0	6.8	0.9	7.5	8.2
Region 3	3.7	7.6	-0.4	7.1	7.0
Region 4	5.5	11.7	-2.4	12.1	13.3
Region 5	0.1	3.9	-4.4	5.1	3.2

Source : Rothman, David, and Johnson, Robert. Technical Report - Refueling Emissions From Uncontrolled Vehicles. EPA/OMS, EPA-AA-SDSB-85-6, June 1985.

EMISSION ESTIMATES

$$E_r = 264.2[(-5.909) - 0.0949(\Delta T) + 0.0884(T_D) + 0.485\ (RVP)]$$

where:

E_r = Emission rate, milligrams of VOC per liter of liquid loaded

RVP = Reid vapor pressure, psia

ΔT = Difference between the temperature of the fuel in the automobile tank and the temperature of the dispensed fuel, °F

T_D = Dispensed fuel temperature, °F

TABLE 3-6. MONTHLY AND GEOGRAPHIC VARIATIONS IN REFUELING EMISSION FACTORS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Weighted Average Summer (Apr-Sep)	Weighted Average Winter (Oct-Mar)	Weighted Average Annual
ALABAMA	1760	1870	1720	1610	1380	1450	1460	1390	1240	1880	1960	1850	1420	1840	1630
ALASKA (a)	1570	1640	1640	1490	1650	1720	1860	1840	1810	2020	1830	1640	1730	1740	1740
ARIZONA	1440	1380	1260	1090	1020	1060	1080	1110	990	1440	1400	1310	1060	1370	1220
ARKANSAS	1850	1870	1720	1610	1380	1450	1370	1390	1240	2000	2080	1940	1400	1910	1630
CALIFORNIA (b)	1550	1750	1850	1670	1060	1140	1280	1280	1190	1620	1660	1650	1270	1680	1470
COLORADO	1590	1510	1060	720	770	870	1150	1080	1080	1630	1570	1530	950	1480	1200
CONNECTICUT	1370	1420	1390	1140	970	1050	1150	1150	1110	1720	1640	1440	1090	1500	1290
DELAWARE	1370	1420	1390	1140	970	1050	1150	1150	1010	1590	1640	1440	1070	1480	1260
DIST. OF COL.	1370	1320	1300	1010	980	1050	1150	1150	1010	1590	1640	1440	1060	1440	1250
FLORIDA	1760	1870	1720	1610	1380	1450	1520	1550	1240	1880	1960	1850	1460	1840	1650
GEORGIA	1760	1870	1720	1610	1380	1450	1460	1390	1240	1880	1960	1850	1420	1840	1630
HAWAII (a)	1120	1190	1190	1050	1300	1470	1610	1580	1470	1570	1380	1190	1420	1280	1350
IDAHO (a,b)	1540	1400	1330	1060	750	840	1060	1080	1030	1240	1210	1260	970	1320	1150
ILLINOIS	1370	1420	1390	1070	920	1050	1120	1120	1010	1590	1610	1390	1050	1470	1260
INDIANA	1370	1420	1390	1140	970	1050	1150	1150	1010	1590	1640	1440	1080	1480	1270
IOWA	1590	1610	1280	840	770	1030	1350	1280	1240	1850	1790	1640	1090	1640	1350
KANSAS	1590	1510	1060	720	770	1030	1200	1130	1240	1630	1570	1530	1010	1480	1230
KENTUCKY	1370	1320	1300	1010	870	1050	1150	1150	1010	1590	1640	1440	1040	1450	1230
LOUISIANA	1760	1870	1720	1610	1380	1450	1460	1390	1240	1880	1960	1850	1420	1840	1620
MAINE	1370	1420	1390	1140	970	1050	1150	1150	1110	1720	1640	1440	1100	1500	1290
MARYLAND	1370	1420	1390	1140	970	1050	1150	1150	1010	1590	1640	1440	1080	1480	1280
MASSACHUSETTS	1370	1420	1390	1140	970	1050	1150	1150	1110	1720	1640	1440	1090	1500	1290
MICHIGAN	1370	1420	1390	1140	970	1050	1150	1150	1110	1720	1640	1440	1090	1500	1290
MINNESOTA	1590	1610	1280	970	870	1030	1350	1280	1240	1850	1790	1640	1130	1630	1360
MISSISSIPPI	1760	1870	1720	1610	1380	1450	1460	1390	1240	1880	1960	1850	1420	1840	1630
MISSOURI	1590	1510	1190	840	770	1030	1200	1130	1240	1850	1700	1530	1030	1560	1290
MONTANA	1590	1610	1280	840	770	1030	1350	1280	1240	1850	1790	1640	1100	1630	1340
NEBRASKA	1590	1610	1280	840	770	1030	1350	1280	1240	1630	1570	1530	1090	1530	1300
NEVADA (b)	1630	1750	1800	1620	1100	1140	1280	1280	1190	1580	1600	1620	1270	1660	1460
NEW HAMPSHIRE	1370	1420	1390	1140	970	1050	1150	1150	1110	1720	1640	1440	1100	1500	1290

TABLE 3-6. MONTHLY AND GEOGRAPHIC VARIATIONS IN REFUELING EMISSION FACTORS (CONTINUED)

NEW JERSEY	1370	1420	1390	1140	970	1050	1150	1150	1110	1720	1640	1440	1100	1500	1300
NEW MEXICO	1490	1340	1360	1150	1020	1060	1080	1110	1090	1610	1620	1440	1090	1480	1270
NEW YORK	1370	1420	1390	1140	970	1050	1150	1150	1110	1720	1640	1440	1090	1500	1290
NORTH CAROLINA	1850	1870	1850	1740	1380	1450	1460	1390	1240	2000	2080	1940	1450	1930	1680
NORTH DAKOTA	1590	1610	1280	970	870	1030	1350	1280	1240	1850	1790	1640	1130	1640	1350
OHIO	1370	1420	1390	1140	970	1050	1150	1150	1010	1590	1640	1440	1080	1470	1260
OKLAHOMA	1530	1510	1480	1290	1180	1160	1190	1210	1090	1610	1620	1530	1190	1550	1360
OREGON (a,b)	1540	1400	1330	1190	750	840	1060	1080	1030	1460	1380	1310	1000	1390	1180
PENNSYLVANIA	1370	1420	1390	1140	970	1050	1150	1150	1110	1720	1640	1440	1090	1500	1290
RHODE ISLAND	1370	1420	1390	1140	970	1050	1150	1150	1110	1720	1640	1440	1100	1500	1290
SOUTH CAROLINA	1760	1870	1850	1740	1380	1450	1460	1390	1240	2000	2080	1850	1460	1910	1670
SOUTH DAKOTA	1590	1610	1280	840	770	1030	1350	1280	1240	1630	1570	1530	1100	1530	1290
TENNESSEE	1850	1870	1850	1740	1380	1450	1460	1390	1240	2000	2080	1940	1450	1930	1680
TEXAS	1440	1450	1360	1200	1100	1110	1130	1160	1090	1610	1620	1440	1130	1490	1300
UTAH (b)	1730	1850	1960	1780	1180	1140	1230	1230	1190	1660	1720	1720	1280	1770	1510
VERMONT	1370	1420	1390	1140	970	1050	1150	1150	1110	1720	1640	1440	1100	1500	1290
VIRGINIA	1370	1320	1300	1010	870	1050	1150	1150	1010	1590	1640	1440	1040	1450	1240
WASHINGTON	1540	1500	1420	1190	750	840	1060	1080	1030	1460	1420	1360	990	1450	1210
WEST VIRGINIA	1370	1420	1390	1140	970	1050	1150	1150	1010	1590	1640	1440	1080	1470	1260
WISCONSIN	1370	1420	1390	1140	970	1050	1150	1150	1010	1590	1640	1440	1080	1480	1270
WYOMING	1590	1610	1280	840	770	1030	1350	1280	1240	1630	1570	1530	1090	1530	1300

(a) = Where data not available, national average values from Tables 3-4 and 3-5 used.

(b) = Where data not available, regional average values from Tables 3-4 and 3-5 used.

TABLE 3.8. VOC EMISSIONS FROM REFUELING FOR SERVICE STATION MODEL PLANTS[a]

Service Station Model Plants[b]	Average Throughput Liters/Month	Average Emission Factor mg/liter[c]	Model Plant Emissions Mg/yr
Model Plant 1	23,000	1,340	0.4
Model Plant 2	76,000	1,340	1.2
Model Plant 3	132,000	1,340	2.1
Model Plant 4	234,000	1,340	3.9
Model Plant 5	700,000	1,340	11.2

[a] Not including emissions associated with spillage and tank emptying/breathing.

[b] Model plants described in Chapter 2.

[c] Average emission factor based on the following:

RVP	11.4
Dispensed fuel temp.	66.0
Dispensed fuel/fuel tank temp. diff.	4.4

Model Plant	Throughput gal/month	No. of Nozzles
1	6,000	2/6
2	20,000	3/6
3	35,000	6/12
4	65,000	9/18
5	185,000	15/30

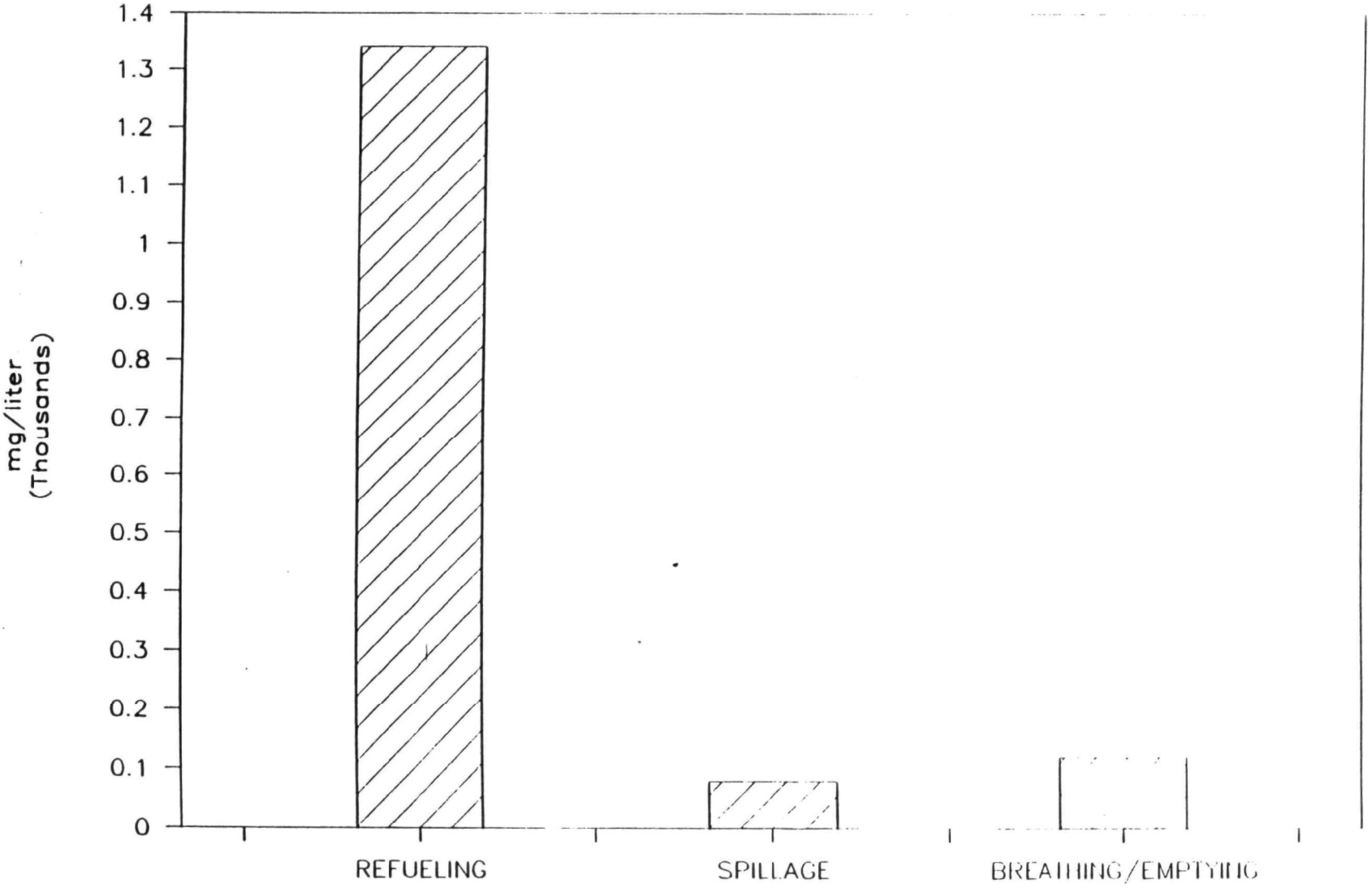
OTHER EMISSION SOURCES

- **Spillage**
- **Emptying/Breathing Losses**

OTHER SOURCES OF EMISSIONS

- **Small Compared to Refueling Emissions**
- **Controversial/Issues**

COMPARISON OF EMISSION MAGNITUDES



SPILLAGE STUDIES

- CARB
- API
- BAAQMD

TABLE 3-7

SUMMARY OF STAGE II/CONVENTIONAL REFUELING SPILLAGE DATA

	Observations		Frequency		gm/liter		gm/gallon		mg/liter	
	Conven.	Stage II	Conven.	Stage II	Conven.	Stage II	Conven.	Stage II	Conven	Stage II
Bay Area (~1983)										
Reported Conven. Data	6,750		0.32		3.51		0.30		80.0	
Balance System		1,254		0.39		1.15		0.12		31.6
Post '78 Balance		310		0.40		0.43		0.05		13.9
Vacuum Assist		737		0.31		0.66		0.07		17.6
Post '78 Vac. Ass.		118		0.28		0.32		0.03		8.5
Red Jacket		83		0.13		0.67		0.08		19.6
Post '78 Red Jacket		9		0.00		0.00		0.00		0.0
CARB Study (July 1991)	1,496	1,515	0.30	0.22	2.21 *	1.59	0.22 **	0.16	58.3	41.9
API Study (June 1989)	1,357	1,278	0.63	0.66	1.20	1.74	0.14	0.22	36.9	58.9

* Assumed gasoline density of .67 gm/ml.
** Assumed 10 gallons per refill event.

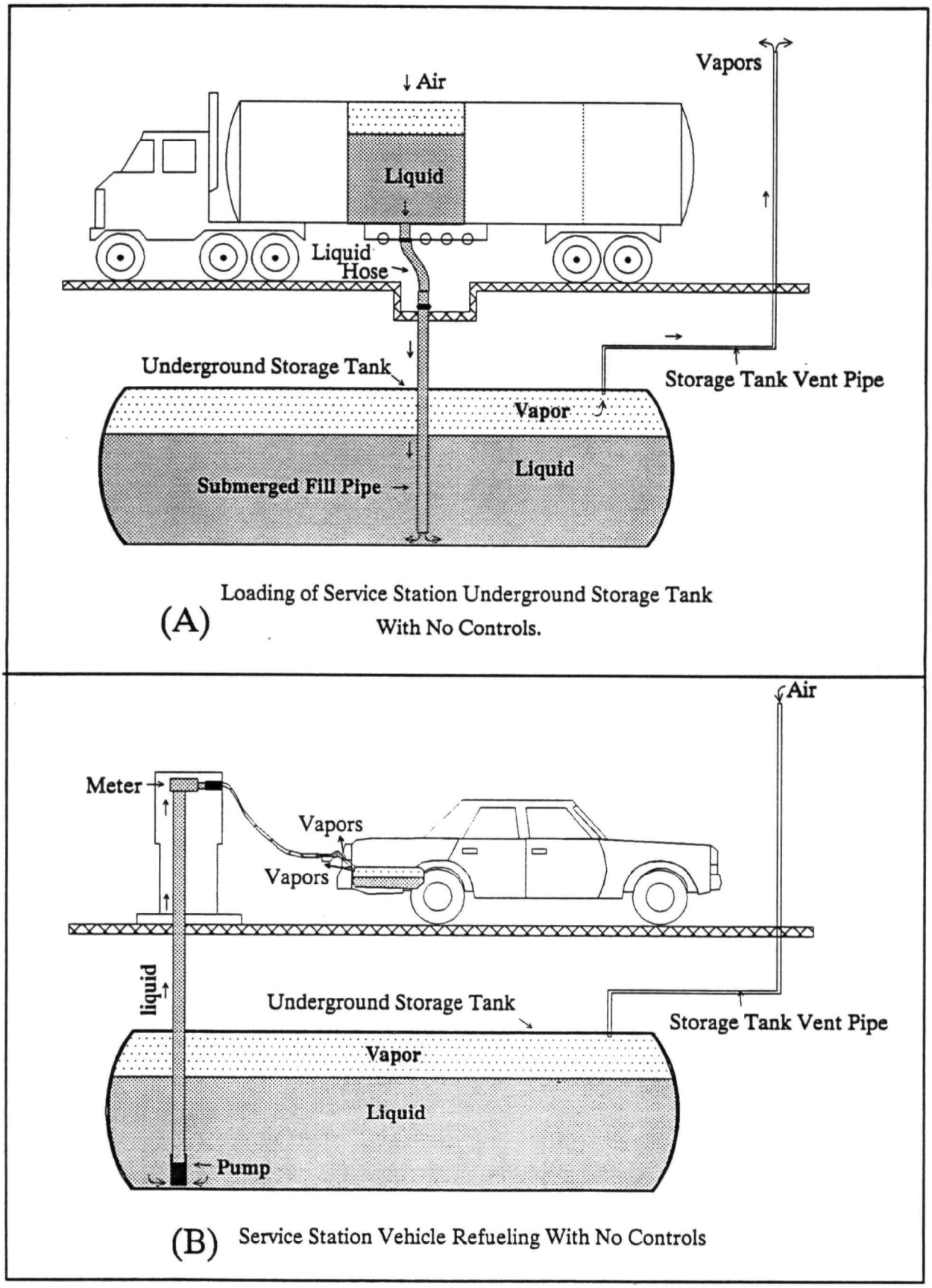


Figure 3-1. Uncontrolled Service Station Operations

EMPTYING/BREATHING LOSSES
FACTORS AFFECTING EMISSIONS

- Dispensing Rate
- Vent Pipe Height
- Studies
  - CARB
  - NIPER

RESULTS OF EMPTYING/BREATHING LOSS STUDIES

• AP-42	120 mg/Liter
• CARB	
- Small Station	110 mg/Liter
- Large Station	25 mg/Liter
• NIPER	72 mg/Liter

SOURCES OF EMISSION

- Refueling Emission Sources
- Factors Influencing Emissions
- Emission Estimates
- Other Emission Sources

CONTROL TECHNOLOGY

CONTROL TECHNOLOGY

CONTROL TECHNOLOGY

- Balance Systems
- Aboveground Equipment
- Assist Systems
- Underground Equipment
- System Effectiveness
- Impacts of Exemption Levels

STAGE II CONTROL TECHNOLOGY

- Simple Concept
- Complex Equipment
- Susceptible to Malfunction Due to "Untrained" Users

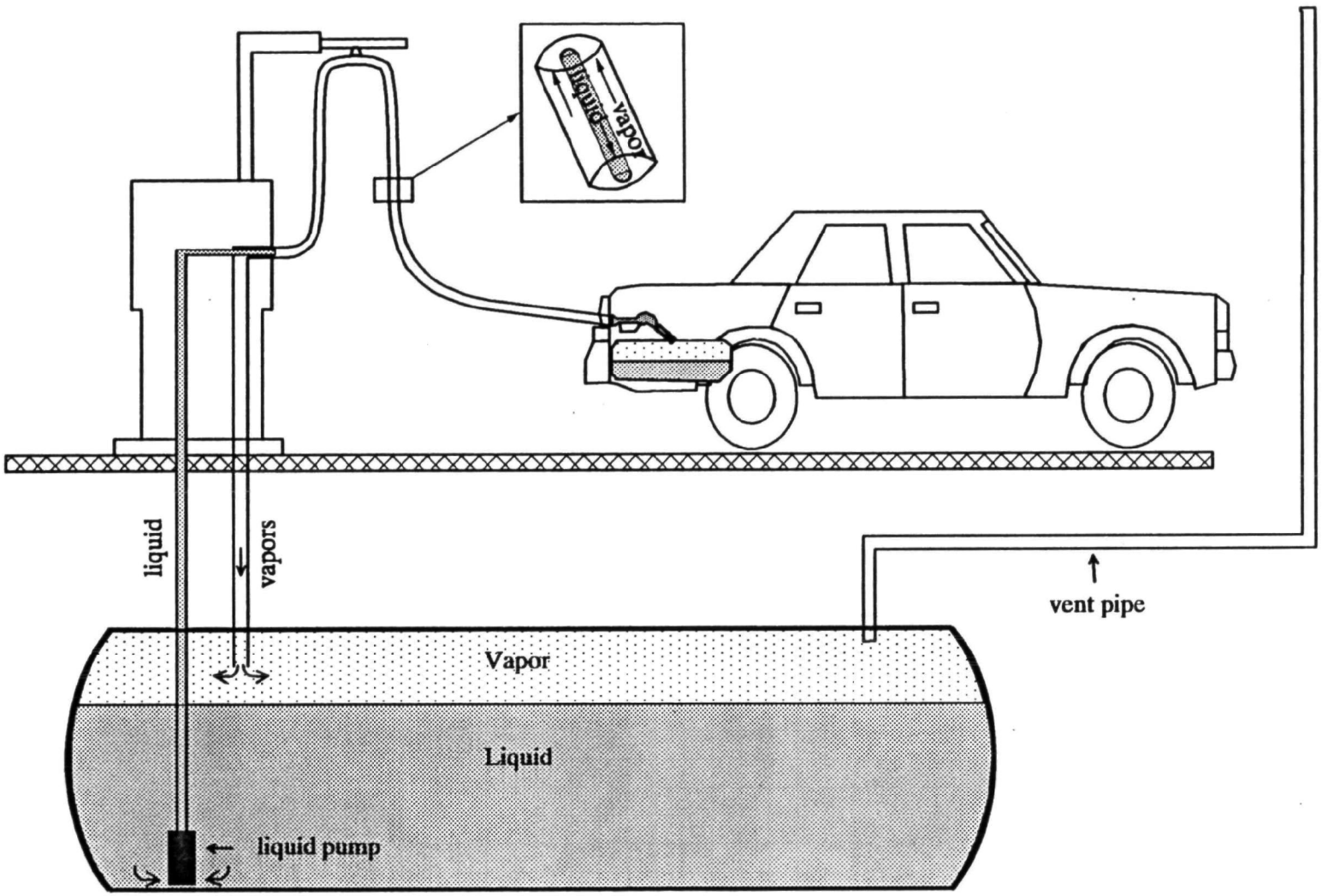
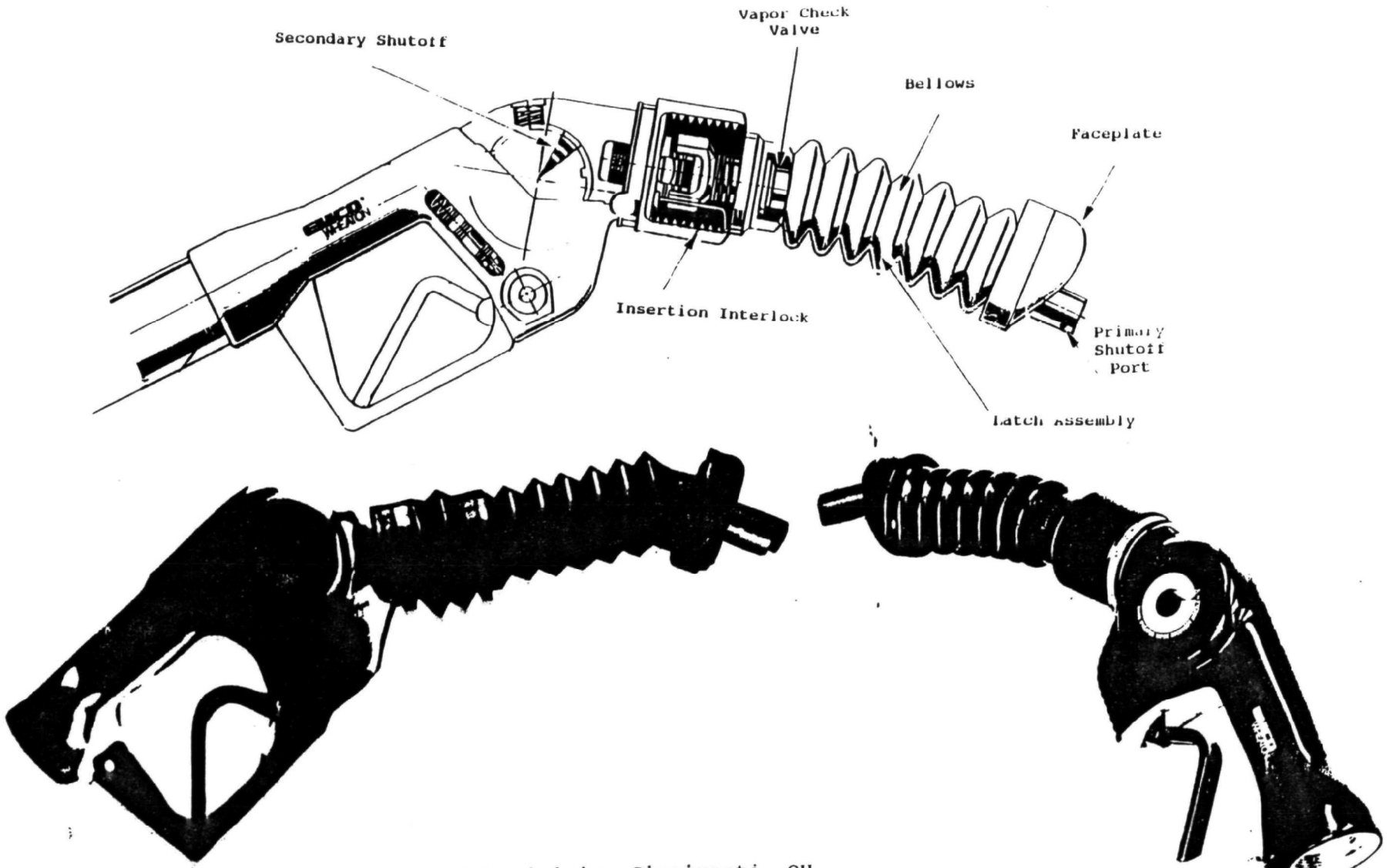


Figure 4-1. Vapor Balance System

ABOVEGROUND SYSTEM COMPONENTS

- Nozzles
  - Bellows
  - Faceplate
  - Primary and Secondary Shutoff
  - Insertion Interlock "No Seal/No Flow"
  - Latch Assembly
- Vapor Check Valve
- Hoses
  - Liquid Removal
  - Breakaways



Photos Courtesy of Dover Corporation/OPW Division Cincinnati, OH and Emco Wheaton, Inc. Research Triangle Park, NC

Figure 4-6. Example Balance Nozzles

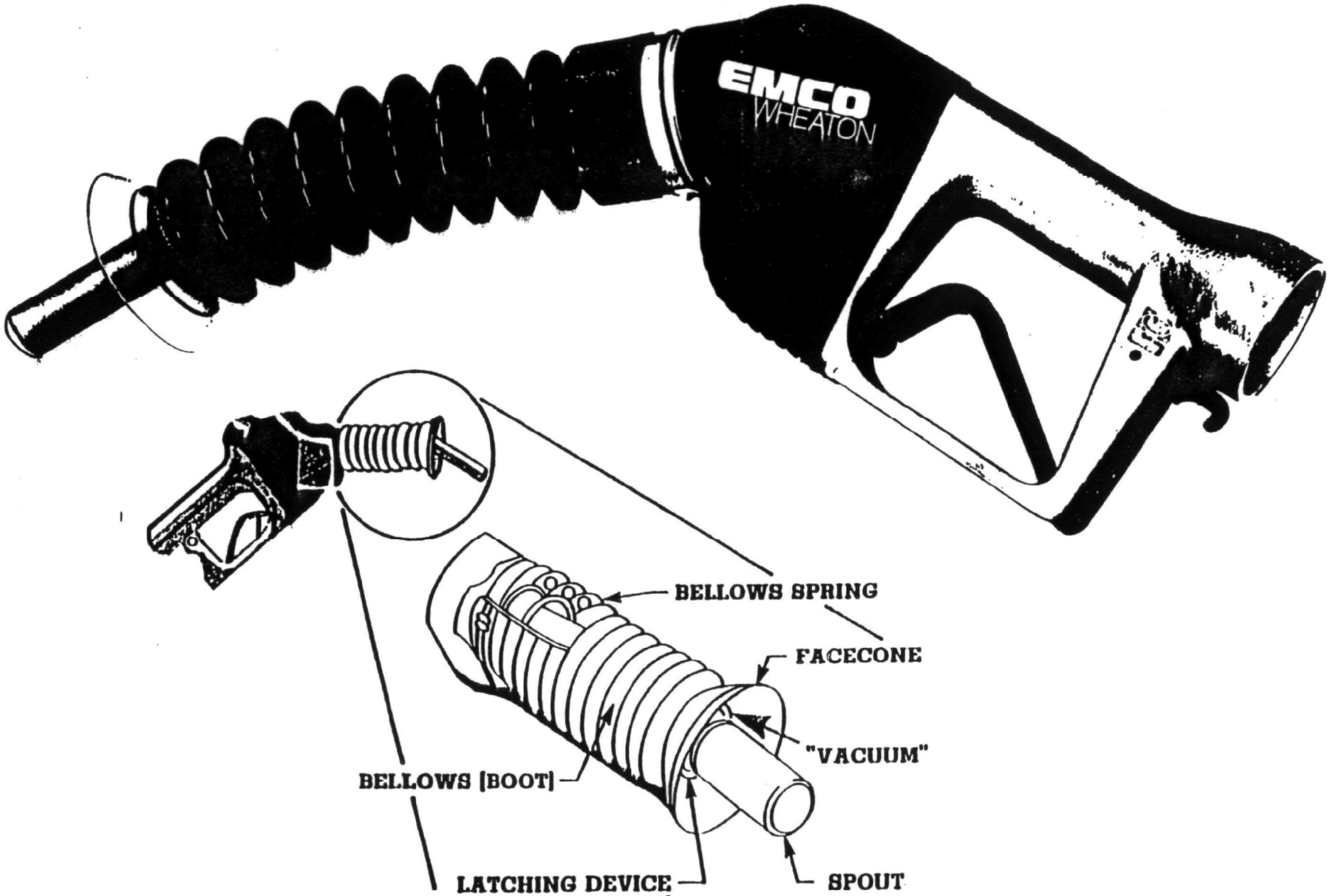


Photo Courtesy of Emco Wheaton, Inc. Research Triangle Park, NC

Figure 4-7. Example Assist Nozzle

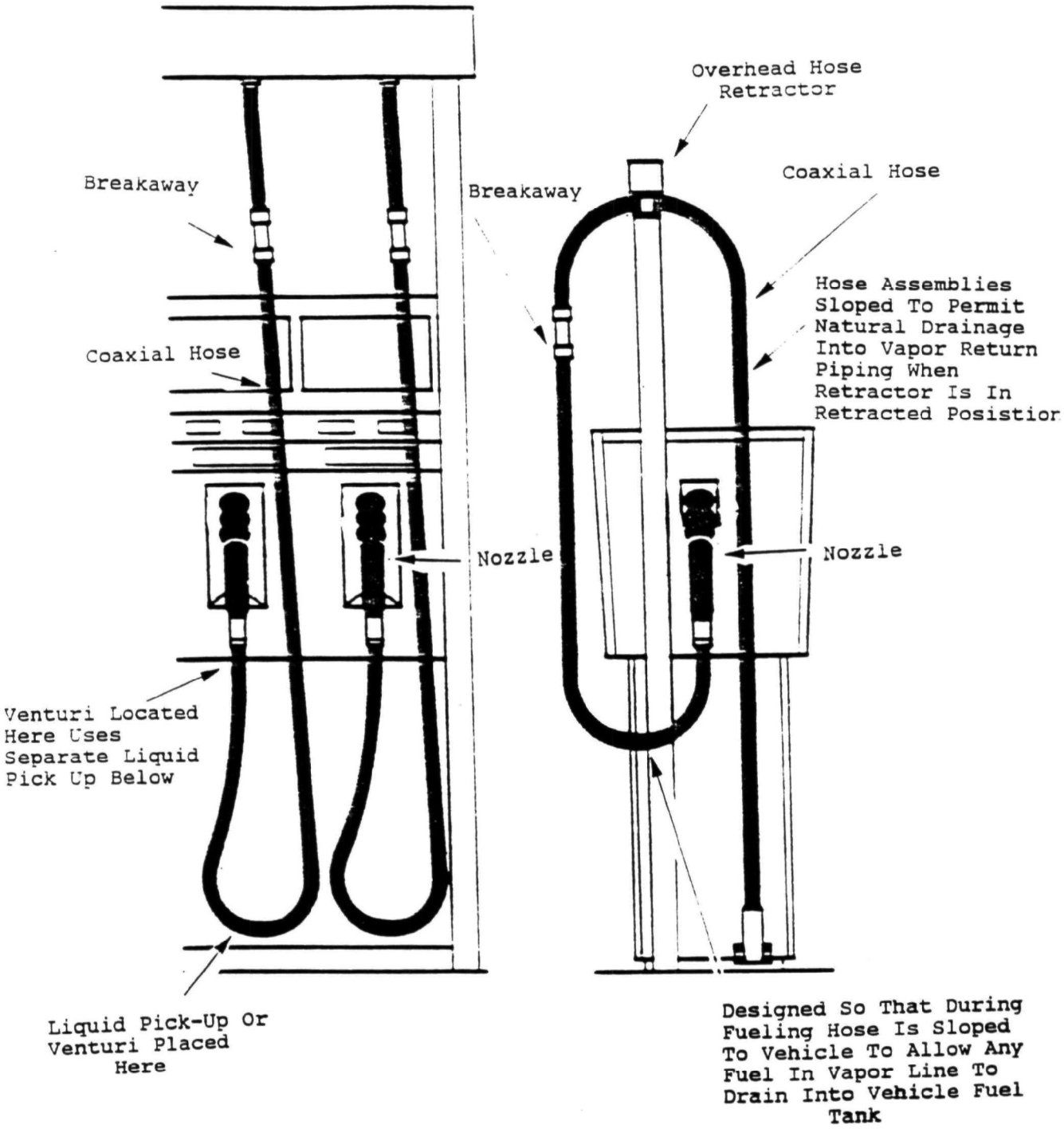


Figure 4-9. High Hang Hose Configurations

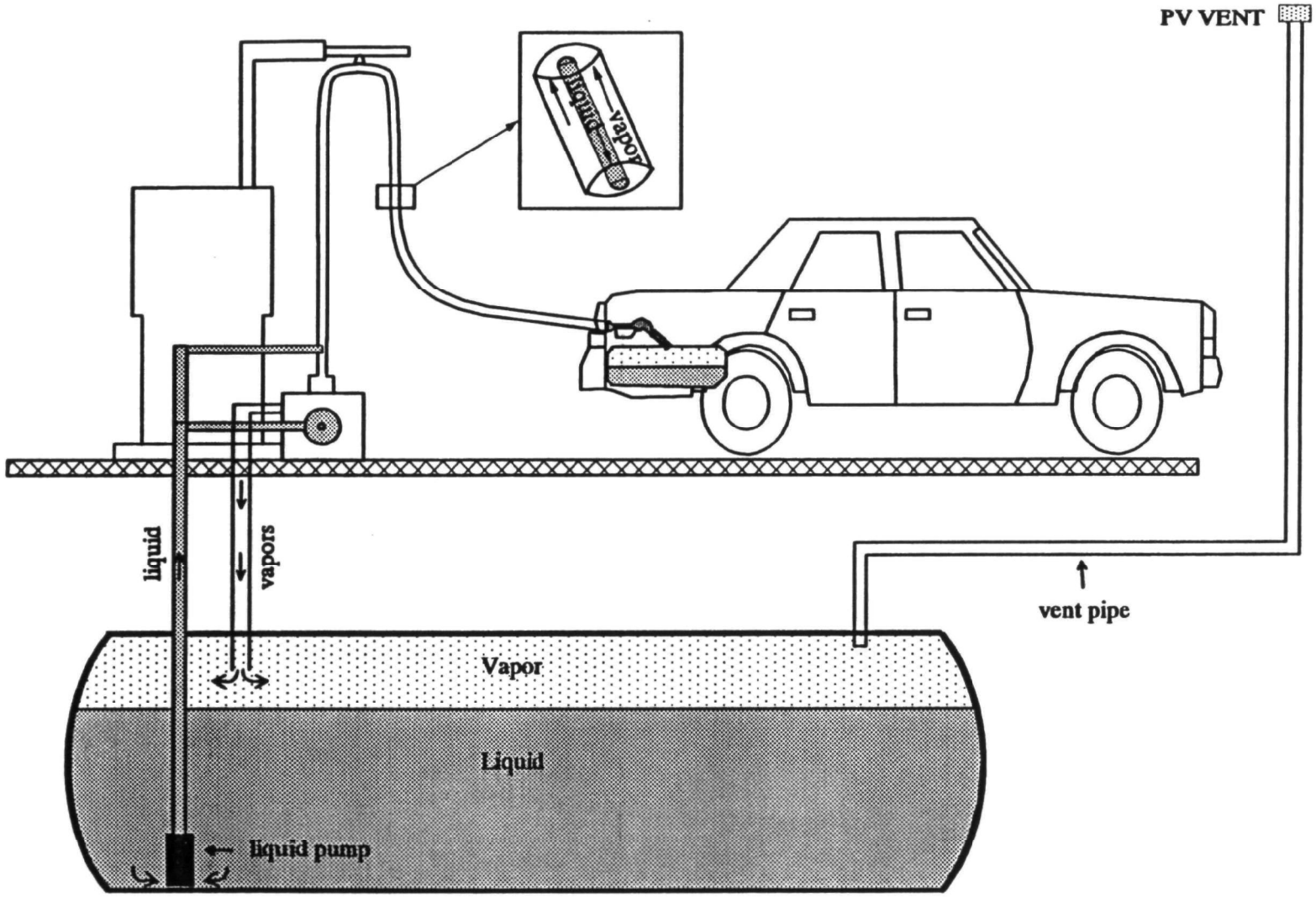


Figure 4-5. Amoco Bellowless Nozzle System

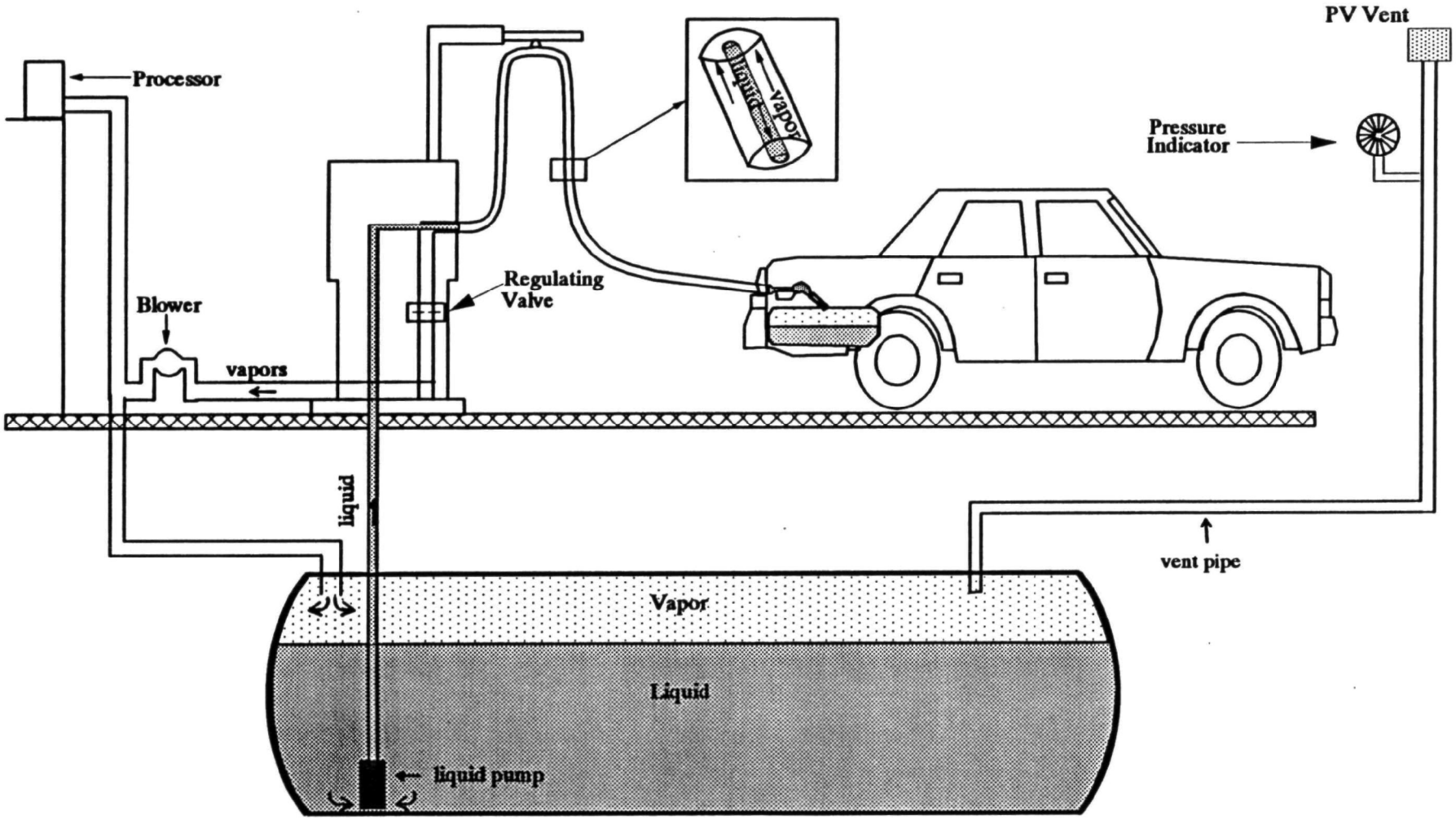


Figure 4-2. Hasstech Assist System

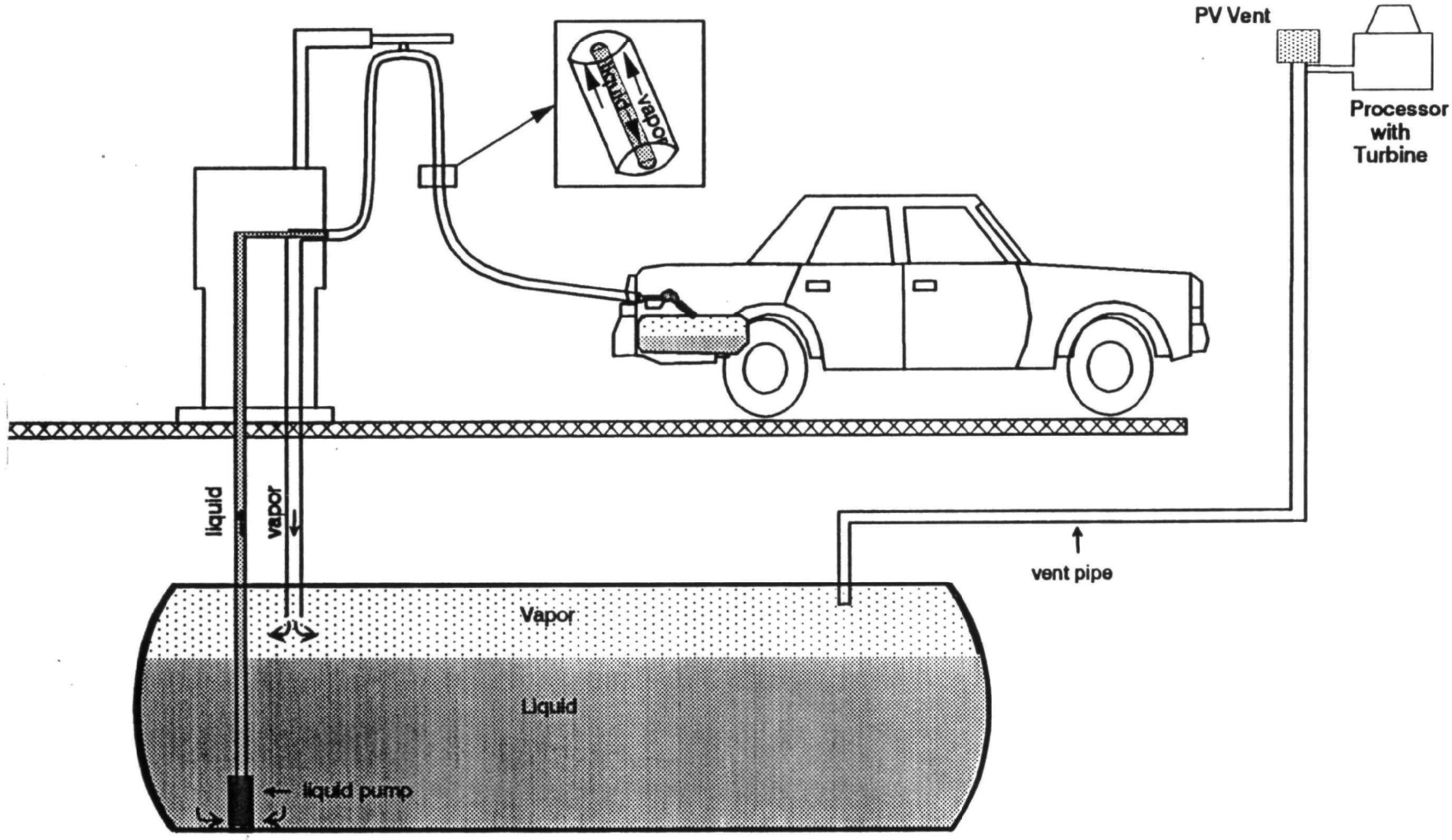


Figure 4-3. Hirt Assist System

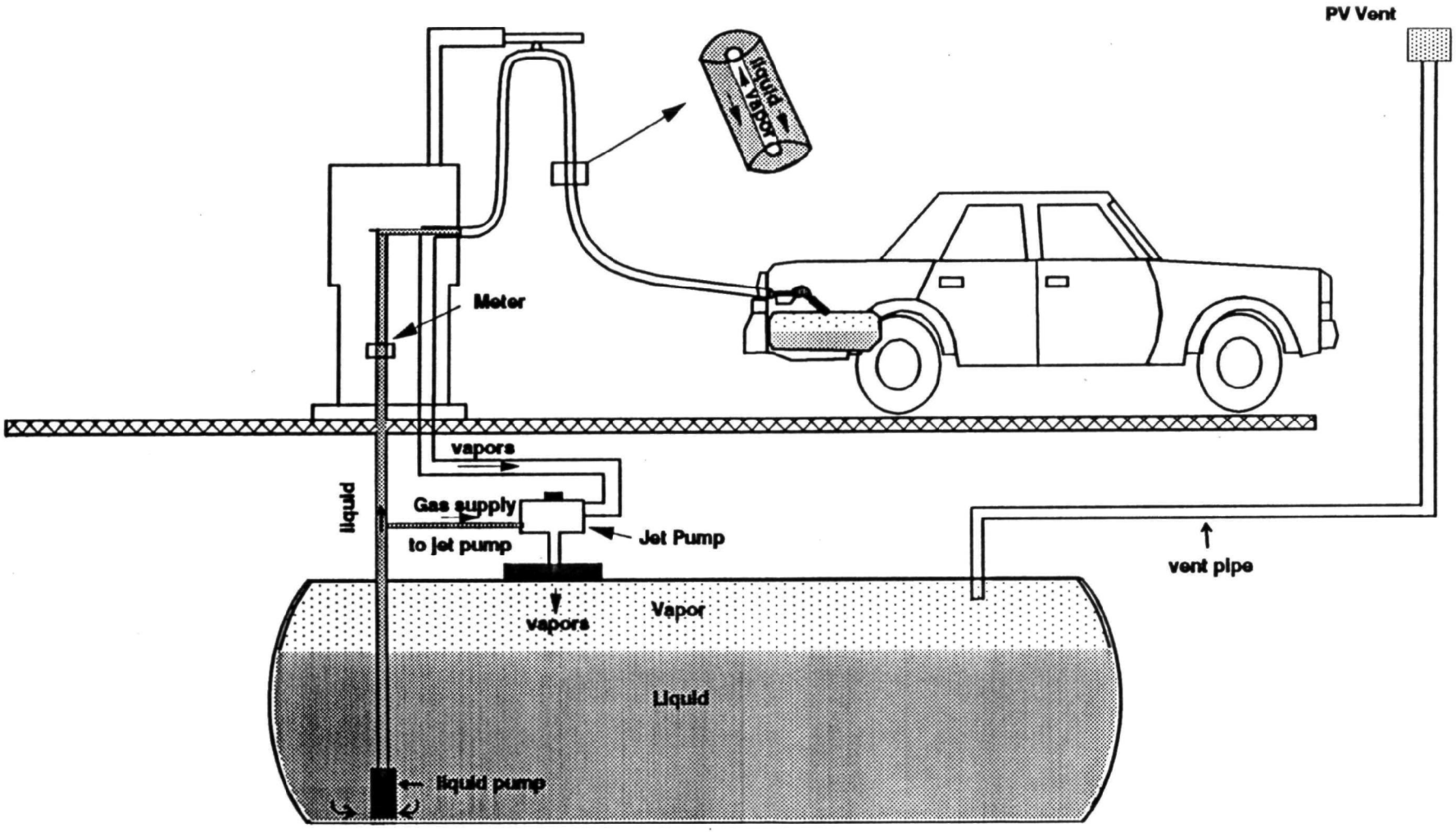


Figure 4-4. Healy Assist System

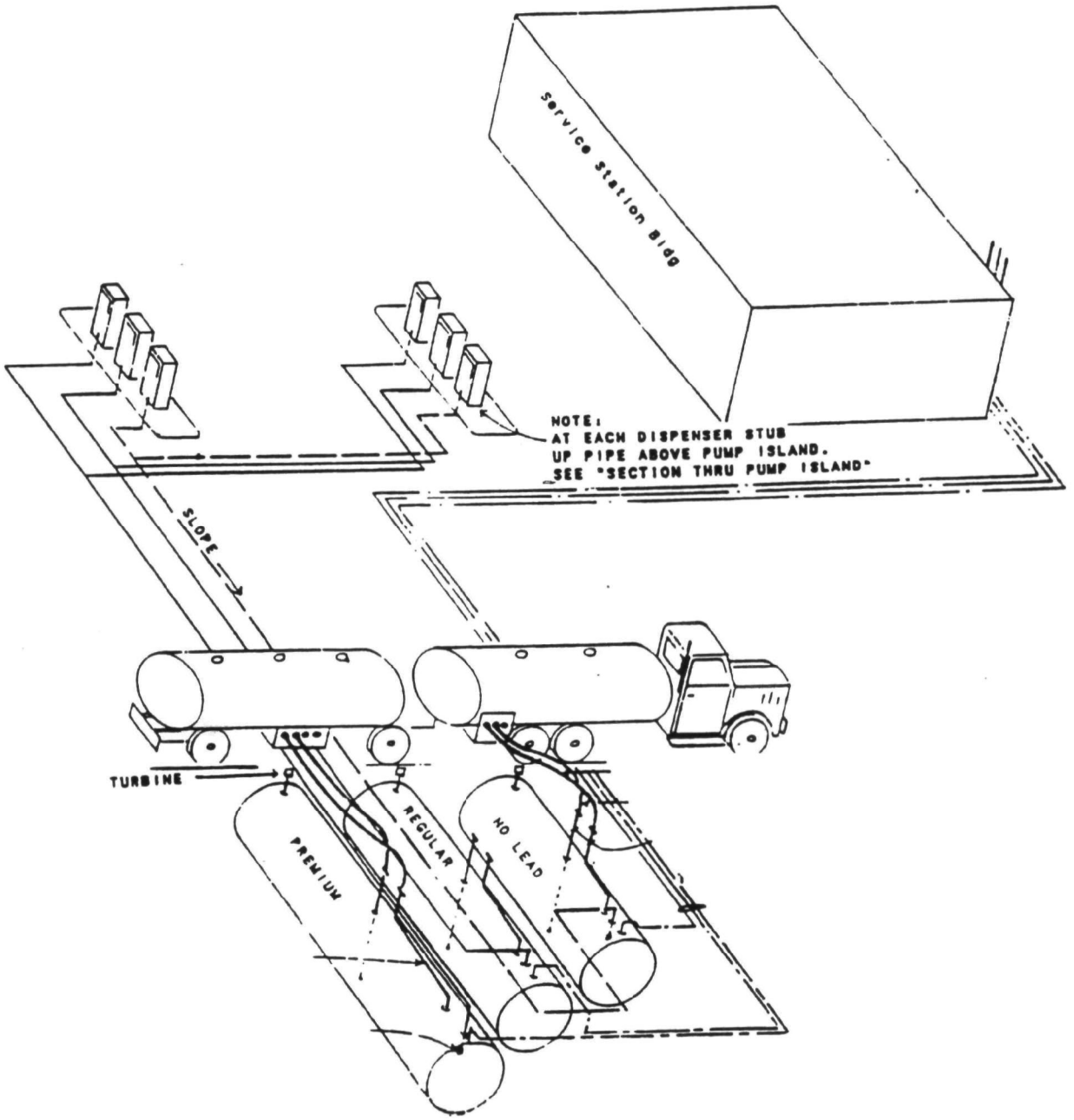


Figure 4-12. Individual Vapor Balance System Underground Piping

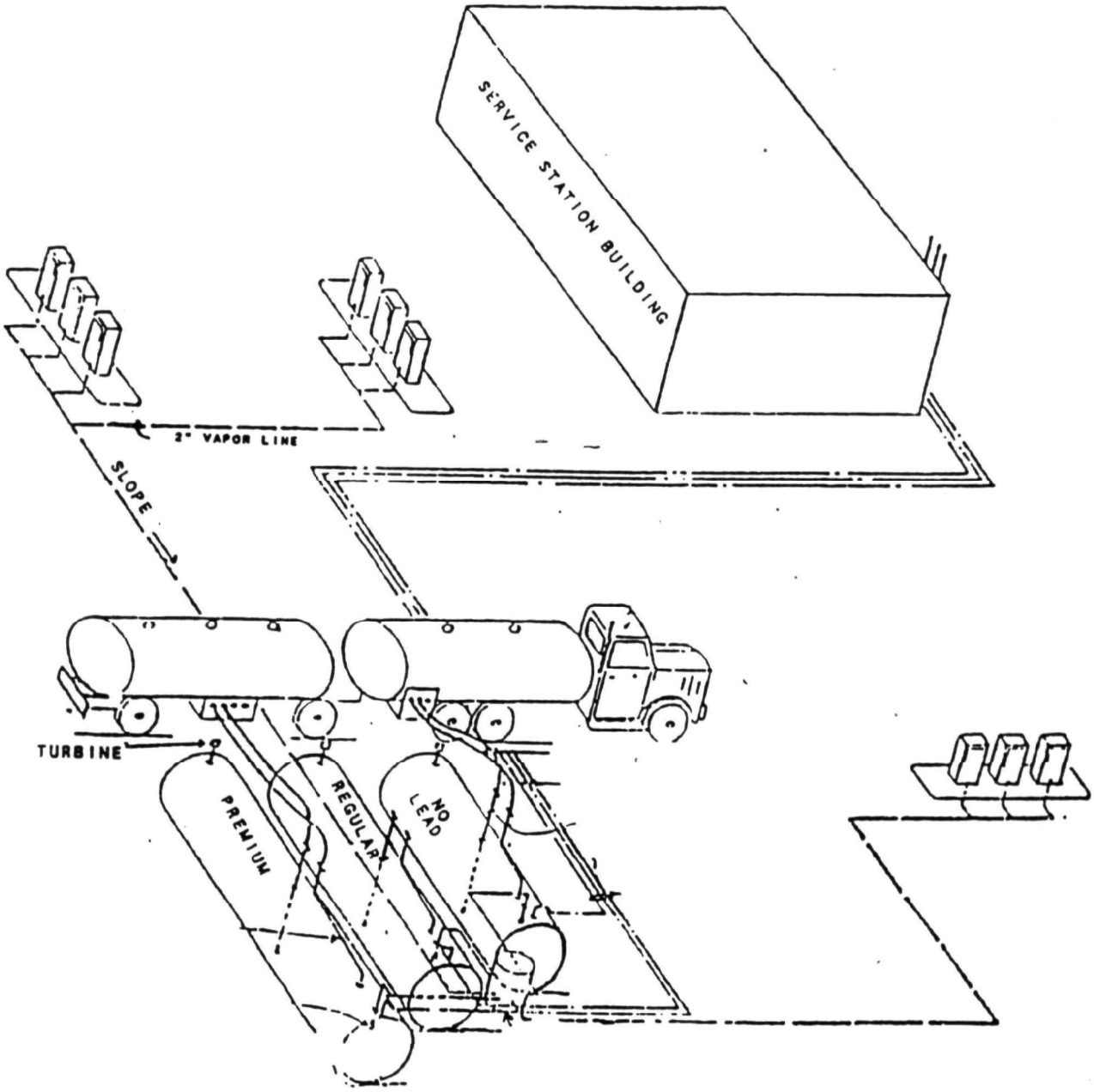


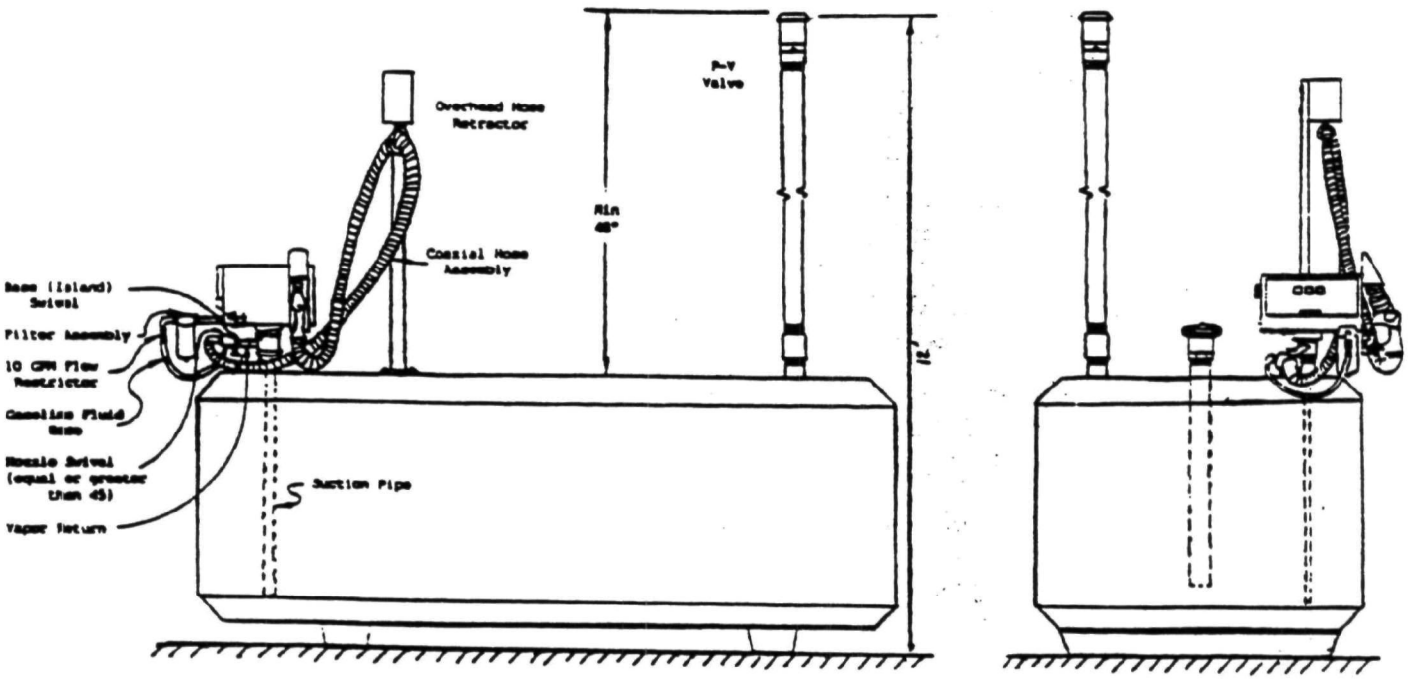
Figure 4-13. Manifolded Balance System Underground Piping

POTENTIAL PROBLEMS - UNDERGROUND PIPING

- Data Indicated as Much as 50 Percent of Underground Piping Not Installed Properly
- Improper Line Size
- Low Points
- Improper Installation
- Underground Piping Tests
  - Pressure Decay/Leak Test
  - Dynamic Pressure Drop Test
  - Liquid Blockage Test
  - Vapor Space Tie Test

Exhibit 1

Executive Order G-70-116-A



Notes:

See Executive Order G-70-97-A (Exhibits 1,2 & 3) for listing of ARB certified Phase I two-point and coaxial vapor recovery equipment and pressure/vacuum valves for storage tanks.

See Executive Order G-70 series for ARB certified Phase II vapor recovery equipment.

IN-USE EFFECTIVENESS

- 95% Efficient at Time of Certification
- Efficiency Changes With Time
- Studies Conducted on Problem or Defect Frequency
  - Washington, D.C.
  - California
- Efficiency Related to Inspection Frequency

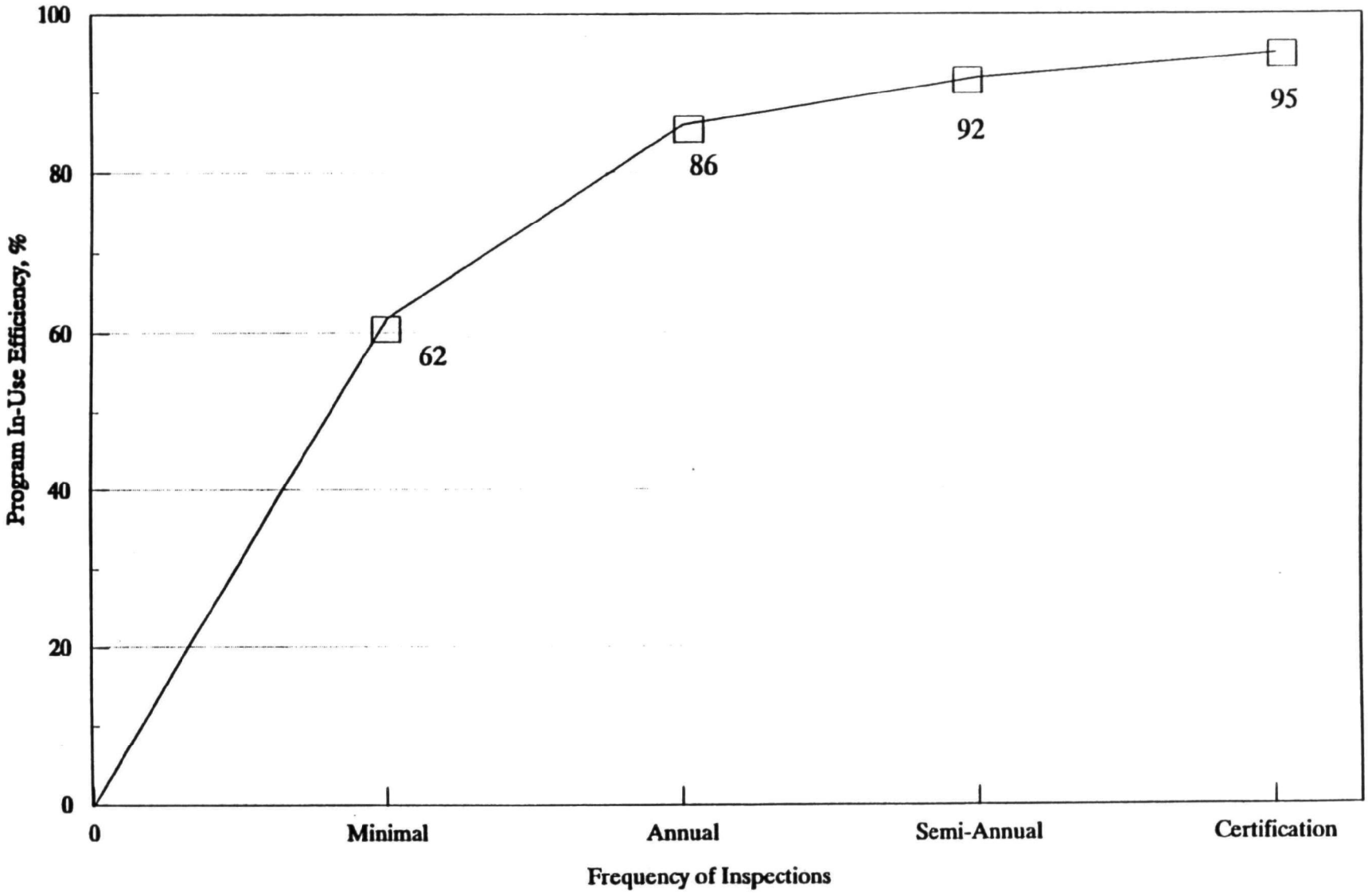


Figure 4-14. Relationship of Inspection Frequency to Program In-Use Efficiency

TABLE E-2. EFFICIENCY DECREASES ASSOCIATED WITH STAGE II BALANCE SYSTEM DEFECTS

Defect	Deficiency Decrease Assigned (Percent)
Defective Faceplate	10
Improper Faceplate	0
Missing Faceplate	22
Defective Nozzle Boot	30
Improper Nozzle Boot	5
Leaking Nozzle Boot	30
Missing Nozzle Boot	100
Uncertified Nozzle Boot	0
Defective Nozzle Body	22
Leaking Nozzle Body	22
Missing Nozzle Body	100
Uncertified Nozzle Body	0
Defective Check Valve	30
Improper Check Valve	30
Missing Check Valve	30
Kinked Hoses	30
Leaking Hoses	10
Wrong Hose Length	5
Torn/Punctured Hoses	10
Defective Retractor	5
Improper Retractor	5

TABLE E-1. BALANCE SYSTEM DEFECT FREQUENCY FROM ACTUAL STAGE II INSPECTION SURVEY[a]

	Number of Defects			Percent of All Nozzles		
Defect	Old	New	Total	Old	New	Total
Defective Faceplate	125	17	142	1.1	1.7	1.2
Improper Faceplate	75	1	76	0.7	0.1	0.6
Missing Faceplate	30	1	31	0.3	0.1	0.3
Defective Nozzle Boot	168	9	177	1.5	0.9	1.5
Improper Nozzle Boot	514	17	531	4.7	1.7	4.5
Leaking Nozzle Boot	1	0	1	0.01	0	0.01
Missing Nozzle Boot	4	0	4	0.04	0	0.03
Uncertified Nozzle Boot	1	0	1	0.01	0	0.01
Defective Nozzle Body	3	2	5	0.03	0.2	0.04
Leaking Nozzle Body	20	2	22	0.2	0.2	0.2
Missing Nozzle Body	2	0	2	0.02	0	0.02
Uncertified Nozzle Body	3	0	3	0.03	0	0.03
Defective Check Valve	476	1	477	4.4	0.1	4.0
Improper Check Valve	61	0	61	0.6	0	0.5
Missing Check Valve	5	0	5	0.05	0	0.04
Kinked Hoses	37	4	41	0.3	0.4	0.3
Leaking Hoses	4	1	5	0.04	0.1	0.04
Wrong Hose Length	111	10	121	1.0	1.0	1.0
Torn/Punctured Hoses	24	2	26	0.2	0.2	0.2
Defective Retractor	44	12	56	0.4	1.2	0.5
Improper Retractor	486	13	499	4.5	1.3	4.2

[a] Total nozzles inspected - 10,907 old nozzles, 1,023 new nozzles, 11,930 total nozzles.

$$E_I = E_T\,[100-(F_1)(ED_1)][(100-(F_2)(ED_2)]---[(100-F_x)(ED_x)]$$

where:

E_I = In-use efficiency, %

E_T = Theoretical or certification efficiency, % (typically 95 percent)

F_x = Frequency of occurrence of defect x, %

ED_x = Efficiency decrease assigned to defect x, %

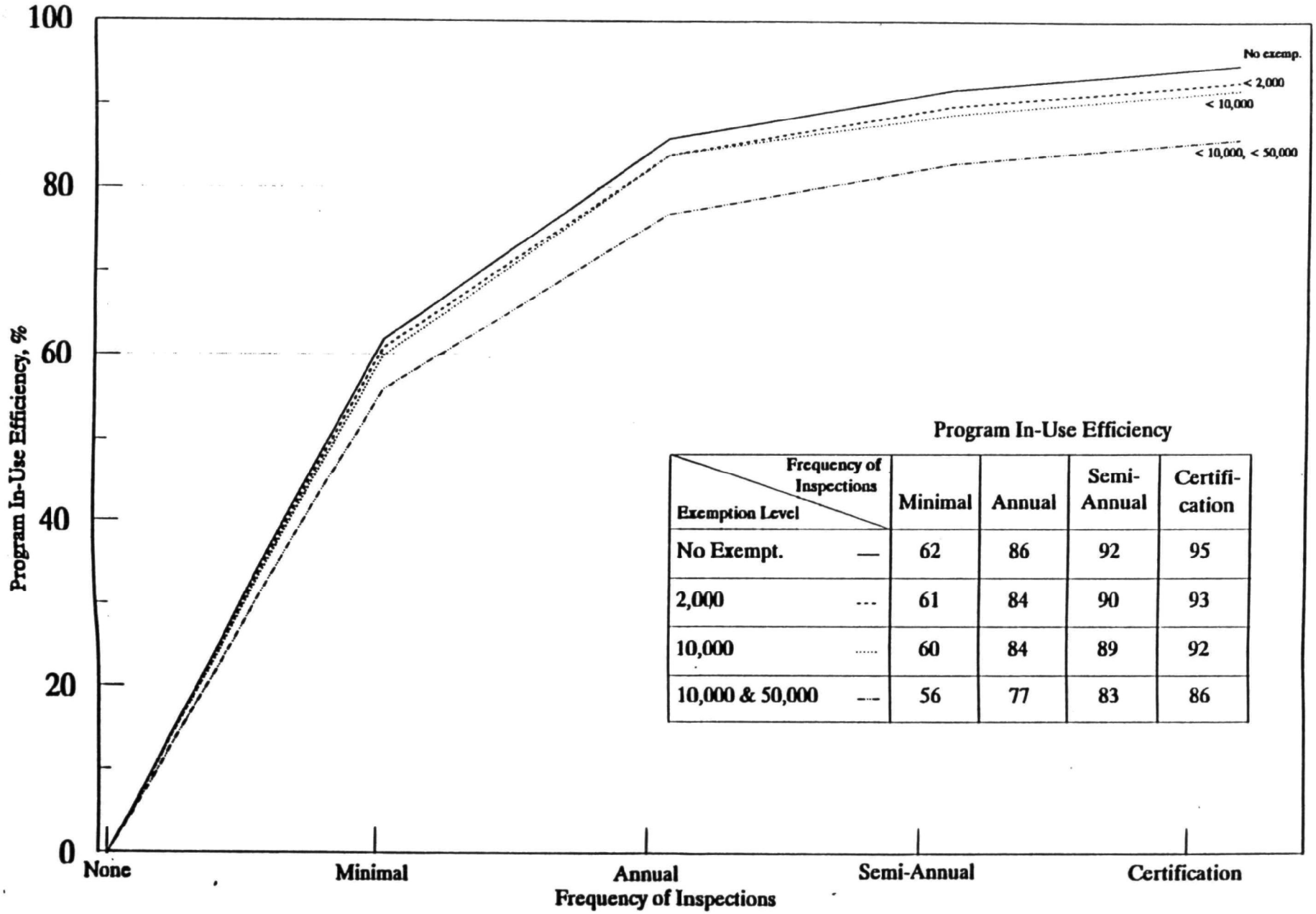
Average In-use Efficiency (Old equipment) = (0.95) [(1.00-(0.011)(0.10))
(1.00-(0.003)(0.22))
(1.00-(0.015)(0.30))
(1.00-(0.047)(0.05))

= (1.00-(0.0001)(.30))
(1.00-(0.0004)(1.00))

= (1.00-(0.0003)(0.22))
(1.00-(0.0002)(0.22))
(1.00-(0.0002)(1.00))
(1.00-(0.044)(0.30))
(1.00-(0.006)(0.30))
(1.00-(0.0005)(0.30))
(1.00-(0.003)(0.30))
(1.00-(0.0004)(0.10))
(1.00-(0.01)(0.05))
(1.00-(0.002)(0.10))
(1.00-(0.004)(0.05))
(1.00-(0.045)(0.05))

= 0.922

= 92.2 percent



Program In-Use Efficiency

Exemption Level \ Frequency of Inspections		Minimal	Annual	Semi-Annual	Certification
No Exempt.	—	62	86	92	95
2,000	---	61	84	90	93
10,000	.....	60	84	89	92
10,000 & 50,000	-·-	56	77	83	86

Figure 4-15. Relationship of Inspection Frequency to Program In-Use Efficiency with Exemptions

REVIEW

- Balance Systems
  - Simple Concept
  - Complex Equipment
  - "Untrained" User
- Effectiveness of Program
  - Maintenance of Aboveground Equipment
  - Underground Piping Installation
  - Exemption Level

STAGE II COSTS

STAGE II COSTS

STAGE II COSTS

- "Ground Up" Model
  - Component by Component Analysis
  - Developed in 1987
- Comparison of Cost Studies
  - EPA Model
  - API
  - MVMA/MBS
  - EPA/PES
- 1991 Stage II Costs

"GROUND-UP" MODEL

- Difficulty in Using Reported Costs
  - What is Included
  - Comparison of Costs
  - Basis of Estimate (Annual Costs)
- Component-By-Component Costs
- Installation
- Capital and Annual Costs
- Appendix B

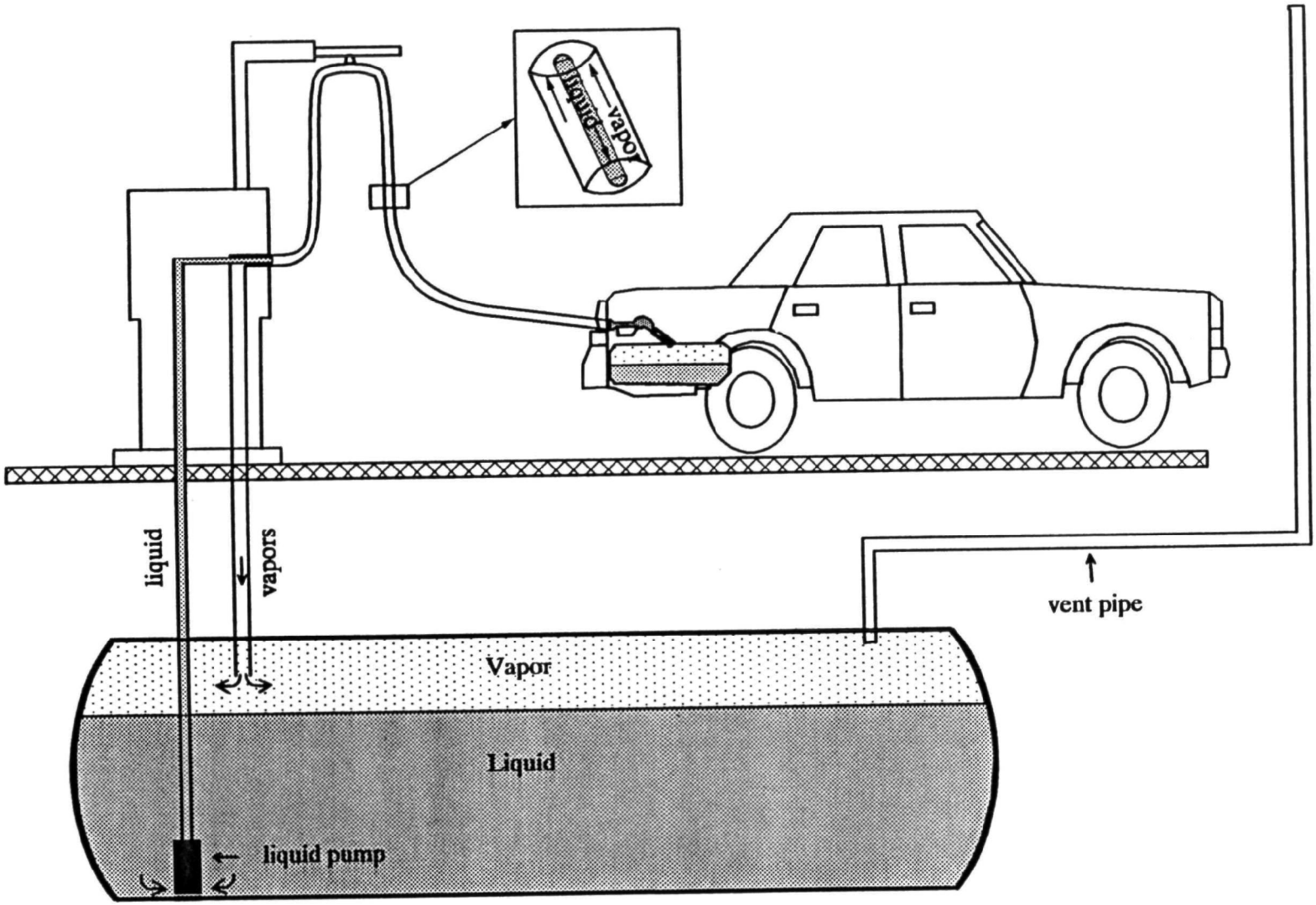


Figure 4-1. Vapor Balance System

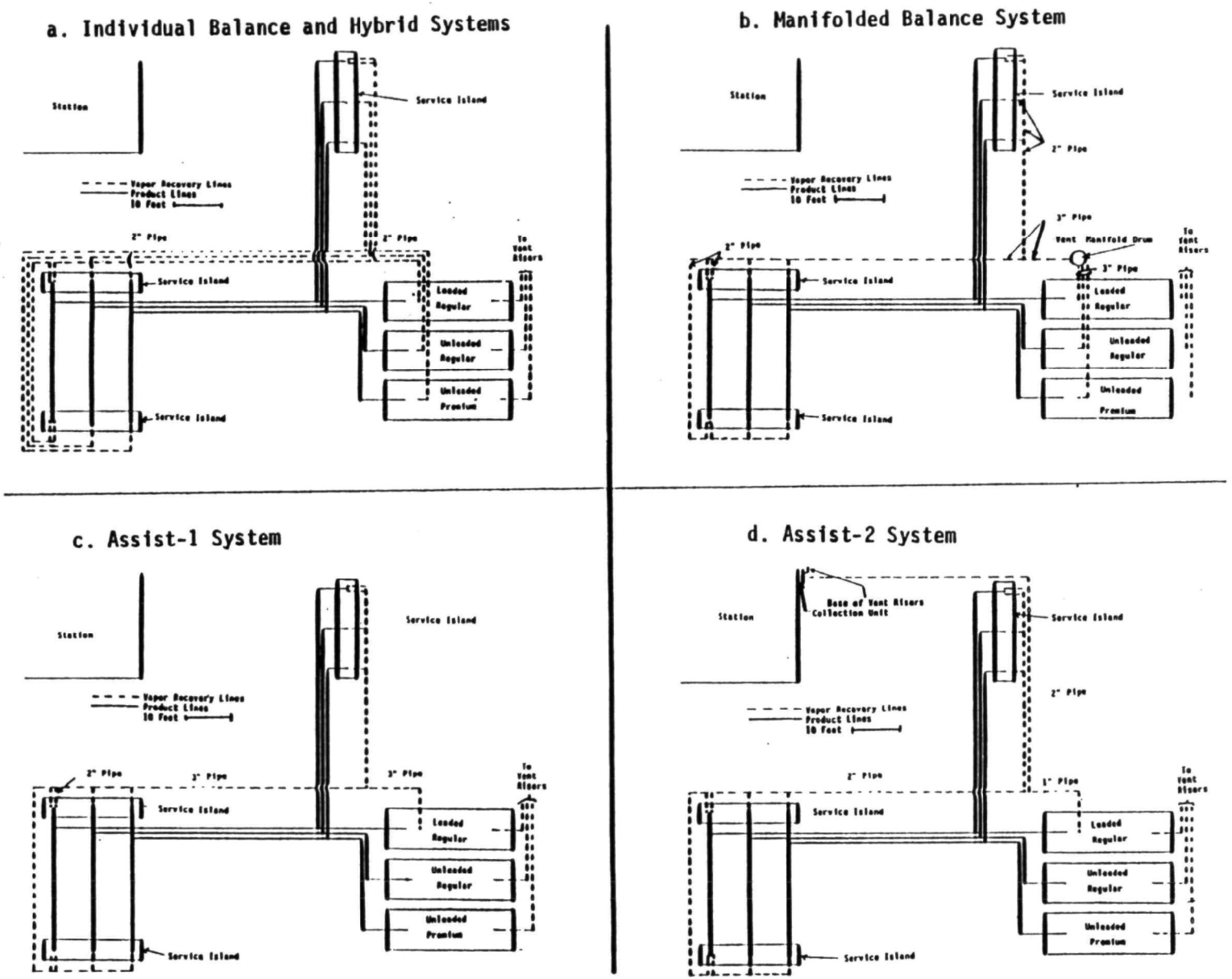


Figure B-11. Stage II Underground Piping Layouts for Model Plant 4

COST ISSUES

- **Retrofit Costs**
- **New Facility Costs**
- **Coordination With UST Activities**

TABLE 5-6. ACTIONS TAKEN IN RESPONSE TO FINDING A LEAK IN AN UNDERGROUND TANK SYSTEM[a]

Action	Percent of all Systems	Description of Savings in Stage II Piping Installation	Percent of Costs Saved[a]		
			Underground Capital Costs	Total Capital Costs	Annual Costs
1. Dig up all piping	4.5%	All trenching costs	65%	40%	25%
2. Dig up end of tanks only	11.8%	Trenching costs over end of all tanks	10%	7%	5%
3. Dig up end of tanks and under dispensers	1.3%	Trenching costs over all tanks and under all dispensers	30%	20%	15%
4. Dig up all piping and tanks	12.5%	All trenching costs	65%	40%	25%
5. Dig up only one tank	1.9%	Trenching costs over one tank	8%	5%	3%
6. Repair one leaking tank	3.1%	Trenching costs over one tank	8%	5%	3%
Total	35.0%				

[a] Cost percentages for a typical 65,000 gallon/month station.

COMPARISON OF COST STUDIES

- Comments Received on EPA Model
- Stage II Installed in St. Louis
- Compare With "Actual" Installed Costs
  - EPA Model
  - API
  - MVMA
  - EPA/PES

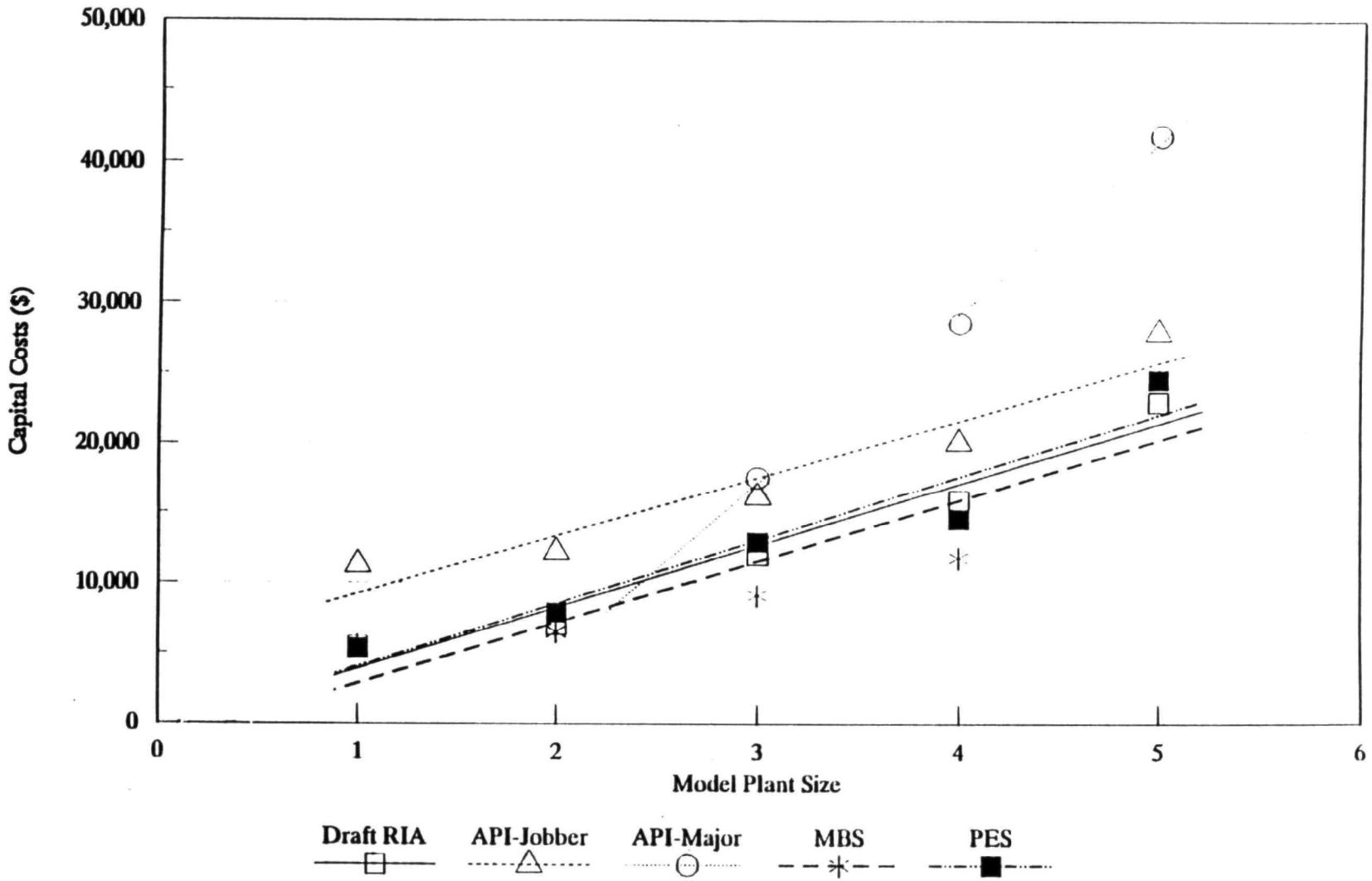


Figure 5-2. Comparison of Installed Capital Costs Lines Based on Linear Regression

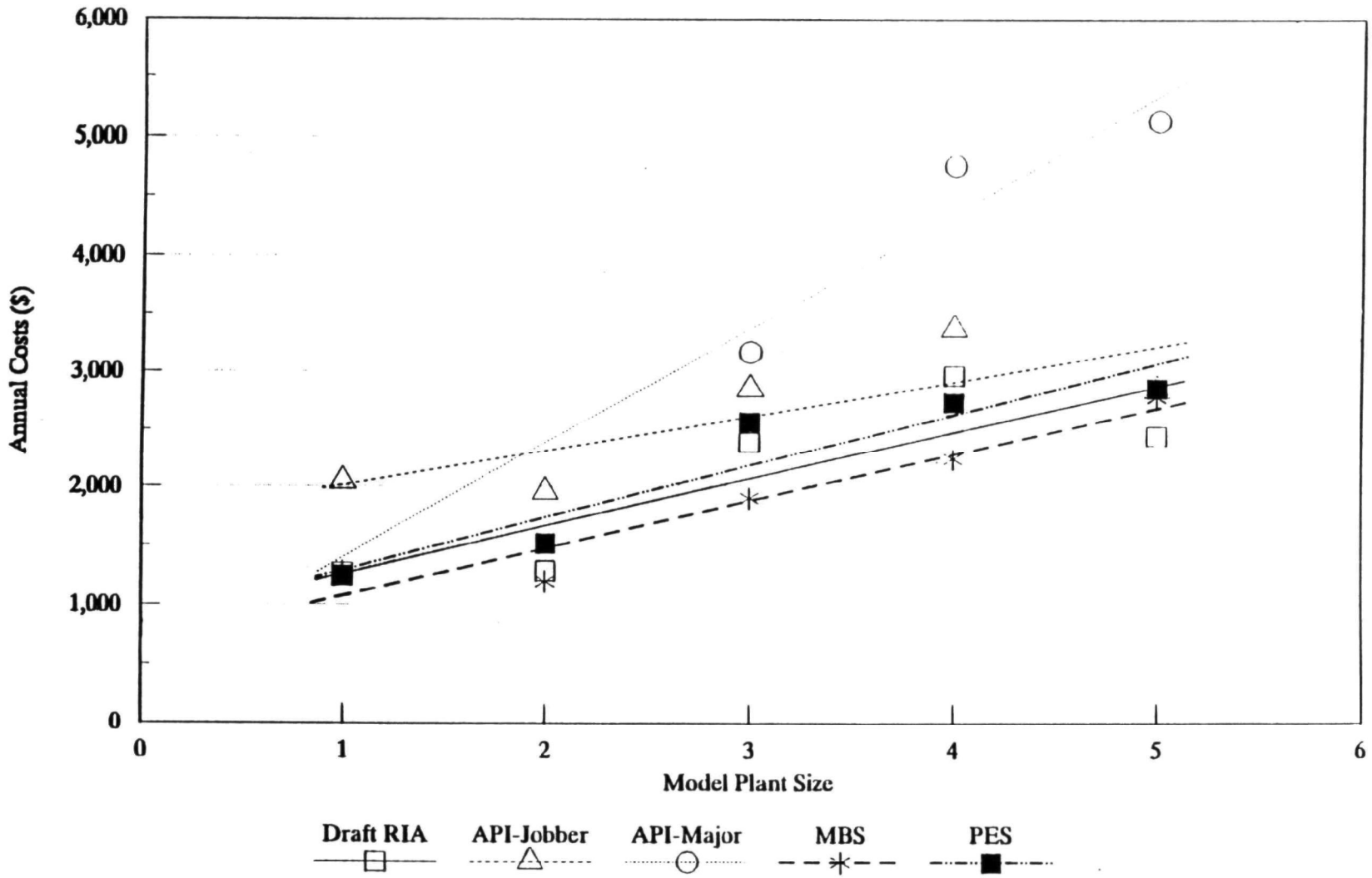


Figure 5-4. Comparison of Normalized Annual Costs Lines Based on Linear Regression

1991 STAGE II COSTS

TABLE 5-1. PURCHASE COSTS FOR VAPOR RECOVERY NOZZLES AND REPLACEMENT PARTS[3,4,5]
(May 1991 Dollars)

Item	Cost
Nozzle Costs	
New Nozzle	$240
Core Return Credit	$50
Rebuilt Nozzle	$190
Component Costs	
Nozzle Boot	$25
Boot Kit	$40
Face Seal Kit	$15
Clamp Kit	$5
Boot Assembly Kit	$30-50

TABLE 5-2. TYPICAL VAPOR RECOVERY HOSE COSTS[13,14,15]
(May 1991 Dollars)

Item[a]	Costs
Coaxial Hose	$140-$230
Liquid Removal System	$200
Coaxial Hose with Removal System	$240

[a] Costs presented for a typical 10 foot hose system.

TABLE 5-3. TYPICAL COSTS OF OTHER VAPOR RECOVERY COMPONENTS[10,12,13]
(May 1991 Dollars)

Item	Costs
High hang hose assembly	$100
Hose break away fittings	$140
Vapor check valves	$80
Swivels	
Nozzle	$60
Island	$60
Dispenser	$60
Retractor	$60
Flow limiters	
Hose splitters	$60

TABLE 5-5. TYPICAL VAPOR PIPING COSTS FOR 65,000 GALLON PER MONTH SERVICE STATION[23]

	Vapor Piping Costs
Individual Balance System	$7,700
Manifolded Balance System	$8,000
Healy Assist System	$7,700
Vacuum Assist System[a]	$7,000

[a] Average of both the Hirt and Hasstech certified vacuum assist systems.

TABLE 5-10. 1991 STAGE II BALANCE SYSTEM CAPITAL COST

COMPONENT	COST OF COMPONENT	
MODEL PLANT 1	SINGLE DISPENSER	MULTIPRODUCT DISPENSER
Number of Nozzles	2	4
Dispenser Direct Cost	1,580	3,210
Piping Direct Cost	3,910	3,910
Total Capital Cost	5,490	7,120
MODEL PLANT 2		
Number of Nozzles	3	6
Dispenser Direct Cost	2,370	4,810
Piping Direct Cost	4,950	4,950
Total Capital Cost	7,320	9,760
MODEL PLANT 3		
Number of Nozzles	6	12
Dispenser Direct Cost	4,740	9,620
Piping Direct Cost	7,860	7,860
Total Capital Cost	12,600	17,480
MODEL PLANT 4		
Number of Nozzles	9	18
Dispenser Direct Cost	7,120	14,430
Piping Direct Cost	9,690	9,690
Total Capital Cost	16,810	24,120
MODEL PLANT 5		
Number of Nozzles	15	30
Dispenser Direct Cost	11,860	24,060
Piping Direct Cost	12,650	12,650
Total Capital Cost	24,510	36,710

TABLE 5-11. 1991 STAGE II BALANCE SYSTEM ANNUAL COST

COMPONENT	COST OF COMPONENT	
MODEL PLANT 1	SINGLE DISPENSER	MULTIPRODUCT DISPENSER
Capital Recovery Cost	701	893
Maintenance Cost	475	475
Other Indirect Costs	219	285
Recovery Credit	129	129
Total Annualized Cost	1,266	1,524
MODEL PLANT 2		
Capital Recovery Cost	939	1,555
Maintenance Cost	617	617
Other Indirect Costs	293	485
Recovery Credit	518	518
Total Annualized Cost	1,331	2,139
MODEL PLANT 3		
Capital Recovery Cost	1,668	2,313
Maintenance Cost	1,230	1,230
Other Indirect Costs	504	699
Recovery Credit	906	906
Total Annualized Cost	2,496	3,336
MODEL PLANT 4		
Capital Recovery Cost	2,297	3,298
Maintenance Cost	1,852	1,852
Other Indirect Costs	672	965
Recovery Credit	1,683	1,683
Total Annualized Cost	3,138	4,432
MODEL PLANT 5		
Capital Recovery Cost	3,455	5,175
Maintenance Cost	3,090	3,090
Other Indirect Costs	980	1,468
Recovery Credit	4,790	4,790
Total Annualized Cost	2,735	4,943

RECOVERY CREDITS

- Value of Recovered Product
- Emission Reduction Converted to Equivalent Liquid Saved
- Dollar Value Assigned to Liquid Saved

TABLE 5-12. COST EFFECTIVENESS OF 1991 STAGE II BALANCE SYSTEMS[a]

	Single Dispenser	Multiproduct Dispenser
MODEL PLANT 1		
Annualized Costs, $	1,266	1,524
Emission Reduction, Mg	0.34	0.34
Cost Effectiveness, $/Mg	3,680	4,430
MODEL PLANT 2		
Annualized Costs, $	1,331	2,139
Emission Reduction, Mg	1.0	1.0
Cost Effectiveness, $/Mg	1,290	2,070
MODEL PLANT 3		
Annualized Costs, $	2,496	3,336
Emission Reduction, Mg	1.8	1.8
Cost Effectiveness, $/Mg	1,380	1,850
MODEL PLANT 4		
Annualized Costs, $	3,138	4,432
Emission Reduction, Mg	3.4	3.4
Cost Effectiveness, $/Mg	910	1,290
MODEL PLANT 5		
Annualized Costs, $	2,735	4,943
Emission Reduction, Mg	9.7	9.7
Cost Effectiveness, $/Mg	280	510

[a] Emission reduction from Table 3-8, and assuming annual enforcement (86 percent in-use efficiency).

TABLE 5-13. PROGRAM COST EFFECTIVENESS COMPARED TO EXEMPTION LEVEL

Program Exemption Level	Program Cost Effectiveness ($/Mg)		
	Single Dispenser	Multiproduct Dispenser	Average[a]
No Exemptions	1,130	1,570	1,350
Ex < 2,000 gal/month	1,030	1,460	1,240
Ex < 10,000 gal/month	890	1,310	1,100
Ex < 10,000 gal/month Independents < 50,000 gal/month	820	1,210	1,020

[a] Average assumes equal distribution of single and multiproduct dispensers.

SUMMARY

- EPA Model Considered Good Estimate of Stage II Costs
- 1991 Cost Presented
- Stage II is Cost Effective

PLANNING AND PUBLIC AWARENESS

PLANNING

- **Consultation with Other Agencies**
- **Characterization of the Affected Industry**
- **Estimation of Environmental and Economic Impacts**

OTHER AFFECTED AGENCIES

- OSHA
- Fire Marshal
- Measurement Standards
- UST

CHARACTERIZATION OF THE AFFECTED INDUSTRY

- Service Station
- Facility Population
- Gasoline Throughput
- Size Distribution of Facilities

DEFINITION OF SERVICE STATION

"Any site where gasoline is dispensed to motor vehicle fuel tanks from stationary storage vessels"

TYPES OF SERVICE STATIONS

- **Public Facilities**

  Traditional service stations

  Pumpers

  Convenience Stores

- **Private Facilities**

  Government

  Fleets (taxis, rental cars, etc.)

  Trucking and local service

  School buses

  Agriculture

TABLE 2-4. ESTIMATED 1990 RETAIL SERVICE STATION POPULATION

State	Number of Stations	State	Number of Stations
Alabama	6,500	Montana	1,400
Alaska	300	Nebraska	3,000
Arizona	4,010	Nevada	450
Arkansas	3,764	New Hampshire	1,050
California	13,800	New Jersey	3,860
Colorado	3,400	New Mexico	2,066
Connecticut	1,900	New York	6,800
Delaware	450	North Carolina	10,643
Dist. of Columbia	134	North Dakota	1,245
Florida	10,152	Ohio	6,205
Georgia	7,000	Oklahoma	4,700
Hawaii	392	Oregon	2,165
Idaho	1,123	Pennsylvania	6,000
Illinois	10,100	Rhode Island	602
Indiana	4,500	South Carolina	5,200
Iowa	4,169	South Dakota	1,245
Kansas	3,062	Tennessee	6,000
Kentucky	2,446	Texas	11,000
Louisiana	6,600	Utah	2,137
Maine	700	Vermont	856
Maryland	2,450	Virginia	6,000
Massachusetts	2,500	Washington	3,500
Michigan	8,500	West Virginia	2,800
Minnesota	3,598	Wisconsin	5,074
Mississippi	6,000	Wyoming	1,372
Missouri	7,200	NATIONWIDE TOTAL	210,120

Source: National Petroleum News, "Counting Procedure Shows How Retail Outlet Population is Greater Than Expected," April 1991.

1990 GASOLINE THROUGHPUT BY STATE

STATE	1990 THROUGHPUT	PERCENT OF NATIONWIDE	STATE	1990 THROUGHPUT	PERCENT OF NATIONWIDE
ALABAMA	2,120,444	1.8%	MONTANA	444,349	0.4%
ALASKA	274,133	0.2%	NEBRASKA	795,515	0.7%
ARIZONA	1,678,470	1.4%	NEVADA	651,818	0.6%
ARKANSAS	1,264,427	1.1%	NEW HAMPSHIRE	510,137	0.4%
CALIFORNIA	13,304,359	11.4%	NEW JERSEY	3,547,006	3.0%
COLORADO	1,547,261	1.3%	NEW MEXICO	811,429	0.7%
CONNECTICUT	1,445,681	1.2%	NEW YORK	6,119,254	5.3%
DELAWARE	347,026	0.3%	NORTH CAROLINA	3,337,499	2.9%
DISTRICT OF COL.	175,799	0.2%	NORTH DAKOTA	352,200	0.3%
FLORIDA	6,212,149	5.3%	OHIO	5,765,788	4.9%
GEORGIA	3,571,616	3.1%	OKLAHOMA	1,712,492	1.5%
HAWAII	388,769	0.3%	OREGON	1,366,546	1.2%
IDAHO	491,663	0.4%	PENNSYLVANIA	4,733,852	4.1%
ILLINOIS	5,224,728	4.5%	RHODE ISLAND	381,057	0.3%
INDIANA	2,696,329	2.3%	SOUTH CAROLINA	1,618,044	1.4%
IOWA	1,376,510	1.2%	SOUTH DAKOTA	393,896	0.3%
KANSAS	1,251,101	1.1%	TENNESSEE	2,613,637	2.2%
KENTUCKY	1,850,610	1.6%	TEXAS	8,859,492	7.6%
LOUISIANA	2,024,455	1.7%	UTAH	734,344	0.6%
MAINE	611,394	0.5%	VERMONT	290,641	0.2%
MARYLAND	2,157,151	1.9%	VIRGINIA	3,027,842	2.6%
MASSACHUSETTS	2,433,953	2.1%	WASHINGTON	2,311,131	2.0%
MICHIGAN	4,371,053	3.8%	WEST VIRGINIA	835,298	0.7%
MINNESOTA	2,077,581	1.8%	WISCONSIN	2,123,146	1.8%
MISSISSIPPI	1,265,062	1.1%	WYOMING	262,113	0.2%
MISSOURI	2,752,483	2.4%			
			NATIONWIDE	116,513,000	

TABLE A-1. RETAIL SERVICE STATION DISTRIBUTION BASED ON LUNDBERG DATA FROM 16 METROPOLITAN AREAS

GASOLINE THROUGHPUT RANGE (gallons/month)	PERCENTAGE OF SERVICE STATIONS
0 - 5,999	3.8
6,000 - 9,999	4.8
10,000 - 24,999	15.0
25,000 - 49,999	23.5
50,000 - 99,999	32.3
100,000 - 199,999	18.2
> 200,000	2.4

Source: Lundberg Survey, Incorporated.

TABLE A-2

SIZE DISTRIBUTIONS OF COUNTIES SORTED BY POPULATION

Lundberg Survey

Incorporated Census Data

Gasoline Throughput For U.S. Environmental Protection Agency

COUNTY	POPULATION	SIZE1	SIZE2	SIZE3	SIZE4	SIZE5	SIZE6	SIZE7
MONROE, IL	22365	13.3	6.7	33.3	40.0	6.7	0.0	0.0
WALLER, TX	23150	22.0	9.8	24.4	19.5	17.1	7.3	0.0
CLINTON, IL	33455	12.9	25.8	19.4	32.3	6.5	3.2	0.0
BRISTOL, RI	48288	0.0	14.3	4.8	42.9	28.6	9.5	0.0
LIBERTY, TX	52241	12.0	12.0	34.7	26.7	12.0	2.7	0.0
YAMHILL, OR	65307	0.0	3.2	38.7	29.0	29.0	0.0	0.0
LAPEER, MI	74340	27.5	13.7	15.7	17.6	15.7	7.8	2.0
FRANKLIN, MO	80413	13.4	5.2	13.4	46.6	17.5	4.1	0.0
OSCEOLA, FL	104104	1.1	2.3	17.2	29.9	39.1	9.2	1.1
WASHINGTON, RI	108003	1.6	4.7	14.1	31.3	31.3	15.6	1.6
LIVINGSTON, MI	114958	13.3	4.4	11.1	17.8	22.2	15.6	15.6
MACOMB, IL	117206	0.7	1.3	5.7	14.3	40.3	30.0	7.7
SUSSEX, NJ	129633	1.3	5.1	15.4	26.9	39.7	10.3	1.3
KENT, RI	159900	1.0	1.9	12.5	28.8	37.5	17.3	1.0
JEFFERSON, MO	170254	4.7	3.8	7.5	27.4	42.5	13.2	0.9
MONTGOMERY, TX	180394	9.9	11.5	28.1	27.1	13.5	8.3	1.6
BRAZORIA, TX	190891	10.7	12.6	34.0	27.9	13.0	1.9	0.0
GALVESTON, TX	216175	3.8	10.9	35.9	25.0	18.5	6.0	0.0
FORT BEND, TX	224751	12.5	10.6	17.3	29.8	20.2	9.6	0.0
CLARK, WA	237277	1.9	4.9	14.6	29.1	34.0	15.5	0.0
SOMERSET, NJ	239188	0.8	1.7	11.7	19.2	48.3	17.5	0.8
MADISON, IL	246762	2.4	4.8	18.2	41.8	28.5	4.2	0.0
CLACKAMAS, OR	277791	4.2	2.5	10.1	21.0	37.0	21.8	3.4
WASHTENAW, MI	280222	4.9	4.9	10.6	9.8	44.7	22.0	3.3
SEMINOLE, FL	285213	0.7	2.0	20.5	18.5	35.1	18.5	4.6
WASHINGTON, OR	309883	0.0	2.4	6.1	14.6	40.2	35.4	1.2
RICHMOND, NY	349549	5.1	2.5	14.4	33.1	29.7	13.6	1.7
MORRIS, NJ	419456	1.6	2.4	9.8	28.9	37.0	19.1	1.2
OCEAN, NJ	429076	3.0	1.2	15.1	25.3	28.3	19.3	7.8
PASSIAC, NJ	442895	1.7	3.9	16.7	29.6	36.5	11.2	0.4
UNION, NJ	490000	2.8	6.0	15.5	21.6	31.4	21.6	1.1
HUDSON, NJ	533598	7.4	5.5	12.9	23.9	30.1	17.8	2.5
MONMOUTH, NJ	548793	0.8	2.7	7.0	23.4	39.1	25.0	2.0
MULTINOMAH, OR	580029	3.2	0.8	7.9	26.5	40.3	19.0	2.4
PROVIDENCE, RI	585763	3.5	5.5	14.8	33.5	27.7	13.9	1.0
MIDDLESEX, NJ	667761	4.3	4.8	12.1	31.5	26.1	18.0	3.2
ORANGE, FL	670213	2.8	3.3	13.9	23.6	37.1	17.3	1.9
ESSEX, NJ	749355	1.1	9.9	19.1	23.2	36.8	9.6	0.4
BERGEN, NJ	818237	3.0	5.1	16.5	24.5	35.6	14.0	1.3
OAKLAND, MI	1076234	1.8	2.0	5.7	13.3	39.8	33.0	4.3
BRONX, NY	1203789	5.1	3.3	16.7	27.0	27.9	18.1	1.9
NEW YORK, NY	1420702	2.5	1.3	5.0	17.5	28.8	30.0	15.0
QUEENS, NY	1881375	5.3	5.9	18.8	27.7	27.7	13.8	0.8
WAYNE, MI	2049294	2.1	3.2	5.8	11.3	46.6	28.1	2.9
KINGS, NJ	2300664	4.6	4.8	18.0	24.5	30.0	16.1	1.9
SAN DIEGO, CA	2465961	2.5	1.2	6.8	14.3	33.1	34.4	7.8
HARRIS, TX	2791102	4.2	6.8	21.0	25.2	27.7	14.3	0.8

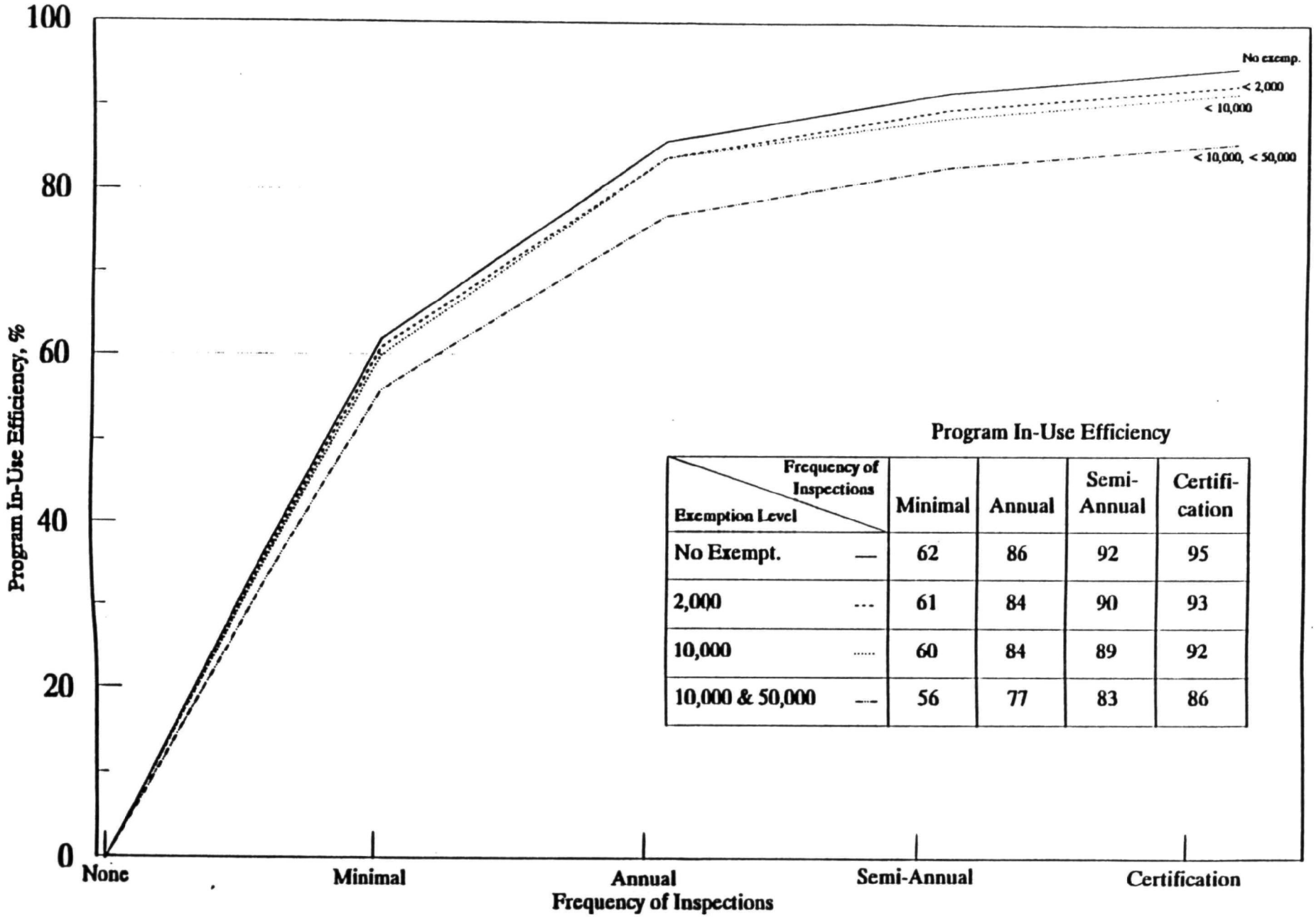
ESTIMATION OF IMPACTS

- **Environmental**

- **Economic**

TABLE 3-6. MONTHLY AND GEOGRAPHIC VARIATIONS IN REFUELING EMISSION FACTORS

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Weighted Average Summer (Apr-Sep)	Weighted Average Winter (Oct-Mar)	Weighted Average Annual
ALABAMA	1760	1870	1720	1610	1380	1450	1460	1390	1240	1880	1960	1850	1420	1840	1630
ALASKA (a)	1570	1640	1640	1490	1650	1720	1860	1840	1810	2020	1830	1640	1730	1740	1740
ARIZONA	1440	1380	1260	1090	1020	1060	1080	1110	990	1440	1400	1310	1060	1370	1220
ARKANSAS	1850	1870	1720	1610	1380	1450	1370	1390	1240	2000	2080	1940	1400	1910	1630
CALIFORNIA (b)	1550	1750	1850	1670	1060	1140	1280	1280	1190	1620	1660	1650	1270	1680	1470
COLORADO	1590	1510	1060	720	770	870	1150	1080	1080	1630	1570	1530	950	1480	1200
CONNECTICUT	1370	1420	1390	1140	970	1050	1150	1150	1110	1720	1640	1440	1090	1500	1290
DELAWARE	1370	1420	1390	1140	970	1050	1150	1150	1010	1590	1640	1440	1070	1480	1260
DIST. OF COL.	1370	1320	1300	1010	980	1050	1150	1150	1010	1590	1640	1440	1060	1440	1250
FLORIDA	1760	1870	1720	1610	1380	1450	1520	1550	1240	1880	1960	1850	1460	1840	1650
GEORGIA	1760	1870	1720	1610	1380	1450	1460	1390	1240	1880	1960	1850	1420	1840	1630
HAWAII (a)	1120	1190	1190	1050	1300	1470	1610	1580	1470	1570	1380	1190	1420	1280	1350
IDAHO (a,b)	1540	1400	1330	1060	750	840	1060	1080	1030	1240	1210	1260	970	1320	1150
ILLINOIS	1370	1420	1390	1070	920	1050	1120	1120	1010	1590	1610	1390	1050	1470	1260
INDIANA	1370	1420	1390	1140	970	1050	1150	1150	1010	1590	1640	1440	1080	1480	1270
IOWA	1590	1610	1280	840	770	1030	1350	1280	1240	1850	1790	1640	1090	1640	1350
KANSAS	1590	1510	1060	720	770	1030	1200	1130	1240	1630	1570	1530	1010	1480	1230
KENTUCKY	1370	1320	1300	1010	870	1050	1150	1150	1010	1590	1640	1440	1040	1450	1230
LOUISIANA	1760	1870	1720	1610	1380	1450	1460	1390	1240	1880	1960	1850	1420	1840	1620
MAINE	1370	1420	1390	1140	970	1050	1150	1150	1110	1720	1640	1440	1100	1500	1290
MARYLAND	1370	1420	1390	1140	970	1050	1150	1150	1010	1590	1640	1440	1080	1480	1280
MASSACHUSETTS	1370	1420	1390	1140	970	1050	1150	1150	1110	1720	1640	1440	1090	1500	1290
MICHIGAN	1370	1420	1390	1140	970	1050	1150	1150	1110	1720	1640	1440	1090	1500	1290
MINNESOTA	1590	1610	1280	970	870	1030	1350	1280	1240	1850	1790	1640	1130	1630	1360
MISSISSIPPI	1760	1870	1720	1610	1380	1450	1460	1390	1240	1880	1960	1850	1420	1840	1630
MISSOURI	1590	1510	1190	840	770	1030	1200	1130	1240	1850	1700	1530	1030	1560	1290
MONTANA	1590	1610	1280	840	770	1030	1350	1280	1240	1850	1790	1640	1100	1630	1340
NEBRASKA	1590	1610	1280	840	770	1030	1350	1280	1240	1630	1570	1530	1090	1530	1300
NEVADA (b)	1630	1750	1800	1620	1100	1140	1280	1280	1190	1580	1600	1620	1270	1660	1460
NEW HAMPSHIRE	1370	1420	1390	1140	970	1050	1150	1150	1110	1720	1640	1440	1100	1500	1290



Program In-Use Efficiency

Exemption Level \ Frequency of Inspections		Minimal	Annual	Semi-Annual	Certification
No Exempt.	—	62	86	92	95
2,000	---	61	84	90	93
10,000	.....	60	84	89	92
10,000 & 50,000	—·—	56	77	83	86

Figure 4-15. Relationship of Inspection Frequency to Program In-Use Efficiency with Exemptions

TABLE 5-10. 1991 STAGE II BALANCE SYSTEM CAPITAL COST

COMPONENT	COST OF COMPONENT	
MODEL PLANT 1	SINGLE DISPENSER	MULTIPRODUCT DISPENSER
Number of Nozzles	2	4
Dispenser Direct Cost	1,580	3,210
Piping Direct Cost	3,910	3,910
Total Capital Cost	5,490	7,120
MODEL PLANT 2		
Number of Nozzles	3	6
Dispenser Direct Cost	2,370	4,810
Piping Direct Cost	4,950	4,950
Total Capital Cost	7,320	9,760
MODEL PLANT 3		
Number of Nozzles	6	12
Dispenser Direct Cost	4,740	9,620
Piping Direct Cost	7,860	7,860
Total Capital Cost	12,600	17,480
MODEL PLANT 4		
Number of Nozzles	9	18
Dispenser Direct Cost	7,120	14,430
Piping Direct Cost	9,690	9,690
Total Capital Cost	16,810	24,120
MODEL PLANT 5		
Number of Nozzles	15	30
Dispenser Direct Cost	11,860	24,060
Piping Direct Cost	12,650	12,650
Total Capital Cost	24,510	36,710

TABLE 5-11. 1991 STAGE II BALANCE SYSTEM ANNUAL COST

COMPONENT	COST OF COMPONENT	
	SINGLE DISPENSER	MULTIPRODUCT DISPENSER
MODEL PLANT 1		
Capital Recovery Cost	701	893
Maintenance Cost	475	475
Other Indirect Costs	219	285
Recovery Credit	129	129
Total Annualized Cost	1,266	1,524
MODEL PLANT 2		
Capital Recovery Cost	939	1,555
Maintenance Cost	617	617
Other Indirect Costs	293	485
Recovery Credit	518	518
Total Annualized Cost	1,331	2,139
MODEL PLANT 3		
Capital Recovery Cost	1,668	2,313
Maintenance Cost	1,230	1,230
Other Indirect Costs	504	699
Recovery Credit	906	906
Total Annualized Cost	2,496	3,336
MODEL PLANT 4		
Capital Recovery Cost	2,297	3,298
Maintenance Cost	1,852	1,852
Other Indirect Costs	672	965
Recovery Credit	1,683	1,683
Total Annualized Cost	3,138	4,432
MODEL PLANT 5		
Capital Recovery Cost	3,455	5,175
Maintenance Cost	3,090	3,090
Other Indirect Costs	980	1,468
Recovery Credit	4,790	4,790
Total Annualized Cost	2,735	4,943

PUBLIC AWARENESS

PUBLIC AWARENESS IS VITAL TO THE SUCCESS OF ANY STAGE II PROGRAM TO ENSURE THE PROPER USE OF STAGE II EQUIPMENT

SHOULD EDUCATE:

- **Facility Owners and Operators**
- **General Public**

ENFORCEMENT DOCUMENT
TRAINING AND PUBLIC EDUCATION

- **Inspector Training**
- **Facility Owner/Operator Training**
- **Education of Regulated Facilities**
- **General Public Education**

FACILITY OWNER/OPERATOR TRAINING ON STAGE II EQUIPMENT

At Least One Owner/Operator From Each Facility Should Receive Training in the Following Areas:

- **Purposes and Effects of the Stage II Vapor Control Program**
- **Equipment Operation and Function**
- **Maintenance Schedules and Requirements**
- **Equipment Warranties**
- **Equipment Manufacturer Contacts for Parts and Service**

POA EDUCATION OF REGULATED FACILITIES

The POA Should Prepare and Distribute the Following Information on the Purposes and Benefits of Stage II Vapors Control to All Regulated Facilities:

- **The General Purposes and Benefits of the Stage II Vapor Control Program**

- **The Specific Program Requirements**

- **Potential Enforcement Consequences for Non-Compliance**

- **Information on the Program Oversight Agency**

SELF-INSPECTION HANDBOOK

GASOLINE FACILITIES

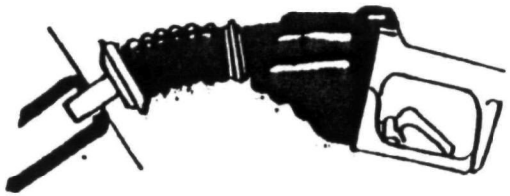
PHASE I & II VAPOR RECOVERY

AIR RESOURCES BOARD
COMPLIANCE DIVISION
COMPLIANCE ASSISTANCE PROGRAM

OTHER EXAMPLES OF FACILITY EDUCATION/TRAINING

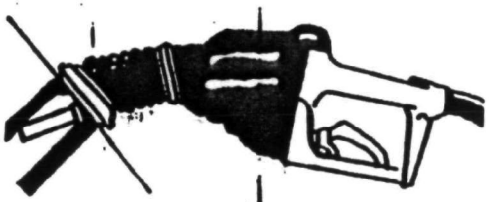
- South Coast self-inspection
- Massachusetts self-enforcement

How to Use a Stage II Nozzle



1. Insert the nozzle into your car's fill pipe.

2. Push the nozzle far enough into the fill pipe to compress the bellows and make a tight seal.



3. Push the nozzle down or to the side to latch it firmly into the fill pipe. Tug slightly on the nozzle to check the connection. Once it latches, you can stop pushing. If the nozzle won't latch on, continue applying pressure to maintain a tight seal.

4. Squeeze the lever to begin gasoline flow and fill your tank to the desired level. The nozzle will shut off automatically when the tank is full. Don't top off your tank!

5. Wait a few seconds before removing the nozzle from your car's fill pipe after automatic shutoff to let the remaining gasoline drain out.

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Department of Environmental Protection
Division of Air Quality Control
One Winter Street, 8th Floor
Boston, Massachusetts 02108

Cut Gas Vapors Off At The Pump!

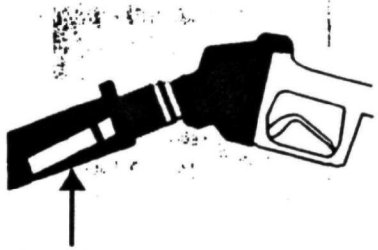
New nozzles on the pumps at Massachusetts gas stations cut smog, conserve fuel and reduce fire hazard

Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Protection

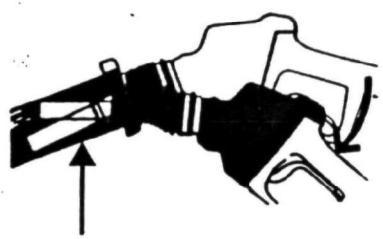
NOZZLE OPERATION

Used properly, vapor recovery nozzles fight smog!

1. Insert nozzle



2. Tilt down, dispense gasoline.



3. After shutoff, wait 3 seconds, push in, lift and remove nozzle.

TOXIC RISK!

* Avoid Spillage
* Avoid Breathing Fumes

For Your Protection-Do Not Top Off Tank

Nozzle Problems?
Call S.C.A.Q.M.D. (800) 242-4020

89477-05

WAYS TO INFORM AND EDUCATE THE PUBLIC CONCERNING A STAGE II PROGRAM

- **Require operating instructions be placed at the pump**
- **Provide a toll free complaint number**
- **Develop a Public Awareness Program including Brochures, Pamphlets, Fact Sheets, etc.**
- **TV, Radio, Newspapers**
- **Seminars/Presentations at Community and Civic Organizations**

REGULATIONS/
EQUIPMENT REQUIREMENTS

ELEMENTS OF A STAGE II REGULATION

- Equipment Requirements
- Exemption Levels
- Compliance Schedules
- Recordkeeping Requirements

CERTIFIED SYSTEMS

- Control systems required to achieve at least 95 percent control

- Systems must:

  1) be tested using CARB methods, or

  2) be tested and approved by an equivalent testing program, or

  3) be certified by CARB.

CALIFORNIA AIR RESOURCES BOARD VAPOR RECOVERY CERTIFICATION

The requirements which must be met for CARB certification include:

- **Successful completion of tests.**

  For new systems, these include:

  - **Operational test of at least 90 days**
  - **Efficiency test ("100-car test")**
  - **Leak test**

- **Proof of financial responsibility**
- **Acceptable warranty**

  - **3 years unless life of component is less**
  - **1 year for hoses and nozzles**

- **Acceptable installation and maintenance procedures and manuals**
- **Approval by:**

  - **DMS (Division of Measurement Standards)**
    Responsible for recirculation, meter accuracy, shutoffs
  - **SFM (State Fire Marshall)**
    Responsible for fire safety
  - **DOSH (Division of Occupational Safety and Health)**
    Responsible for safety other than fire

- **Payment of certification fee**

California Air Resources Board (CARB) Certification

Approval of Three State Agencies
Required Before Certification May Be Issued

State Fire Marshal (SFM)
Only Agency Responsible for Fire Safety

Division of Measurement Standards (DMS)
Shutoff Mechanisms and Prevention of Recirculation

Division of Occupational Safety and Health (DOSH)
Safety Other than Fire Safety

CARB Certification Test Procedures

Operational Test

At least **90 days**

Service station with at least **100,000 gals/month throughput**

No maintenance except as specified in manual

No fault for vandalism or accidents (drive-offs)

Station Leak Test

Phase I Efficiency Test

Phase II Efficiency Test

Minimum of **100 vehicle fuelings**

Minimum of 40 Baseline fuelings

COSTS OF CERTIFICATION

- Application Fees
- Testing Fees (Government and Private)
- Communication/Travel, etc.
- Industry estimates total cost of certifying system at $50,000 - $100,000

ABOVE GROUND STORAGE TANK SYSTEMS

- Two types seen in California:

  1) Bulk plant type card lock facilities

  2) Small Vaulted Storage Tanks

- Insufficient number of fuelings to meet 100 car matrix

- Certified using "engineering" analysis and judgement

CERTIFIED SYSTEMS IN OTHER STATES

- Missouri
- New Jersey
- New York
- Dade County, FL
- Massachusetts

Missouri Stage II Regulation

(B) Certification of Vapor Recovery Equipment. Vapor Recovery Equipment Certification will be performed by the director. It is the responsibility of the supplier/manufacturer to provide proof to the director that a vapor recovery system or its modifications meet the requirements of certification as provided in 10 CSR 10-5.220(6)(B)1. — 3. The requirements for a vapor recovery system or its modifications to be certified are as follows:

1. The system must be certified by the State of California Air Resources Board as having a vapor recovery or removal efficiency of at least ninety-five percent (95%).

2. All rules and requirements of the Missouri Department of Natural Resources are met. These consist of rules found in Title 10 of the *Code of State Regulations*.

Dade County, FL Stage II Regulation

(C) It shall be unlawful for any person to dispense or to permit, cause, allow, let or suffer the dispensing of gasoline, gasohol or any petroleum distillate into any motor vehicle fuel tank or into any motor vehicle fuel delivery vessel from any loading facility unless such loading facility is equipped with a vapor collection system or its equivalent, properly installed, and operational, as approved by the director of the department of environmental resources management or his designee. When dispensing gasoline, gasohol or other petroleum distillates through the hatches of a motor vehicle fuel delivery vessel with a loading arm equipped with such vapor collection system, a pneumatic, hydraulic or other mechanical device shall be installed to create a vapor-tight seal between the loading arm and the hatch. For all other loading of gasoline, gasohol and other petroleum distillates effected through means other than hatches, delivery lines shall be equipped with fittings which create vapor-tight connections and which close automatically when disconnected. The vapor collection system required herein shall be one of the following:

Metropolitan Dade County, Florida Clean Air Program - Stage II Vapor Recovery System Specifications	Date: Name:
Company Name and Address	
California Air Resources Board EXECUTIVE ORDER NUMBER	
Dade County APPROVAL NUMBER	
Dispenser Manufacturer and Model	
Pump Number(s)	_____ to _____
Stage II Vapor Recovery System	____ Balance _____ Hirt _____Assist ____Other (specify)_____
Nozzle (check Manufacturer and enter model number)	____OPW 111V-____111V-____ ____EMCO WHEATON __A4005 / __RA4005 ____HUSKY Model V ____Other (specify)_____
Coaxial Hose Assembly Manufacturer and Model	
Liquid Removal System	_____No _____Yes (specify)_____
Pressure-Vacuum (P/V) Vents, Pressure and Vacuum	P = _____ oz. pressure V = _____ oz. vacuum
Retractor Manufacturer and Model	
Remote Check Valves	_____No _____ Yes (specify)_____
Maximum Flow Rate	_____ gpm
Flow Limiter	_____No _____ Yes (specify)_____
Height of Hose Loop from Drive Surface	_____ inches
Height of Hose Loop from Island	_____ inches
Inside Diameter of (galvanized) Vapor Riser	_____ inches
Breakaway	_____No _____ Yes (specify)_____

Please complete this form for each system and submit for approval to :
DERM Air Section, 111 N.W. 1st [illegible] Suite 1310, Miami, Florida 33128

Section D

(Use Form VEM-032 [Stage 1] for each location which does not have a DEP ID Number.)

DEP ID #	Facility Location (City)	County	Throughput* (Gals.)	Log Number (DEP Use Only)

** Throughput in gallons dispensed at this location from 9-1-86 to 8-31-87.*

Section E

Please check *(only 1)* the certified Stage II Vapor Recovery equipment that will be installed at each location. The number next to each manufacturer represents the California executive order that certified that equipment.

____Atlantic Richfield (G-70-25-AA)

____Emco Wheaton (G-70-17-AA)

____Hasstech (G-70-7-AB)

____Hirt (G-70-33-AB)

____OPW (G-70-36-AA)

____Texaco (G-70-38-AA)

____Chevron (G-70-53-AA)

____Exxon (G-70-23-AA)

____Healy (G-70-70-AA)

____Mobil (G-70-48-AA)

____Red Jacket (G-70-14-AA)

____Union (G-70-49-AA)

____Other _____ Calif. Ex. Order # _____

FOR DEPARTMENT USE ONLY — DO NOT WRITE BELOW THIS LINE

Application for authorization to install the above indicated Stage II vapor recovery system is hereby: ____ **APPROVED** ____ **DENIED**

Reason for Denial: ____ No Fee ____ No Certified Controls
____ Application is Illegible ____ No Signature

NSR DECISION DATE: _____ BY: _____
Chief, Bureau of New Source Review

NOTE: If applications are approved, you will be sent form VEM-017 at a later date. Form VEM-017 will include your New Jersey Plant ID Numbers, New Jersey Stack Numbers, and Certificate Numbers. This form must be readily available at locations above until you receive your VEM-017 forms.

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE PREVENTION
DIVISION OF AIR QUALITY CONTROL
STAGE II - FACILITY INSTALLATION AND COMPLIANCE FORM

For DEP use only:
_ Incomplete
ID #:

Completion of this form is required by and satisfies the requirements of DEP regulation 310 CMR 7.24(6)(c)2. Failure to provide complete and accurate information may subject you to administrative penalties. Complete items 1-7 PRIOR to installation of vapor recovery equipment and return the white copy to DEP. Upon FINAL installation, complete item 8 and return the yellow copy. Retain the pink copy for your records. If you have any questions, call DEP at 617-556-1035. PLEASE TYPE OR PRINT CLEARLY.

1. FACILITY OWNER:

Name: _____ Phone: (____) _____

Business Mailing Address: _____

City, State: _____ ZIP: _____

2. FACILITY OPERATOR/LESSEE.

Name: _____ Phone: (____) _____

Business Mailing Address: _____

City, State: _____ ZIP: _____

3. FACILITY INFORMATION:

Name: _____ Phone: (____) _____

Street Address: _____

City, State: _____ ZIP: _____

4. TYPE OF VAPOR COLLECTION AND CONTROL SYSTEM (check one only):
☐ Vapor Balance ☐ Vacuum Assist ☐ Other: _____

5. VAPOR COLLECTION AND CONTROL EQUIPMENT INFORMATION: Only equipment which has already been approved and certified by the California Air Resources Board (CARB) is acceptable.

Equipment	No. of	Manufacturer's Name	Model No.	CARB Number (i.e., Executive Order #)
NOZZLES				
HOSES				
DISPENSERS				

6. ANTICIPATED DATES OF INSTALLATION:

Underground Piping: ____/____/____ (mm dd yy) Aboveground Equipment: ____/____/____ (mm dd yy)

7. STATEMENT OF NOTIFICATION (Sign and return the white copy):
I certify that I have provided the above information, and to the best of my knowledge it is true and complete.

_____ _____
Signature of legally responsible person Date

Name: _____ Title: _____

Business Address: _____ Phone: (____) _____

City, State: _____ ZIP: _____

8. STATEMENT OF COMPLIANCE (Sign and return the yellow copy when installation of equipment has been completed): I certify that the equipment listed in item #5 above has been installed and is operating in compliance with 310 CMR 7.24(6).

_____ _____
Signature of legally responsible person (#7 above) Date

RETURN FORMS TO: Department of Environmental Protection, Division of Air Quality Control
Stage II Program, One [illegible] 8th Floor, Boston, MA 02108

CARB EXECUTIVE ORDERS

CARB Certification Executive Orders

Issued after all certification requirements have been met

SFM Approval

DMS Approval

DOSH Approval

Successful Completion of Tests

Payment of Certification Fee

Contain Requirements of Certification

Configuratins of Underground Piping

List of Certified Components

Specific Requirements

(Example: Pressure Drop Criteria for Balance and Hirt)

State of California
AIR RESOURCES BOARD

Executive Order G-70-17-AB
Relating to Modification of Certification
of the Emco Wheaton Balance Phase II
Vapor Recovery System

WHEREAS, the Air Resources Board (the "Board") has established, pursuant to Sections 39600, 39601, and 41954 of the Health and Safety Code, certification procedures for systems designed for the control of gasoline vapor emissions during motor vehicle fueling operations ("Phase II vapor recovery systems") in its "Certification Procedures for Gasoline Vapor Recovery Systems at Service Stations" as last amended December 4, 1981 (the "Certification Procedures"), incorporated by reference in Section 94001 of Title 17, California Administrative Code;

WHEREAS, the Board has established pursuant to Sections 39600, 39601, and 41954 of the Health and Safety Code, test procedures for determining compliance of Phase II vapor recovery systems with emission standards in its "Test Procedures for Determining the Efficiency of Gasoline Vapor Recovery Systems at Service Stations" as last amended September 1, 1982 (the "Test Procedures"), incorporated by reference in Section 94000 of Title 17, California Administrative Code;

WHEREAS, Emco Wheaton has applied for certification of the Emco Wheaton Models A4000 and A4001 vapor recovery nozzles and Model A220 series vapor check valves for use with the Balance Phase II vapor recovery systems;

WHEREAS, Section VIII-A of the Certification Procedures provides that the Executive Officer shall issue an order of certification if he or she determines that a vapor recovery system conforms to all of the requirements set forth in Sections I through VII;

WHEREAS, I find that coaxial vapor recovery hoses when used with Emco Wheaton balance Phase II vapor recovery systems result in an improvement to the performance of the systems; and

WHEREAS, I find that the Emco Wheaton Model A4001 coaxial vapor recovery nozzles and Model A220 series vapor check valves, when used with the balance Phase II vapor recovery systems, at all new and existing installations, conform with all the requirements set forth in Sections I through VII of the Certification Procedures.

NOW THEREFORE, IT IS HEREBY ORDERED that the certification, Executive Order G-70-17-AA, issued on February 8, 1983 is hereby modified to add the Emco Wheaton Model A4000 and A4001 vapor recovery nozzles and Model A220 series vapor check valves for use with the Emco Wheaton balance Phase II vapor recovery system.

IT IS FURTHER ORDERED that only the coaxial Emco Wheaton Models A4000 and A3000 vapor recovery nozzles may be installed on new installations.

EXECUTIVE ORDER G-70-17-AB
NOTES TO ACCOMPANY EXHIBITS 1 & 2

1. For non-retail outlets which fuel special vehicles, the installation of vapor recovery hoses longer than specified in the latest version of Executive Order G-70-52 are allowed if the following conditions are met:

   a. The non-retail outlet fuels special vehicles such as large trucks, large skip loaders, off-the-road equipment, etc. where reaching the fill pipe requires longer hoses.

   b. The vapor return hoses are arranged to be self-draining or provisions are made to drain the hoses after each refueling or the system incorporates an approved liquid blockage detection system arranged to cease dispensing when a blockage occurs.

   c. The Executive Officer of the Air Resources Board or his/her designee has approved the plans for compliance with condition b.

2. The maximum allowable pressure drop through a system including nozzle, vapor hose, swivels, and underground piping is:

   a. 0.15 inch water at a flow of 20 CFH;
   b. 0.45 inch water at a flow of 60 CFH;
   c. 0.95 inch water at a flow of 100 CFH.

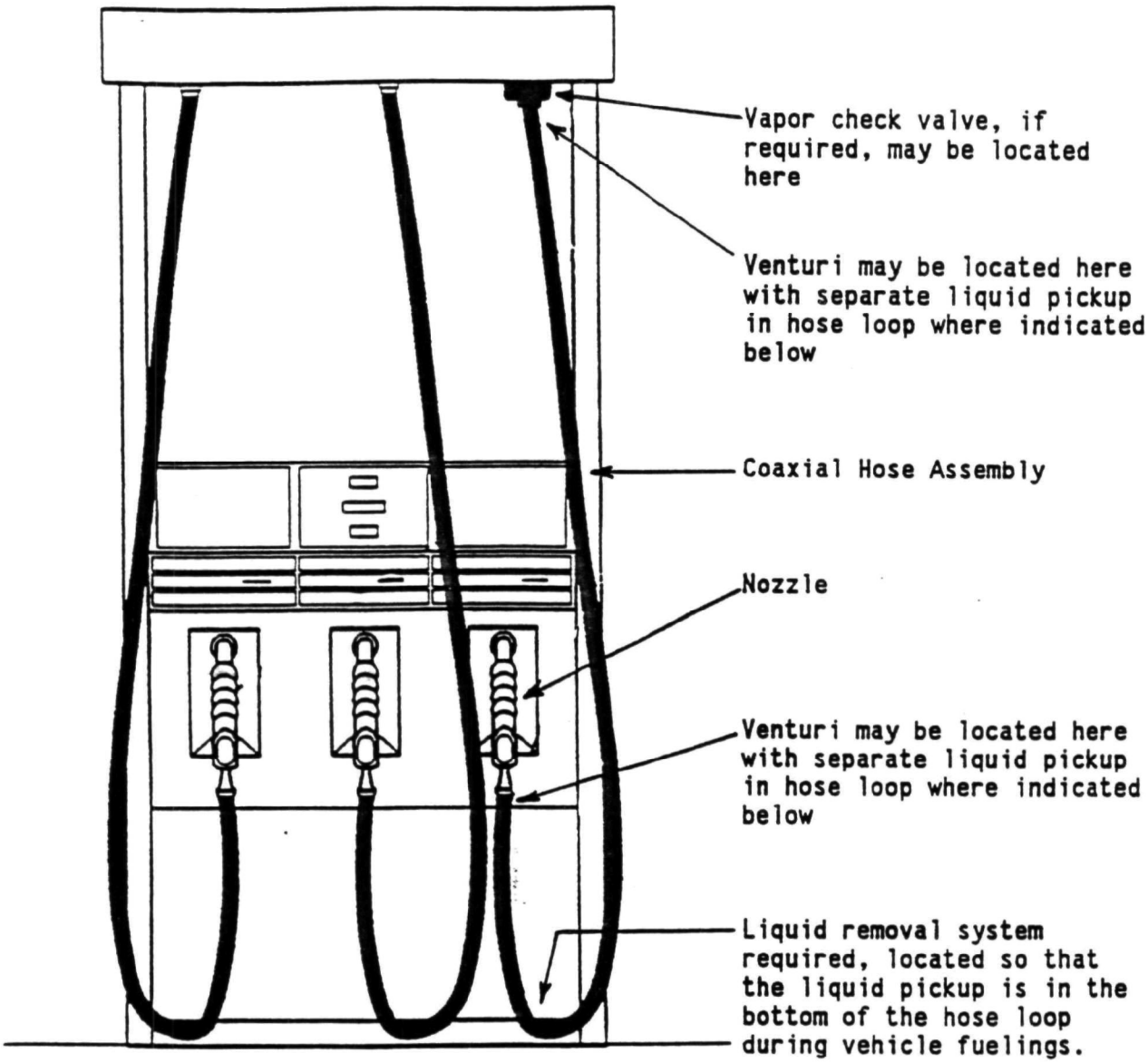
   A pressure drop test must be conducted with the drybreak to the underground tank open.

3. The vent pipes and vent manifold shall be adequately supported throughout their length and when they are supporting weights in addition to their own, additional supports may be required, such as anchoring to a building or other structure.

4. All vapor return and vent piping shall be equipped with swing joints at the base of the riser to each dispensing unit, at each tank connection and at the base of the vent riser where it fastens to a building or other structure. When a swing joint is used in a riser containing a shear section, the riser must be rigidly supported.

5. Float check valves (or alternative equipment, design, or operating procedures acceptable to the Air Resources Board) are required for all underground manifolded piping systems installed on or after November 13, 1980 to prevent contamination of unleaded gasoline with leaded gasoline, via vapor recovery piping, during underground storage tank loading or overfill.

EXHIBIT 10
Executive Order G-70-52-AM
High-Hang Coaxial Hose Configuration With Liquid Removal System
For New and Existing Installations



Notes:

1. Use 1 inch or larger inside diameter galvanized pipe for riser.
2. The maximum length of the hose assembly is 10-1/2 feet.
3. An ARB certified liquid removal system must be installed and maintained according to the manufacturer's current specifications.
4. A flow limiter is required on all dispensers that have a maximum flowrate in excess of 10 gpm. A flow limiter may be required on all gasoline dispensers at the option of the local air pollution control district.
5. The Emco Wheaton and EZ-flo A4001 and A4003 nozzles are permitted only when used in conjunction with approved vapor check valves.
6. The hose may not touch the island or the ground when not in use. In the case of a dogbone island where the wider island ends protect the hose from damage by vehicle tires, the hose may touch the vertical face of the dogbone island at the option of the local air pollution control district.

Exhibit 2, page 4

Executive Order G-70-52-AM
Component[1/] List for Red Jacket, Hirt, or Balance
Phase II Vapor Recovery Systems

Manufacturer/Item and Model Number	SFM ID Number	Exhibits 4	5	6	7	8a	8b	8c	9a	9b	9c	10	11	11a
High-Hang Hose Dispensers[3/]														
Bennett Pump 7012, 7024, 8022, 8024, 8033											X	X		
Bennett Pump 8036, 9036, 9048											X	X		
Dresser Wayne 390					X	X	X	X	X	X	X	X		
Dresser Wayne 490						X	X	X				X		
Dresser Wayne 390Dx-GQU									X	X	X	X		
Gilbarco MPD									X	X	X	X		
Gilbarco Advantage									X	X	X	X		
Koppens Calcutrim											X	X		
Southwest 2300 and 2400 MPD											X	X		
Tokheim High-discharge TCS														
H311, H312, H322, H324, H413, H426, H614, H628											X	X		
Product Blending Dispensers[18/]														
Dresser Wayne 395-1L Blender												X		
Dresser Wayne 375 Blender												X		
Dresser Wayne 585 Blender												X		
Dresser Wayne 590 Blender												X		
Gilbarco SalesMaker (SMK) Blender												X		
Gilbarco Multi-Product (MPD) Blender												X		
Tokehim 262 with blend valves [19/]			X											
Tokehim 426 TCS with blend valves												X	X	X
Coaxial Hose Assembly [16/]														
B.F. Goodrich Coax	005:014:001		X	X		X			X			X		
B.F. Goodrich Super II Coax	005:014:001		X	X		X			X			X		
Dayco Petroflex 2000 Mdl 7574	005:033:001		X	X		X	X	X	X	X	X	X	X	X
Dayco Petroflex 2000 Mdl 7573	005:033:002		X	X		X	X	X	X	X	X	X	X	X
Dayco Petroflex 3000														
Model 7575 Blending Hose	005:033:006											X		
Gates Kleanaire	005:045:001		X	X		X	X	X	X	X	X	X	X	X

(continued next page)

OTHER REGULATION ELEMENTS

OTHER REGULATION ELEMENTS

ELEMENTS OF A STAGE II REGULATION

- Equipment Requirements
- Exemption Levels
- Compliance Schedules
- Recordkeeping Requirements

EXEMPTION LEVELS

- **Optional - - Maximum Allowable Exemptions:**

  $\leq$ 50,000 gal/month dispensed for "independent small business marketers"

  $\leq$ 10,000 gal/month dispensed for all facilities

TABLE 5-12. COST EFFECTIVENESS OF 1991 STAGE II BALANCE SYSTEMS[a]

	Single Dispenser	Multiproduct Dispenser
MODEL PLANT 1		
Annualized Costs, $	1,266	1,524
Emission Reduction, Mg	0.34	0.34
Cost Effectiveness, $/Mg	3,680	4,430
MODEL PLANT 2		
Annualized Costs, $	1,331	2,139
Emission Reduction, Mg	1.0	1.0
Cost Effectiveness, $/Mg	1,290	2,070
MODEL PLANT 3		
Annualized Costs, $	2,496	3,336
Emission Reduction, Mg	1.8	1.8
Cost Effectiveness, $/Mg	1,380	1,850
MODEL PLANT 4		
Annualized Costs, $	3,138	4,432
Emission Reduction, Mg	3.4	3.4
Cost Effectiveness, $/Mg	910	1,290
MODEL PLANT 5		
Annualized Costs, $	2,735	4,943
Emission Reduction, Mg	9.7	9.7
Cost Effectiveness, $/Mg	280	510

[a] Emission reduction from Table 3-8, and assuming annual enforcement (86 percent in-use efficiency).

PERCENT CONSUMPTION EXCLUDED WITH VARIOUS STAGE II EXEMPTION SCENARIOS

EXEMPTION SCENARIO	PERCENT CONSUMPTION EXCLUDED FROM REGULATION
EXEMPT STATIONS 2,000 GAL/MON	2.4%
EXEMPT STATIONS < 10,000 GAL/MON	2.8%
EXEMPT STATIONS < 10,000 GAL/MON AND INDEPENDENTS < 50,000 GAL/MON	10.0%

Program In-Use Efficiency

Frequency of Inspections / Exemption Level		Minimal	Annual	Semi-Annual	Certification
No Exempt.	—	62	86	92	95
2,000	---	61	84	90	93
10,000	.....	60	84	89	92
10,000 & 50,000	----	56	77	83	86

EXAMPLES OF EXEMPTION LEVEL

- Bay Area
- Philadelphia
- District of Columbia

Bay Area

REGULATION 8
ORGANIC COMPOUNDS
RULE 7
GASOLINE DISPENSING FACILITIES

8-7-100 GENERAL

8-7-101 Description: The purpose of this Rule is to limit emissions of organic compounds from gasoline dispensing facilities. (Amended 3/17/82, 11/30/83, 10/17/90)

8-7-110 Exemptions

8-7-111 Phase I Exemptions: The following are exempt from Section 8-7-301:

111.1 Storage tanks with a capacity of less than 1.0 cubic meter (260 gallons).

111.2 Storage tanks installed before October 1, 1974 at facilities with an annual throughput of less than 227 cubic meters (60,000 gallons) which were not equipped with Phase I vapor recovery as of July 1, 1983. Should throughput exceed 227 cubic meters (60,000 gallons) in any one year, this exemption shall no longer apply.

111.3 Storage tanks used primarily for the fueling of implements of husbandry as defined in Division 16, Chapter 1, of the California Vehicle Code, provided such tanks are equipped with a submerged fill pipe.

111.4 Storage tanks where the APCO determines in writing that Phase I vapor recovery is not feasible.

(Amended and Renumbered 11/30/83, 3/4/87, Amended 10/17/90)

8-7-112 Phase II Exemptions: The following are exempt from Section 8-7-302:

112.1 Facilities which are exempt from Phase I.

112.2 Delivery of fuel to vehicle tanks, of a class of vehicles where it is determined by the APCO in writing that fill-neck configuration, location or other design features of that class of vehicles makes application of the requirements of this rule inapplicable to that class of vehicles. This subsection 8-7-112.2 shall not exempt any gasoline dispensing facility from installing and using such vapor recovery systems as required by this Rule.

112.3 Dispensing of gasoline at facilities where the APCO determines in writing that Phase II vapor recovery is not feasible.

112.4 Vehicle to vehicle refueling.

112.5 Facilities which exclusively refuel motor vehicle tanks with a capacity of 0.019 cubic meters (5 gallons) or less.

112.6 Facilities which exclusively refuel aircraft.

112.7 Facilities with an annual throughput of less than 227 cubic meters (60,000 gallons) where Phase II vapor recovery equipment was not installed prior to July 1, 1983. Should throughput exceed 227 cubic meters (60,000 gallons) in any one year, this exemption shall no longer apply.

112.8 Deleted March 4, 1987

(Amended and Renumbered 11/30/83, 3/4/87, Amended 10/17/90)

8-7-113 Tank Gauging and Inspection Exemption: Any tank may be opened for gauging or inspection when loading operations are not in progress provided that such tank is not pressurized. (Adopted November 30, 1983)

8-7-114 Stationary Tank Testing Exemption: The requirements of 8-7-301 do not apply to deliveries made to completely fill stationary tanks for the purpose of leak testing, provided that such deliveries do not exceed 3.8 cubic meters (1000 gallons) at each facility. (Adopted November 30, 1983)

Philadelphia

2. The vapor return line and associated connections shall be designed so as to be of sufficient size and sufficiently free of restrictions to allow vapor return to the delivery vessel to achieve the specified control requirement.

3. The vapor-laden delivery vessel shall be refilled only at loading facilities equipped with a vapor recovery system as prescribed in Section V.A.

All delivery vessels subject to this Section shall be so designed and maintained as to be vapor tight at all times, except during repair and maintenance. The Department may require the owner or operator of any such delivery vessel to submit records of inspection and procedures related to such maintenance, including visual inspections and leak testing.

The provisions of this Section shall not apply to any stationary storage container having a capacity of less than 2000 gallons installed underground prior to the date of adoption of this Section.

The provisions of this Section shall become effective pursuant to the Section XXIV of these Regulations and compliance shall be effected within the time and manner prescribed thereunder.

C. No person shall load or permit the loading of gasoline into the fuel tank of any motor vehicle, as defined by the Pennsylvania Department of Transportation, at any gasoline dispensing facility unless the loading is conducted using a vapor control system, properly installed, well maintained, in operation, and approved by the Department, that prevents the release to the atmosphere of at least 90 percent by weight of the gasoline vapors displaced from the motor vehicle fuel tank during loading. Such vapor control system installation shall also be in accordance with applicable provisions of TITLE 5 of the Philadelphia Code, and the owner or operator of any affected facility shall post and maintain, in conspicuous locations in the gasoline dispensing area, clear visual instructions pertaining to the proper use of the gasoline dispensing equipment and attendant vapor control device.

The above gasoline dispensing vapor control requirements shall apply to:

1. Any existing gasoline dispensing facility with a

gasoline throughput equal to or greater than 10,000 gallons per calendar month, based on gasoline throughput records for the facility for the 12-month period prior to, or for any monthly period subsequent to, the effective date of this sub-Section, as follows:

a. Any existing gasoline dispensing facility with a gasoline throughput equal to or greater than 1,500,000 gallons per year shall comply with the vapor control requirements not later than 12 months from the effective date of this sub-Section.

b. Any existing gasoline dispensing facility with a gasoline throughput equal to or greater than 1,000,000 gallons per year, but less than 1,500,000 gallons per year, shall comply with the vapor control requirements not later than 18 months from the effective date of this sub-Section.

c. Any existing gasoline dispensing facility with a gasoline throughput equal to or greater than 500,000 gallons per year, but less than 1,000,000 gallons per year, shall comply with the vapor control requirements not later than 24 months from the effective date of this sub-Section.

d. Any existing gasoline dispensing facility with a gasoline throughput of less than 500,000 gallons per year shall comply with the vapor control requirements not later than 36 months from the effective date of this sub-Section.

2. Any gasoline dispensing facility, or part thereof, regardless of gasoline throughput quantity, which is constructed, reconstructed or modified, except for minor repairs or alterations, after the effective date of this sub-Section.

D. No person shall sell, deliver for use, use, or exchange in trade for use in Philadelphia any gasoline having a Reid Vapor Pressure greater than 9.0 during the period May 1 through September 15, commencing in calendar year 1991 and continuing every year thereafter. The owner or operator of any gasoline loading, distribution, or dispensing facility which supplies gasoline for use in Philadelphia shall test and record, or otherwise document, the Reid Vapor Pressure of each gasoline shipment loaded from, distributed by, or received at the facility for use in Philadelphia during the

District of Columbia

705 STAGE II VAPOR RECOVERY

705.1 Unless exempted under §§705.4 or 705.5, the transfer of gasoline to any vehicular fuel tank from any stationary storage container shall be prohibited unless the transfer is made through a fill nozzle designed, operated, and maintained as follows;

(a) To prevent the discharge of gasoline vapors to the atmosphere from either the vehicle filler neck or the fill nozzle;

(b) To direct the displaced vapor from the vehicular fuel tank to either of the following:

(1) A system, utilizing a process other than vacuum assist, wherein at least ninety percent (90%) by weight of the organic compounds in the displaced vapors are removed, recovered, and/or destroyed; or

(2) A system, utilizing a vacuum assist process, wherein at least ninety-six percent (96%) by weight of the organic compounds in the displaced vapors are removed, recovered and/or destroyed; and

(c) Prevent vehicular fuel tank overfills and spillage.

705.2 A vapor-balance system meeting the specifications set forth in §705.6 and used in compliance with §705.7 shall be deemed to be in compliance with the requirements set forth in §705.1(b)(1).

705.3 All gasoline dispensing facilities available to the general public, or to segments of the general public by virtue of having some membership or military status, having three (3) or less dispensing nozzles shall be exempt from the requirements of §705.1.

705.4 All gasoline dispensing facilities available to the general public, or to segments of the general public by virtue of having some membership or military status, may, if desired by the owner thereof, have no more than one (1) nozzle at each facility which does not comply with the requirements of §705.1; Provided that this exemption shall not be applicable to stations with no self-service islands.

705.5 A vapor balance system shall have the following:

(a) A vapor-tight vapor return hose to conduct the vapors displaced from the vehicular fuel tank to the gasoline dispensing facility's gasoline storage tank(s);

(b) A vapor-tight seal to prevent the escape of gasoline vapors into the atmosphere from the interface between the fill nozzle and the filler neck of the vehicular fuel tank;

COMPLIANCE DATES

{Starting after State adoption}

6 months	facilities constructed after Nov. 15, 1990
one year	$\geq$ 100,000 gal/month facilities
two years	all others

3-year phase-in schedule for independents

ISSUES TO CONSIDER IN COMPLIANCE SCHEDULE DEVELOPMENT

- Number of Experienced Contractors in the Area

- Number of Service Stations that will have the same compliance date

- Equipment Availiability

VERIFICATION OF FACILITY COMPLIANCE

- Permitting records
- Station Operating License
- System Installation and Testing Results
- Stage II Maintenance Records
- Inspection Records
- Compliance Records
- Training Certification

THROUGHPUT RECORDS

- Kept on at least a monthly basis
- Gasoline delivery receipts
- Gasoline sales information
- Reported for tax purposes

EXAMPLES OF RECORDKEEPING REQUIREMENTS

- New York
- Massachusetts
- Philadelphia
- Bay Area

New York

to this Part must be closed while the transport vehicle is loaded, unloaded or in motion, except when gasoline transport vehicles are hatch-loaded in conformance with section 229.6(c)(2) or 229.7(a)(2) of this Title.

230.5 Gasoline dispensing sites — recordkeeping and reporting.

(a) The owner of any gasoline dispensing site in the New York City metropolitan area must maintain records showing the quantity of all gasoline delivered to the site. These records must be retained for at least two years, and must be made available to the commissioner or his representative upon request at any reasonable time.

(b) The sum of all gasoline deliveries to a gasoline dispensing site during the previous 12 consecutive months will be used to determine whether the requirements of section 230.2 of this Part apply. Once a gasoline dispensing site becomes subject to the requirements of section 230.2 because its annual gasoline throughput exceeds an applicability level, subsequent decreases in gasoline deliveries or throughput do not excuse a source owner from having to maintain the effectiveness of the stage I and/or stage II equipment.

230.6 Gasoline transport vehicles — recordkeeping and reporting.

(a) The owner of any gasoline transport vehicle subject to this Part must maintain records of pressure-vacuum testing and repairs. The records must include the identity of the gasoline transport vehicle, the results of the testing, the date that the testing and repairs, as needed, were done, the nature of needed repairs and the date of retests where appropriate.

(b) A copy of the most recent pressure-vacuum test results, in a form acceptable to the commissioner, must be kept with the gasoline transport vehicle.

(c) Records acceptable to the commissioner must be retained for two years after the testing occurred, and must be made available to the commissioner or his representative on request at any reasonable time.

230.7 Compliance schedules.

(a) Any person subject to the stage I vapor collection requirements for gasoline dispensing sites of this Part must have submitted a proposed schedule to the commissioner which includes specific steps and dates necessary to comply with the provisions of this Part by January 1, 1981.

(b) Owners of gasoline dispensing sites subject to the stage I vapor collection requirements of this Part must have been in compliance with all requirements before October 2, 1982.

(c) The pressure-vacuum test and associated requirements of section 230.4(a) for gasoline transport vehicles subject to this Part are in effect as of April 11, 1985.

(d) Owners of gasoline dispensing sites subject to the stage II vapor collection requirements of this Part must be in compliance with these requirements by the following dates.

(1) July 1, 1988 where the annual throughput of the gasoline dispensing site is 500,000 gallons or more; or

(2) July 1, 1989 where the annual throughput of the gasoline dispensing site is between 250,000 and 500,000 gallons.

230.8 Variances. Where it can be shown to the satisfaction of the commissioner that a gasoline dispensing site or gasoline transport vehicle cannot comply with the requirements of this Part for reasons of technological or economic feasibility, the commissioner may, upon submission of satisfactory evidence, grant to the source owner or operator a variance from the requirements of this Part and accept a lesser degree of control or an alternate compliance schedule.

PART 231
NEW SOURCE REVIEW IN NONATTAINMENT AREAS

(Effective August 23, 1979; June 22, 1980; August 10, 1984)

Section 231.1 Definitions. (a) For the purpose of this Part, the general definitions of Part 200 of this Title apply.

(b) For the purpose of this Part, the following definitions also apply:

(1) *Actual emission reduction.* The actual decrease in the rate of emissions of an air contaminment from an

Massachusetts

(4) For the purpose of 310 CMR 7.24(1) through (3) any testing required by the Department shall be in accordance with methods approved under the provisions of 310 CMR 7.13. For the determination of total emissions required by 310 CMR 7.24(1) and (2), compliance testing shall be in accordance with applicable procedures described in EPA Method 18, as described in Code of Federal Regulations Title 40, Part 60, or any other method approved by EPA and the Department. For the pressure vacuum certification required by 310 CMR 7.24(3), compliance testing shall be in accordance with applicable procedures described in EPA Method 27 as described in Code of Federal Regulations Title 40, Part 60 or by another method approved by EPA and the Department.

(5) Gasoline Reid Vapor Pressure

(a) No person shall sell or supply from a bulk plant or terminal, gasoline having a Reid Vapor Pressure greater than 9.0 pounds per square inch (psi) during the period beginning May 1 and continuing through September 15, beginning in 1989 and continuing every year thereafter.

(b) Compliance with this section may be determined by the Department through an audit of RVP test results provided by the supplier or through fuel sampling and testing subject to the following provisions:

1. Any person owning, operating, leasing or controlling any gasoline marketing facility shall, upon request by any employee of the Department, provide a sample or samples of gasoline from said gasoline marketing facility in accordance with the test methods listed in 310 CMR 7.24(5)(b)2.

2. Any fuel sampling and testing required by the Department shall be conducted in accordance with ASTM Method D4177, ASTM Method D4057, ASTM Method D323 or any other method approved by the Department and EPA.

(c) This regulation will be enforced in accordance with M.G.L. c.111, s.142A through E, as amended.

(6) U Dispensing of Motor Vehicle Fuel

(a) The requirements of 310 CMR 7.24(6) shall apply to:

1. any motor vehicle fuel dispensing facility which has been constructed or substantially modified on or before November 1, 1989 and which at any time since January 1, 1988 has had a throughput of at least 20,000 gallons in any one calendar month, or

2. any motor vehicle fuel dispensing facility, regardless of throughput, which is constructed or substantially modified after November 1, 1989

(b) Except as provided in 310 CMR 7.24(6)(a) no person, owner, operator or employee of a motor vehicle fuel dispensing facility, shall dispense, or allow the dispensing of, motor vehicle fuel from any motor vehicle fuel dispensing facility unless the motor vehicle fuel dispensing facility is equipped with a properly operating vapor collection and control system.

(c) Any person who owns, leases, operates or controls a motor vehicle fuel dispensing facility, which is subject to 310 CMR 7.24(6), shall, in accordance with the applicable date provided for in 310 CMR 7.24(6)(d):

1. install and properly operate a certified vapor collection and control system, and make any other modifications to their facility necessary to comply with the requirements of 310 CMR 7.24(6);

2. notify and inform the Department prior to installation of the vapor collection and control system, on a form obtained from the Department, of the dates of installation and the specific type of vapor collection and control system to be installed.

3. ensure that, prior to initial operation of the vapor collection and control system, the operators and employees of the motor vehicle fuel dispensing facility have received training and instruction in the operation and maintenance of the vapor collection and control system;

4. maintain the vapor collection and control system such that it recovers at least 95% by weight of motor vehicle fuel vapors displaced during the dispensing of motor vehicle fuel;

5. conspicuously post operating instructions for dispensing motor vehicle fuel using the vapor collection and control system in the motor vehicle fuel dispensing area. These instruction must at a minimum include:

a. a clear description of how to correctly dispense motor vehicle fuel using the system;

b. a warning not to attempt continued refueling after automatic shutoff;

c. a telephone number to report problems experienced with the vapor collection and control system to the Department; and

6. conspicuously post "Out of Order" signs on, any aboveground part of the vapor collection and control system which is not fully operative, until said vapor collection and control system has been repaired.

7. take any steps necessary to prohibit the use of any aboveground part of the vapor collection and control system which is not fully operative and otherwise in compliance with the performance standards of 310 CMR 7.24(6)(c)4

(d) Any motor vehicle fuel dispensing facility, which is subject to the requirements of 310 CMR 7.24(6), shall have a vapor collection and control system installed, and properly operating, in accordance with the following schedule(s):

1. Any motor vehicle fuel dispensing facility which is constructed or substantially modified after November 1, 1989 shall comply with the requirements of 310 CMR 7.24(6) at the completion of its construction or substantial modification, or April 1, 1991, whichever is later.

2. Any motor vehicle fuel dispensing facility which has begun construction or substantially modification on or before November 1, 1989 shall comply with the requirements of 310 CMR 7.24(6), in accordance with the following schedule:

a. by April 1, 1991 where the annual (calendar year) throughput of the motor vehicle fuel dispensing facility is greater than or equal to 1,000,000 gallons of motor vehicle fuel; or

b. by April 1, 1992 where the annual throughput of the motor vehicle fuel dispensing facility is less than 1,000,000 gallons but greater than or equal to 500,000 gallons of motor vehicle fuel; or

c. by April 1, 1993 for any other motor vehicle fuel dispensing facility subject to 310 CMR 7.24(6).

(e) No person shall alter, modify, remove, or otherwise render inoperative any element or component of the vapor collection and control system which would render it incapable of collecting at least 95% by weight of motor vehicle fuel vapors displaced during the dispensing of motor vehicle fuel.

(f) Any person who owns, leases, operates or controls a motor vehicle fuel dispensing facility, subject to 310 CMR 7.24(6), shall maintain a continuous rec-

ord of the type and duration of any failures of the vapor collection and control system at said facility. These records shall be kept at the facility for two years, and must be made available for inspection by Department, EPA or local enforcement personnel.

(g) Any person who owns, leases, operates or controls a motor vehicle fuel dispensing facility, subject to 310 CMR 7.24(6), shall, upon written notice from the Department and in accordance with methods approved by the Department and EPA, perform or have performed tests to demonstrate compliance with 310 CMR 7.24(6).

(h) The provisions and requirements of 310 CMR 7.24(6) are subject to the enforcement provisions specified in 310 CMR 7.52.

Philadelphia

period April 15 through September 1, commencing in calendar year 1991 and continuing every year thereafter.

The Department shall establish or approve procedures, methods and guidelines for the sampling and testing of gasoline for Reid Vapor Pressure compliance and for the maintenance of gasoline shipment and delivery records and documentation, including reporting requirements related thereto.

Records regarding gasoline shipments and deliveries shall include Reid Vapor Pressure, quantity, and date of shipment or delivery, and such other information as the Department may prescribe. Documentation may include, without limitation, bills of lading, invoice delivery tickets, and loading tickets.

Each required record or documentation shall be retained by the owner or operator of any affected facility for a period of at least two (2) years and shall be made available for inspection by the Department upon request.

Blends of gasoline and oxygenate compounds are exempt from the 9.0 Reid Vapor Pressure limitation, except that the gasoline portion of the blend, prior to blending, shall not be exempted.

Bay Area

8-7-310 **New Tank Phase II Requirements:** All gasoline tanks with a capacity greater than 1.0 cubic meter (260 gallons) and installed after March 4, 1987 must be equipped with Phase I and II vapor recovery. (Adopted 3/4/87, Amended 10/17/90)

8-7-311 **Exempt Tank Requirements:** Any tank with a capacity greater than 1.0 cubic meter (260 gallons) where Phase I vapor recovery equipment is not required must be equipped with a submerged fill pipe. Above ground gasoline storage tanks shall be equipped with a pressure-vacuum relief valve which is set to either a pressure within 10% of the maximum allowable working pressure of the tank or at least 25.8 mm Hg (0.5 psig) pressure. (Adopted October 17, 1990)

8-7-312 **Removal of Gasoline:** A person shall not transfer or allow the transfer of gasoline from stationary tanks into gasoline delivery vehicles unless a vapor recovery system that collects 95% of gasoline vapors is used. (Adopted October 17, 1990)

8-7-400 **ADMINISTRATIVE REQUIREMENTS**

8-7-401 **Equipment Installation and Modification:** A person shall not install or modify Phase I or Phase II gasoline vapor recovery equipment, exclusive of repair or replacement of like parts, unless an Authority to Construct has been obtained pursuant to Section 301 of Regulation 2, Rule 1. (Adopted November 30, 1983)

8-7-402 **Deleted October 17, 1990**

8-7-403 **Deleted March 4, 1987**

8-7-404 **Certification of New Installations:** Any person who installs or modifies underground Phase II vapor recovery piping under an Authority to Construct shall provide written certification, where applicable pursuant to the California Health and Safety Code Section 41954, that the Phase II vapor recovery system meets the dynamic backpressure requirements. Certification shall be established by testing, as prescribed in the Manual of Procedures, Volume IV, ST-27.
(Adopted October 17, 1990)

8-7-405 **Compliance Schedule, Loss of Exemption:** Any person exempt from Phase II vapor recovery requirements before October 17, 1990, who operates a facility that exclusively refuels vehicles which are not motor vehicles as defined by the California Vehicle Code shall comply with the following schedule:

405.1 By March 1, 1991, submit a petition to the APCO for exemption under Section 8-7-112 or an application for an Authority to Construct pursuant to Section 301 of Regulation 2, Rule 1.

405.2 By June 1, 1991, be in final compliance with this rule.
(Adopted October 17, 1990)

8-7-500 **MONITORING AND RECORDS**

8-7-501 **Burden of Proof:** The burden of proof of eligibility for exemption from this rule is on the applicant. Persons seeking such an exemption shall maintain adequate records and furnish them to the APCO upon request. (Adopted November 30, 1983)

8-7-502 **Right of Access:** Any facility subject to this rule shall maintain on site the means to provide access to any and all components as necessary to determine compliance with the provisions of this rule. Access shall be furnished to the APCO upon request. (Adopted October 17, 1990)

8-7-600 **MANUAL OF PROCEDURES**

8-7-601 **Determination of Equipment in Compliance with Dynamic Backpressure Requirements and Vapor Tight:** The means of determining whether equipment is in compliance with dynamic backpressure requirements and vapor tight shall be evaluated as prescribed in the Manual of Procedures, Volume IV, ST-27 and ST-30.
(Amended November 30, 1983, October 17, 1990)

EXAMPLES OF ADDITIONAL ELEMENTS

- Signs

  South Coast
  New York

- Topping Off

  Bay Area

- Information Distribution

  Missouri

- Testing

  Massachusetts

South Coast
- signs

(Amended July 7, 1989)

ATTACHMENT B

DISTRICT REQUIRED SIGNS

I. The operator shall post the following signs:

(A) "NOZZLE" operating instructions:

(B) "SCAQMD" toll-free telephone number; and

(C) A "warning" stating:

"TOXIC RISK - FOR YOUR OWN PROTECTION
DO NOT BREATHE FUMES
DO NOT TOP TANKS"

II. All required signs shall conform to all of the following:

(A) For decal signs:

(i) Each sign shall be located adjacent to the dispenser price indicator (per gallon) on each side next to the driveway it serves; and

(ii) Sign shall be readable from a distance of 3 feet.

(B) All other signs:

(i) For pump toppers, one double-back sign per island;

(ii) For permanent (non-decal) signs, two single-sided or one double-sided sign(s) per two (2) dispensers.

(iii) All signs shall be readable from a distance of 6 feet.

New York
-signs

(3) Gasoline dispensing site. Any site where gasoline is dispensed into vehicle fuel tanks or into portable containers used to fuel any motor from any stationary storage container(s) larger than 250 gallons.

(4) Gasoline transport vehicle. Any tank truck, trailer or railroad tank car, with a capacity of 300 gallons or more, used for the transportation of gasoline.

(5) Annual throughput. The amount of petroleum liquid transferred into or dispensed from a defined source or facility during 12 consecutive months.

(6) Submerged filling. The use of a fill pipe or drop tube whose discharge opening is entirely submerged when the liquid is six inches above the bottom of the container. For containers loaded from the side, submerged filing is defined as the use of a fill pipe whose discharge is entirely submerged when the liquid level is 18 inches, or twice the diameter of the fill pipe, whichever is greater, above the bottom of the container.

(7) Stage I vapor collection system. A system where gasoline vapors are forced from a tank into a vapor-tight holding system or vapor control system through direct displacement by the gasoline being loaded.

(8) State II vapor collection system. A system where at least 90 percent, by weight, of the gasoline vapors that are displaced or drawn from a vehicle fuel tank during refueling are removed to a vapor-tight holding system or vapor control system.

(9) Substantially modified. A modification of an existing gasoline dispensing site which involves the addition of one or more new stationary gasoline storage tanks or the repair, replacement, or reconditioning of an existing tank.

(10) Vapor control system. A system that prevents emissions to the outdoor atmosphere from exceeding 4.7 grains per gallon (80 grams per 1,000 liters) of petroleum liquid loaded.

230.2 Gasoline dispensing sites — prohibitions and requirements.

(a) No person may transfer or allow the transfer of gasoline into storage tanks, at gasoline dispensing sites located in the New York City metropolitan area, whose annual throughput exceeds 120,000 gallons, unless the storage tank is equipped with:

(1) a stage I vapor collection system consisting of a vapor-tight return line from the storage tank, or its vent, to the gasoline transport vehicle, and a system that will ensure that the vapor line is connected before gasoline can be transferred into the tank;

(2) a properly installed onsite vapor control system connected to a vapor collection system; or

(3) an equivalent control system.

(b) A stage I vapor collection system and submerged filling are not required for storage tanks with a capacity less than 2,000 gallons located at gasoline dispensing sites in New York City which were installed prior to January 1, 1970. A stage II vapor collection system is not required at gasoline dispensing sites that are not subject to the stage I requirements of this section.

(c) No owner and/or operator of a gasoline dispensing site may transfer or allow the transfer of gasoline into a motor vehicle fuel tank at gasoline dispensing sites located in the New York City metropolitan area whose annual throughput exceeds 250,000 gallons, unless the gasoline dispensing site is equipped with a stage II vapor collection system which must be approved by the department before it is installed. Approval of a stage II vapor collection system will be based on a determination that a properly installed and operated system will remove at least 90 percent by weight of the gasoline vapors that are displaced or drawn from a vehicle fuel tank during refueling to a vapor-tight holding system or vapor control system.

(d) Notwithstanding subdivision (b) of this section, a stage I and a stage II vapor collection system are required at any gasoline dispensing site, regardless of the annual throughput of gasoline, located in the New York City metropolitan area which is constructed after the effective date of this Part or which is replaced or substantially modified after the effective date of this Part.

(e) Stationary storage tanks at gasoline dispensing sites located in Nassau, Suffolk, Rockland or Westchester County, whose annual throughput does not exceed 120,000 gallons, must be equipped for submerged filling.

(f) Owners and/or operators of gasoline storage tanks, gasoline transport vehicles, and gasoline dispensing sites subject to stage I and/or stage II vapor collection or vapor control system requirements must:

(1) install all necessary stage I and/or stage II vapor collection and control systems, and make any modifications necessary to comply with the requirements;

(2) provide adequate training and written instructions to the operator of the affected gasoline dispensing site and the gasoline transport vehicle;

(3) replace, repair or modify any worn or ineffective component or design element to ensure the vapor-tight integrity and efficiency of the stage I and/or stage II vapor collection and vapor control systems; and

(4) connect and ensure proper operation of the stage I and/or stage II vapor collection and control systems whenever gasoline is being loaded, unloaded or dispensed; and

(5) with respect to stage II vapor collection systems, conspicuously post operating instructions for the system in the gasoline dispensing area which include:

(i) a clear description of how to correctly dispense gasoline with the vapor recovery nozzles utilized at the site;

(ii) a warning that continued attempts at dispensing gasoline after the system indicates that the vehicle tank is full may result in spillage or recirculation of gasoline; and

(iii) a telephone number established by the department for use by the public to report problems experienced with the system.

(g) Routine maintenance of components of stage II vapor collection systems must be performed to ensure the integrity and efficiency of the system

(h) The modification, removal, replacement, or addition of any element which would render the stage II vapor collection system inoperative or impair its integrity and efficiency is prohibited.

(i) Stationary storage tanks with a capacity of 250 gallons or more, installed or modified after January 1, 1979, at any gasoline dispensing site in the New York City metropolitan area, must have a stage I vapor collection or vapor control system.

(j) Gasoline dispensing sites in the New York City metropolitan area, used exclusively for farm-type tractors used only for agricultural purposes or snowplowing (other than for hire), farm equipment, including self-propelled machines used in growing, harvesting or handling farm produce, and self-propelled caterpillar or crawler-type equipment being operated on a contract site, are not subject to requirements for stage I vapor collection or vapor control systems, but must be equipped for submerged filling.

(k) Any owner or operator of a gasoline dispensing site which is not regulated by this Part must comply with all other applicable Parts of this Subchapter. Certification of stage II vapor collection system by the department does not relieve the owner and/or operator of the responsibility to comply with other applicable codes and regulations pertaining to fire prevention, weights and measures and safety matters.

230.3 Gasoline transport vehicles — applicability.

This Part applies to owners and operators of all gasoline transport vehicles which:

(a) deliver gasoline to any gasoline dispensing site required to be equipped with a stage I vapor collection system or equivalent, including such gasoline dispensing sites located in states adjacent to New York State; or

(b) convey gasoline either to or from any gasoline loading terminal or gasoline bulk plant, located in the New York City metropolitan area, which is required to be equipped with a vapor control system or equivalent control.

230.4 Gasoline transport vehicles — prohibitions and requirements.

(a) No owner or operator of a gasoline transport vehicle subject to this Part will allow said vehicle to be filled or emptied unless the gasoline transport vehicle:

(1) sustains a pressure change of not more than three inches of water (six millimeters of mercury) in five minutes when pressurized to a gauge pressure of 18 inches of water (34 millimeters of mercury) and evacuated to a gauge pressure of six inches of water (11 millimeters of mercury);

(2) is repaired by the owner or operator within 15 days after failing to meet the pressure change standard in this section; and

(3) displays a marking, near the U S Department of Transportation certificate plate, in letters and numerals at least two inches high, which reads, NYS DEC and the date on which the gasoline transport vehicle was last tested.

(b) All gasoline transport vehicles subject to this Part must be tested annually by the owner or his agent, using test methods acceptable to the commissioner. Reference method 27 in Appendix A of 40 CFR part 60 is considered to be an acceptable method. (See table 1, section 200.9 of this Title.) If the pressure-vacuum test does not show compliance with the pressure change standard, the gasoline transport vehicle must be repaired to make the tank vapor-tight, and retested.

(c) All gasoline transport vehicles subject to this Part must undergo a pressure-vacuum test within one year after the effective date of this Part [April 11, 1985], and each succeeding test is to be done within one year of the previous test.

(d) At the discretion of the commissioner, the requirements for testing and marking gasoline transport vehicles subject to this Part may be satisfied if the vehicle undergoes equivalent certification in another state.

(e) During the loading or unloading of a gasoline transport vehicle subject to this Part, leakage from any component of the gasoline transport vehicle, or the vapor collection or control system, will not equal or exceed 100 percent of the lower explosive limit (LEL measured as propane), when measured at a distance of one inch with a combustible gas detector. No avoidable visible liquid leak from such components is allowed. Components of the transport vehicle or vapor collection or control system include all piping, seals, hoses, connections, pressure-vacuum seals, and other possible leak sources. The combustible gas detector used for determining compliance with this standard will have a minimum range of 0-100 percent of the LEL as propane, a probe within an internal diameter of one quarter inch (0 625 cm), and a response time less than eight seconds with sampling line and probe attached, and be properly calibrated.

(f) No owner or operator of a gasoline transport vehicle subject to this Part will allow said vehicle to be loaded under a pressure exceeding 18 inches of water (34 millimeters of mercury) gauge, or to be unloaded under a vacuum exceeding six inches of water (11 millimeters of mercury) gauge.

(g) Dome covers on gasoline transport vehicles subject.

Bay Area
-topping off

301.4 Effective July 1, 1991, all open vent pipes on stationary tanks at gasoline dispensing facilities shall be equipped with pressure-vacuum relief valves. Pressure relief shall be set between 1 and 3 inches water column

301.5 All Phase I vapor recovery equipment shall be maintained to be properly operating as specified by the manufacturer.

301.6 All Phase I vapor recovery equipment except pressure-vacuum relief valves shall be maintained to be leak-free and vapor tight.

301.7 Effective July 1, 1991, all Phase I vapor recovery systems shall have a poppetted drybreak on the vapor return

(Adopted November 30, 1983, Amended October 17, 1990)

8-7-302 **Phase II Requirements:** A person subject to Phase II vapor recovery requirements shall comply with all of the following requirements:

302.1 A person shall not transfer or allow the transfer of gasoline from stationary tanks into motor vehicle fuel tanks at a gasoline dispensing facility unless a CARB certified Phase II vapor recovery system is used.

302.2 All Phase II vapor recovery systems shall be maintained as per most recent CARB certifications.

302.3 All Phase II vapor recovery equipment shall be maintained to be properly operating as specified by the manufacturer and substantially free of defects pursuant to Section 41960.2(c) of the California Health and Safety Code.

302.4 Any component identified as defective but that does not substantially impair the effectiveness of the vapor recovery system pursuant to Section 41960.2 (e) of the California Health and Safety Code shall be repaired or replaced within seven days.

302.5 All Phase II vapor recovery equipment shall be maintained to be leak-free and vapor tight. (Adopted 11/30/83, Amended 10/17/90)

8-7-303 **Topping Off:** A person shall not top off motor vehicle fuel tanks.

(Renumbered November 30, 1983)

8-7-304 **Certification Requirements:** A person shall not offer for sale, sell or install within the District, any Phase I or Phase II vapor recovery equipment unless such equipment is CARB certified.

(Amended and Renumbered 11/30/83, Amended 10/17/90)

8-7-305 **Deleted October 17, 1990**

8-7-306 **Prohibition of Use:** Whenever the APCO determines that a Phase II vapor recovery system, or any component thereof, contains a defect specified by CARB pursuant to Section 41960.2(c) of the Health and Safety Code, the APCO shall mark such system or component "Out of Order." No person shall use or permit the use of such marked component or system until it has been repaired, replaced, or adjusted, as necessary, and the APCO has reinspected it or has authorized its use pending reinspection.

8-7-307 **Posting of Operating Instructions:** The operator of each retail facility utilizing a Phase II system shall conspicuously post operating instructions for the system in the gasoline dispensing area. The instructions shall clearly describe how to fuel vehicles correctly with vapor recovery nozzles utilized at the station, and shall include a warning that topping off may result in spillage or recirculation of gasoline and is prohibited. Additionally, the instructions shall include a prominent display of the District's or the CARB's toll free telephone number for complaints.

(Amended November 30, 1983)

8-7-308 **Operating Practices:** Gasoline shall not be spilled, discarded in sewers, stored in open containers, or handled in any other manner that would result in evaporation to the atmosphere. (Adopted November 30, 1983)

8-7-309 **Contingent Vapor Recovery Requirements:** Facilities which are equipped with Phase II vapor recovery must also be equipped with Phase I vapor recovery.

(Adopted March 4, 1987, Amended October 17, 1990)

Missouri
— Information
Distribution

(B) Loading shall be accomplished in such a manner that the displaced vapors and air will be vented only to the vapor recovery system. Measures shall be taken to prevent liquid drainage from the loading device when it is not in use or to accomplish complete drainage before the loading device is disconnected. The vapor disposal portion of the vapor recovery system shall consist of one (1) of the following:

1. An adsorber system, condensation system, or equivalent vapor disposal system that processes the vapors and gases from the equipment being controlled and limits the discharge of VOC into the atmosphere to 0.30 grams of VOC vapor per gallon of gasoline loaded:

2. A vapor handling system that directs the vapor to a fuel gas system; or

3. Other equipment of an efficiency equal to greater than paragraphs (4)(B) 1 or 2, if approved by the director

(C) Owners or operators of loading installations subject to this section shall keep complete records documenting the number of delivery vessels loaded and their owners. Records shall be kept for two (2) years and shall be made available to the director upon request.

(D) This section shall not apply to loading installations whose average monthly throughput of gasoline is less than or equal to one hundred and twenty thousand (120,000) gallons when averaged over the most recent calendar year, provided that the installation loads gasoline by submerged loading. To maintain their exemption, these installations shall submit to the director by February 1 of each year a report stating gasoline throughput for each month of the previous calendar year.

(5) Gasoline Transfer.

(A) No owner or operator of a stationary storage tank or delivery vessel shall cause or permit the transfer of gasoline from any delivery vessel into any stationary storage tank with a capacity greater than two thousand (2000) gallons unless such storage tank is equipped with a submerged fill pipe and vapor recovery system or other system of equal vapor control efficiency if approved by the director and the delivery vessel is in compliance with subsection (7)(A) of this rule. Stationary storage tanks with a capacity of two hundred fifty (250) and two thousand (2000) gallons shall be equipped with a submerged fill pipe

1. The vapor recovery system shall collect no less than ninety percent (90%) by volume of the vapors displaced from the stationary storage tank during gasoline transfer and return said vapors via a vapor-tight return line to the delivery vessel.

2. The vapor recovery system shall be so constructed as to ensure that the vapor-tight return line is connected before gasoline can be transferred into the container.

3. A delivery vessel shall be refilled only at installations complying with provisions of section (4)

4. This section shall not be construed to prohibit safety valves or other devices required by governmental safety regulations.

(B) The owners or operators of stationary storage tanks subject to this section shall keep records documenting the number of delivery vessels unloaded and their owners. Records shall be kept for two (2) years and shall be made available to the director upon request.

(C) The provisions of subsection (5)(A) shall not apply to the following:

1. Stationary storage tanks having a capacity less than or equal to two thousand (2,000) gallons used exclusively for the fueling of implements of agriculture;

2. Stationary storage tanks having a capacity less than or equal to two thousand (2000) gallons installed prior to September 15, 1976; and

3. Transfer made to storage tanks equipped with floating roofs or their equivalent.

(6) Refueling of Motor Vehicles

(A) General Provisions.

1. Except as provided in sections (3), (4) and (5), no owner or operator shall install, permit the use of or maintain any stationary gasoline tank with a capacity of more than one thousand (1000) gallons which is not equipped with a vapor recovery system consisting of a vapor gathering system capable of collecting the hydrocarbon vapors and gases discharged during motor vehicle refueling and a vapor disposal system capable of processing such hydrocarbon vapors and gases so as to prevent their emission into the atmosphere.

2. For the purpose of section (6), no gasoline vapor recovery systems or devices shall be installed, used or maintained that have not been certified by the director of the Missouri Department of Natural Resources (subsection (6)(B)).:

3. All tank gauging and sampling sites or ports on the vapor recovery system shall be gas-tight so as to prevent VOC emissions except when gauging or sampling is taking place.

4. All systems shall be maintained in good working order in accordance with the manufacturer's specifications.

5. The operator of each affected facility shall conspicuously post operating instructions in the gasoline dispensing area for the system in use at that station. The instructions shall clearly describe how to fuel vehicles correctly with vapor recovery nozzles utilized at that station. The instructions shall also include a warning that repeated attempts to continue dispensing gasoline after the system has indicated that the vehicle fuel tank is full may result in spillage of gasoline.

6. The director shall identify and list specific equipment defects which substantially impair the effectiveness of components or systems used for the control of gasoline vapors resulting from motor vehicle fueling operations. This ongoing list shall be used by the director as a basis for marking such components or systems out of order, and shall be made available to any and all gasoline dispensing facilities subject to paragraph (6)(A)(1).

7. Upon the identification of defects in equipment or installation of gasoline vapor control system by the director, such system or components thereof shall be marked "out of order" and no person shall use or permit the use of that system or component until it has been repaired, replaced or adjusted and the director has — a) re-inspected the system or component, b) found it to be in good working order, and c) remove the "out of order" notice. The director shall reinspect a system or component he has previously marked "out of order" as expeditiously as possible and in no case shall this be more than thirty (30) days from the date on which the system or component was marked "out of service."

8. It shall be a violation of this rule for any owner or operator to use, permit the use of or maintain a modified vapor recov-

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Massachusetts
- testing

ord of the type and duration of any failures of the vapor collection and control system at said facility. These records shall be kept at the facility for two years, and must be made available for inspection by Department, EPA or local enforcement personnel.

(g) Any person who owns, leases, operates or controls a motor vehicle fuel dispensing facility, subject to 310 CMR 7.24(6), shall, upon written notice from the Department and in accordance with methods approved by the Department and EPA, perform or have performed tests to demonstrate compliance with 310 CMR 7.24(6).

(h) The provisions and requirements of 310 CMR 7.24(6) are subject to the enforcement provisions specified in 310 CMR 7.52.

STAGE I AND II MODEL RULES

- EPA developing Stage II "model rule"

- Elements of Model Rule

  Definitions

  Requirements for equipment installation, operation, and maintenance

  Exemption levels

  Compliance schedules

  Testing requirements

  Recordkeeping requirements

- Mid-April timeframe

- Stage I Model Rule

UNDERGROUND PIPING/TEST METHODS

POTENTIAL PROBLEMS-
UNDERGROUND PIPING

- **Data Indicated as Much as 50 percent of Underground Piping Not Installed Properly**
- **Improper Line Size**
- **Low Points**
- **Improper Installation**

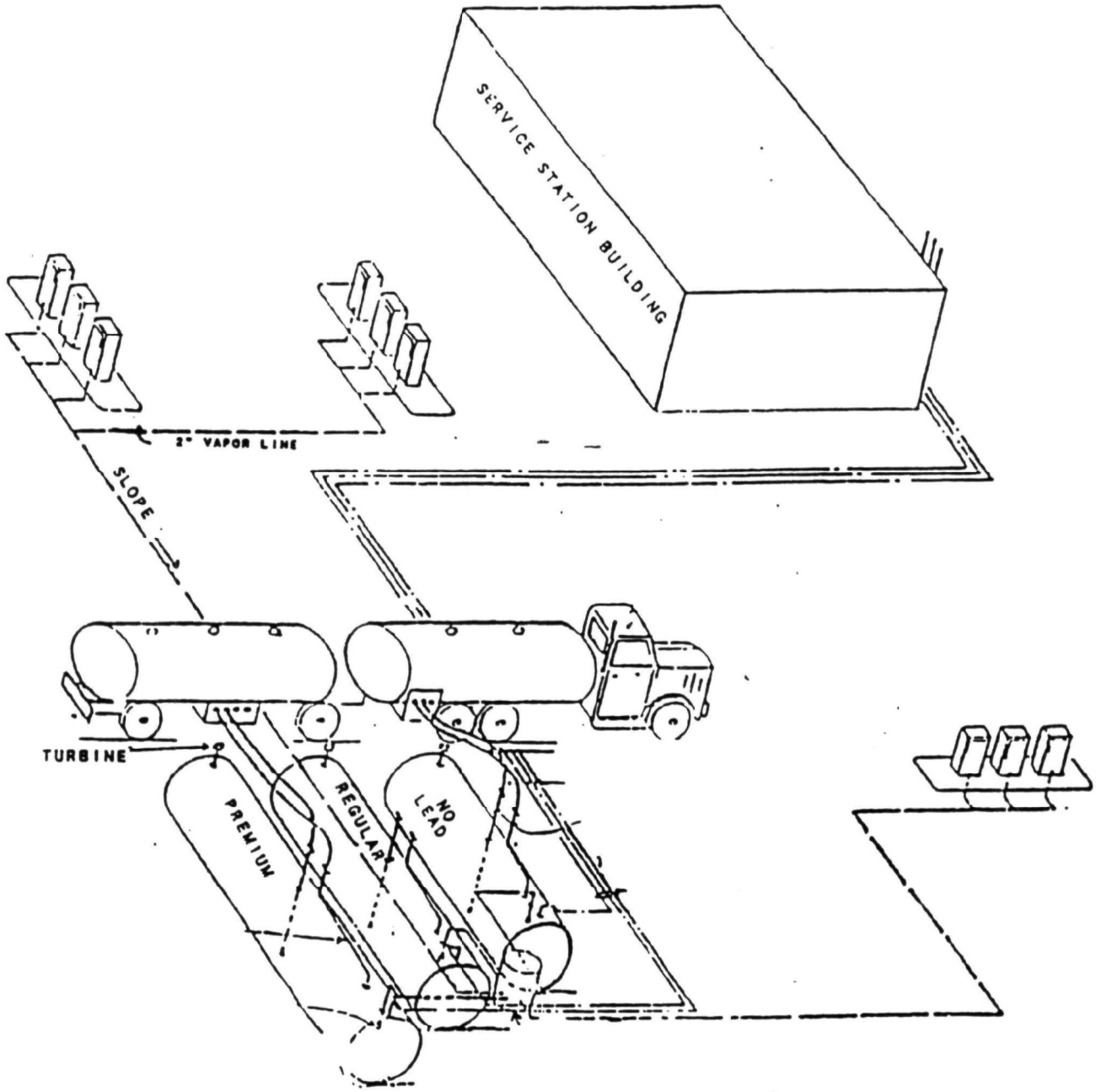


Figure 4-13. Manifolded Balance System Underground Piping

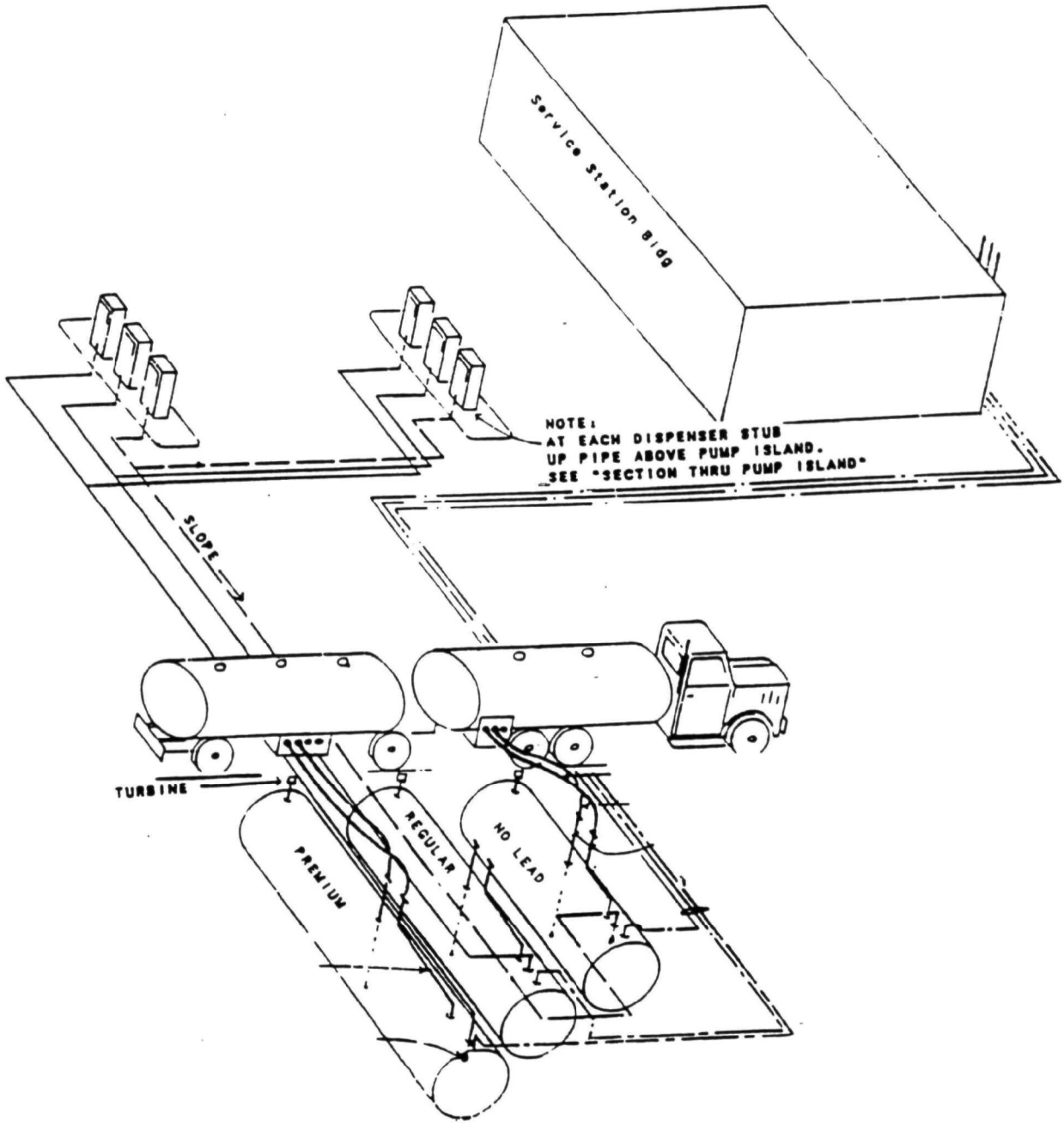


Figure 4-12. Individual Vapor Balance System Underground Piping

TEST METHODS

TEST METHODS

- **Pressure Decay/Leak Test**
- **Dynamic Pressure Drop Test**
- **Liquid Blockage Test**
- **Vapor Space Tie Test**

PRESSURE DECAY/LEAK TEST

- **Quantifies Vapor Tightness of Vapor Recovery System at the service Station**

TEST METHOD

- Cap the vent pipes
- Pressurize vapor piping system with nitrogen (10 inch water column) initially
- Record final pressure after 5 minutes
- Compare pressure drop to minimum requirement

FIGURE 30 - 1

VENT CAP ASSEMBLY

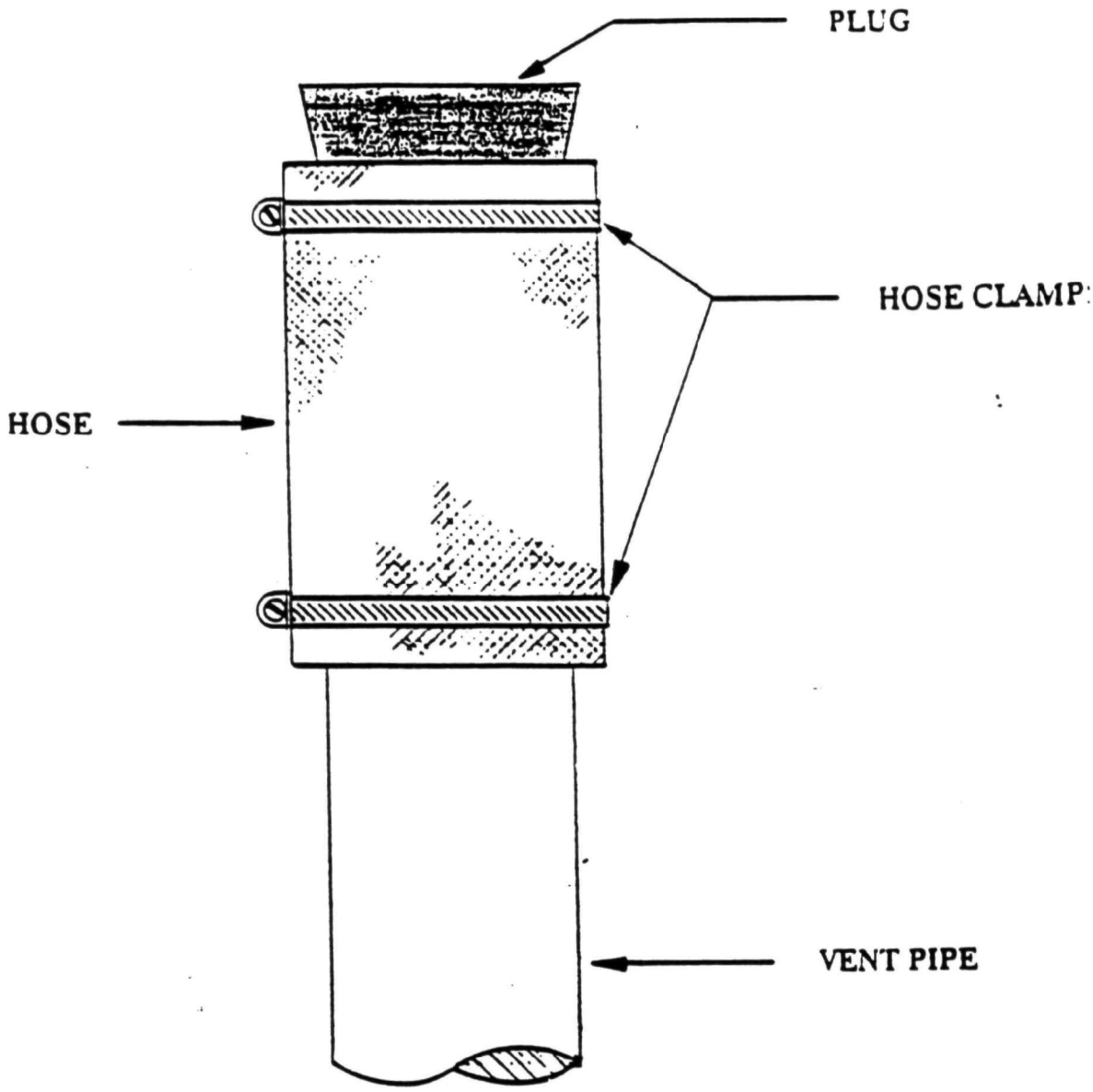


FIGURE 30 - 2

"T" CONNECTOR ASSEMBLY

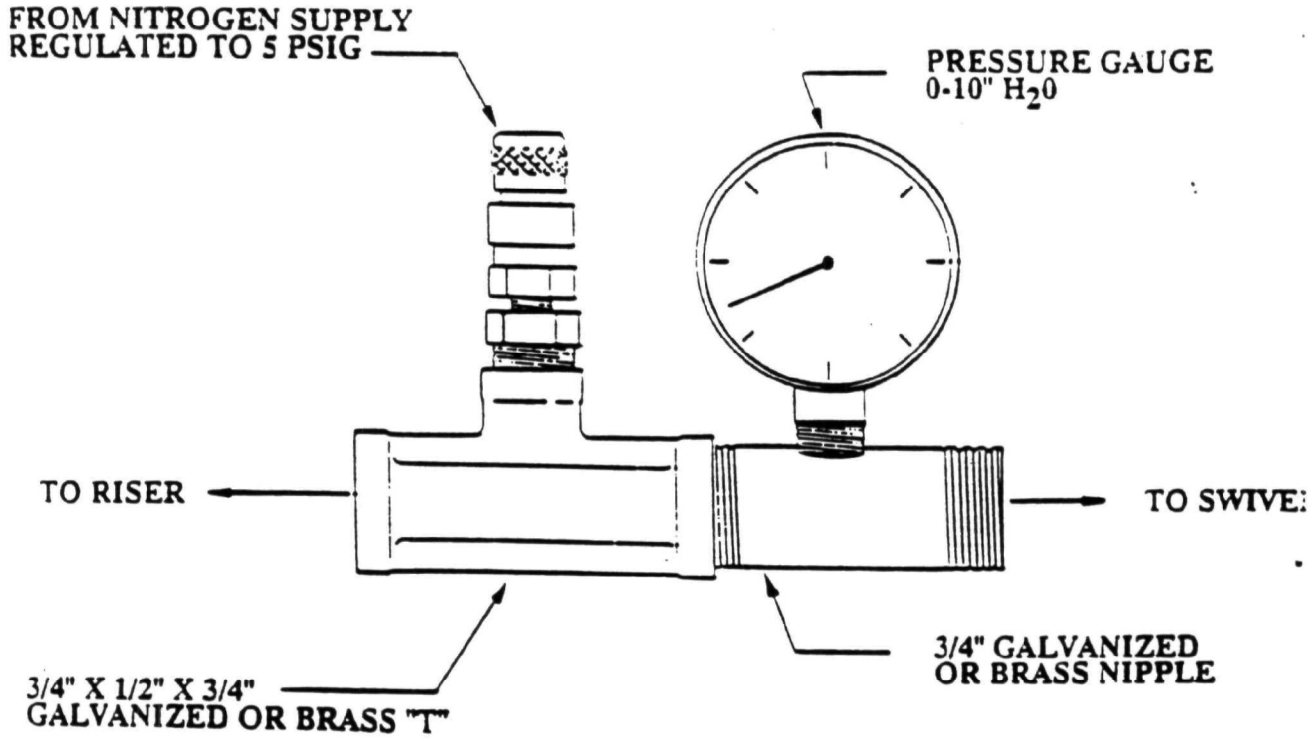


FIGURE 30 - 3

ALTERNATE VENT CAP ASSEMBLY

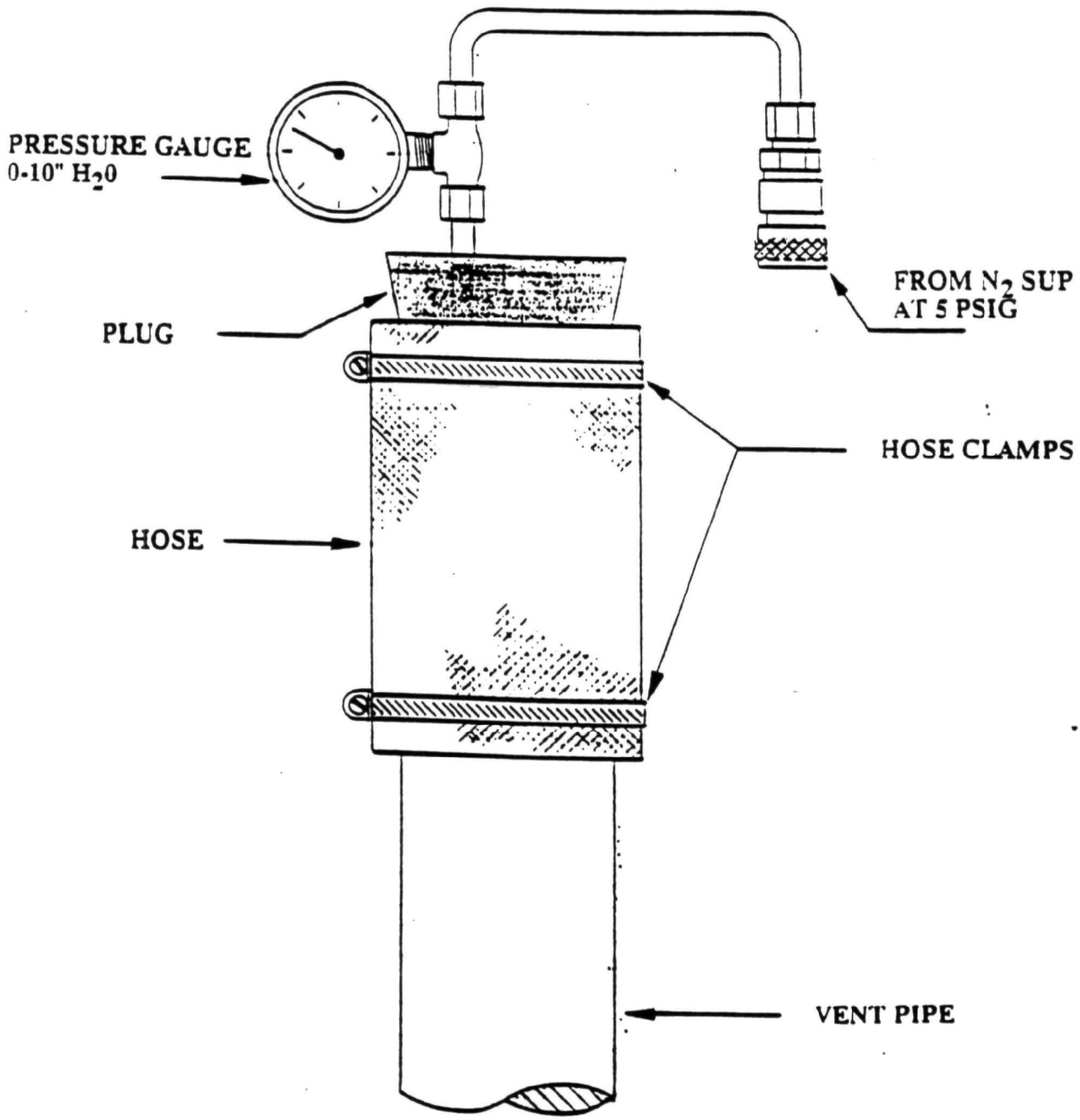


TABLE 30-I

GASOLINE DISPENSING FACILITY
LEAK RATE CRITERIA
INITIAL PRESSURE - 10 INCHES WATER COLUMN

ULLAGE SPACE (GALLONS)	MINIMUM PRESSURE AFTER FIVE MINUTES (Inches of Water)
500	3.7
600	4.5
700	5.2
800	5.8
900	6.2
1,000	6.5
1,500	7.6
2,000	8.2
2,500	8.5
3,000	8.7
3,500	8.9
4,000	9.1
4,500	9.2
5,000	9.3
7,500	9.5
10,000	9.6
15,000	9.7
30,000	9.8

Use linear interpolation for intermediate values of ullage space.

DYNAMIC PRESSURE DROP TEST

- **Determine flow resistance through balance vapor recovery systems at prescribed flow rate.**

DYNAMIC PRESSURE DROP TEST

- **Test Method**

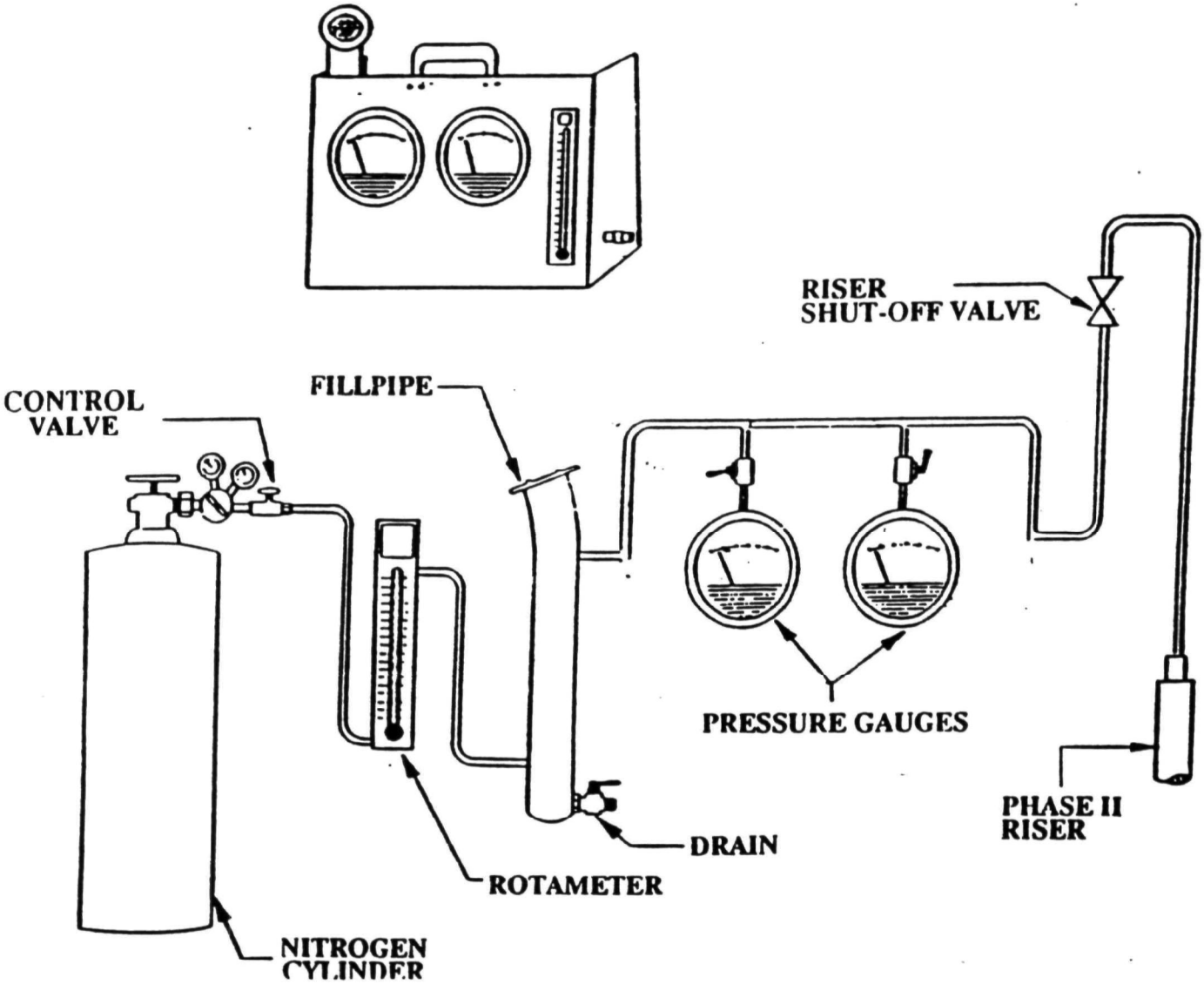
  - **Flow gaseous nitrogen through vapor recovery system at different flow rates**

  - **Measure resulting back pressures near the nozzle faceplate**

  - **Compare to CARB certification criteria**

Figure 27 - 1

PRESSURE DROP TEST UNIT



NITROGEN FLOWRATE CFH	DYNAMIC BACK PRESSURE INCHES H_20
20	0.15
60	0.45
100	0.94

LIQUID BLOCKAGE TEST

- Detect low points in piping configuration
- Balance and Assist systems
- Same as Dynamic Back Pressure Test

LIQUID BLOCKAGE TEST

- Test Method

  - Introduce gasoline to vapor piping and allow sufficient time for gasoline to flow into the underground storage tank

  - Introduce gaseous nitrogen to vapor piping at prescribed flow rates

  - Liquid blockage indicated by...

    1) needle pegging on the pressure gage

    2) wild pulsing of the needle

    3) reading in excess of prescribed limits

VAPOR SPACE TIE TEST

- **Performed with Pressure Decay Test**
- **Verifies proper installation of underground piping**
- **Depress Vapor Dry Breaks**

PERMITTING

PERMITTING

DETERMINATION OF REGULATED UNIVERSE

- The Agency must accurately determine which facilities must comply with the Stage II program requirements.

- The Agency must then develop and maintain a program to accurately track facilities in the regulated universe.

POA RECORDKEEPING REQUIREMENTS

- General Station File

- Station Inspection Report File

- Station Enforcement File

STAGE II PERMITS

- Allow the Agency to maintain the required files, etc.

- Provide Facility with clear description of the requirements

- Enhance enforcement

SOURCES OF FACILITY IDENTIFICATION INFORMATION

- Stage I Permit Files
- Underground Storage Tank Permit Files
- Department of Weights and Measures Files
- Tax Records
- Telephone Directories
- Major Oil Companies
- State Licensing Agencies Records

PERMIT APPLICATIONS

- Name and Address of Business

- Owner/Operator/Lessee Name and Address

- Station characteristics

  operating schedule

  monthly throughput

  number of nozzles, hoses, and dispensers

- Stage II Equipment Information

  type of system

  preliminary site plan including all tanks, dispensers, piping, etc.

EXAMPLES OF PERMIT APPLICATIONS

- Dade County, FL
- New York
- New Jersey

Metropolitan Dade County, Florida Clean Air Program - Stage II Vapor Recovery System Specifications	Date: Name:
Company Name and Address	
California Air Resources Board EXECUTIVE ORDER NUMBER	
Dade County APPROVAL NUMBER	
Dispenser Manufacturer and Model	
Pump Number(s)	_____ to _____
Stage II Vapor Recovery System	____ Balance ____ Hirt ____ Assist ____ Other (specify)_____
Nozzle (check Manufacturer and enter model number)	____ OPW 111V-____ 111V-____ ____ EMCO WHEATON ___ A4005 / ___ RA4005 ____ HUSKY Model V ____ Other (specify)_____
Coaxial Hose Assembly Manufacturer and Model	
Liquid Removal System	____ No ____ Yes (specify)_____
Pressure-Vacuum (P/V) Vents, Pressure and Vacuum	P = _____ oz. pressure V = _____ oz. vacuum
Retractor Manufacturer and Model	
Remote Check Valves	____ No ____ Yes (specify)_____
Maximum Flow Rate	_____ gpm
Flow Limiter	____ No ____ Yes (specify)_____
Height of Hose Loop from Drive Surface	_____ inches
Height of Hose Loop from Island	_____ inches
Inside Diameter of (galvanized) Vapor Riser	_____ inches
Breakaway	____ No ____ Yes (specify)_____

Please complete this form for each system and submit for approval to:
DERM Air Section, 111 N.W. 1st Street, Suite 1310, Miami, Florida 33128

LOCATION	FACILITY	
		G

A ADD
C CHANGE
D DELETE

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

WHITE - ORIGINAL
PINK - DATA ENTRY
YELLOW - APPLICANT

GASOLINE STORAGE AND TRANSFER

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

SECTION A

NAME OF OWNER OF TANKS		
NUMBER AND STREET ADDRESS		
CITY-TOWN-VILLAGE	STATE	ZIP
OWNER'S REPRESENTATIVE / TITLE	TELEPHONE NO	
SIGNATURE OF OWNER'S REPRESENTATIVE		
FACILITY NAME		
FACILITY OPERATORS NAME		
FACILITY LOCATION (Number and Street Address)		
CITY-TOWN-VILLAGE	ZIP	
Annual throughput-gasoline only (gals)	NUMBER OF NOZZLES GASOLINE ONLY	

SECTION B — STAGE I

TANK ID NO.	DATE TANK INSTALLED	CONTENTS	CAPACITY (gals)	Submerged fill YES/NO	STAGE I YES/NO
	/				
	/				
	/				
	/				
	/				
	/				
	/				
	/				

SECTION C

STAGE II	DEC APPROVED STAGE II SYSTEM ID

AGENCY USE ONLY

LOCATION CODE	FACILITY	UTM(E)	UTM(N)	SIC NUMBER	DATE APPL REC'D	DATE APPL REV'D	REVIEWED BY
					/ /	/ /	

RECOMMENDED ACTION RE: PC

DATE ISSUED	EXPIRATION DATE	SIGNATURE OF APPROVAL	FEE
/ /	/ /		

R ☐ ISSUE PERMIT TO CONSTRUCT FOR SOURCE
1. DEVIATION FROM APPROVED APPLICATION SHALL VOID THIS PERMIT
2. TESTS AND/OR ADDITIONAL EMISSION CONTROL EQUIPMENT MAY BE REQUIRED PRIOR TO THE ISSUANCE OF A CERTIFICATE TO OPERATE

RECOMMENDED ACTION RE: CO

DATE ISSUED	EXPIRATION DATE	SIGNATURE OF APPROVAL	FEE
/ /	/ /		

1 ☐ INSPECTED BY _____ DATE / /
2 ☐ INSPECTION DISCLOSED DIFFERENCES AS BUILT VS PERMIT, CHANGES INDICATED ON FORM
3 ☐ ISSUE CERTIFICATE TO OPERATE FOR SOURCE
4 ☐ APPLICATION FOR CO DENIED _____ DATE _____ INITIALED

SPECIAL CONDITIONS.

1	2.
3	4
5.	6.
7.	8.

New Jersey Department of Environmental Protection
Bureau of New Source Review

APPLICATION FOR PERMIT TO CONSTRUCT, INSTALL OR ALTER STAGE II VAPOR CONTROLS FOR TRANSFER OF SERVICE STATION FUELS AT INDIVIDUAL FACILITIES
(Use VEM-032B for Multiple Locations)

Instructions:
- *Print all information carefully in ink.*
- *Illegible applications will be denied.*
- *Complete both sides of the application.*
- *For assistance call (609) 292-6716 & ask for the Stage II Coordinator.*

Section A - Applicant Information

_____ — Applicant's Name

_____ — Mailing Address - No. & Street

_____ — City State Zip Code

NOTE: *The above information will be used to mail your approval or denial directly to you in a window envelope, please print or type on the lines.*

Section B - Gasoline Dispensing Facility Information

Full Legal Business Name _____

Facility Location _____
Street *City* *County*

Contact Person _____ Telephone No. _____

Current DEP ID # _____ Facility's Local Name _____

Section C

The information supplied on this application VEM-032A is to the best of my knowledge true and correct:

NOTE: This application must be submitted with a $250 application fee pursuant to N.J.A.C. 7.27-8.6(a).

_____ _____
Signature of Authorized Officer *Date*

_____ _____
Name (Print or Type) *Title*

Return application in pre-printed, blue envelope that was provided to: **NJDEP**
Bureau of New Source Review
CN 027
Trenton, N.J. 08625

NOTE: This form is to be used for Stage II Vapor Recovery Only.

For DEP Use Only		
Fee	Log No.	Eval.

Section D

1. What was the total throughput of gasoline, in gallons, dispensed from all tanks at this station from September 1, 1986 to August 31, 1987?

Total Throughput _____ gallons

2. Please check the certified Stage II Vapor Recovery equipment that will be installed at this location. The number next to each manufacturer represents the California executive order that certified that equipment.

____Atlantic Richfield (G-70-25-AA)

____Emco Wheaton (G-70-17-AA)

____Hasstech (G-70-7-AB)

____Hirt (G-70-33-AB)

____OPW (G-70-36-AA)

____Texaco (G-70-38-AA)

____Chevron (G-70-53-AA)

____Exxon (G-70-23-AA)

____Healy (G-70-70-AA)

____Mobil (G-70-48-AA)

____Red Jacket (G-70-14-AA)

____Union (G-70-49-AA)

____Other _____ Calif. Ex. Order # _____

FOR DEPARTMENT USE ONLY — DO NOT WRITE BELOW THIS LINE

Application for authorization to install the above indicated Stage II vapor recovery system is hereby:

____ **APPROVED** ____ **DENIED**

Reason for Denial: ____ **No Fee** ____ **No Certified Controls**

____ **Application is Illegible** ____ **No Signature**

NSR DECISION DATE: _____ BY: _____

Chief, Bureau of New Source Review

NOTE: If application is approved you will be sent form VEM-017 at a later date. Form VEM-017 will include your New Jersey Plant ID Number, New Jersey Stack Number, and Certificate Number.

This form must be readily available at the location as indicated on side one of this form until you receive your VEM-017 form.

VEM-032B
1.88

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF NEW SOURCE REVIEW

APPLICATION FOR PERMIT TO CONSTRUCT, INSTALL OR ALTER STAGE II VAPOR CONTROLS FOR TRANSFER OF SERVICE STATION FUELS AT MULTIPLE LOCATIONS

Instructions:
- *Print all information carefully in ink.*
- *Illegible applications will be denied.*
- *Complete both sides of the application.*
- *For assistance call (609) 292-6716 & ask for the Stage II Coordinator.*

Section A - Applicant Information

_____ ← Applicant's Name

_____ ← Mailing Address - No. & Street

_____ ← City State Zip Code

NOTE: *The above information will be used to mail your approval or denial directly to you in a window envelope. please print or type on the lines.*

Section B - Gasoline Dispensing Facility Information

Full Legal Business Name _____
(If more than one legal name, use separate VEM-032A or VEM-032B Forms.)

Contact Person _____ Telephone No. _____

Section C

The information supplied on this application VEM-032B is to the best of my knowledge true and correct.

NOTE: **These applications must be submitted with a $250 fee for each location pursuant to N.J.A.C. 7:27-8.6(a).**

_____ _____
Authorized Signature *Date*

_____ _____
Name (Print or Type) *Title*

Return application in pre-printed, blue envelope that was provided to: **NJDEP**
Bureau of New Source Review
CN 027
Trenton, N.J. 08625

NOTE: **THIS FORM TO BE USED FOR STAGE II VAPOR RECOVERY ONLY AND FOR FACILITIES INSTALLING IDENTICAL EQUIPMENT AT EACH LOCATION OTHERWISE USE FORM VEM-032A.**

For DEP Use Only
F _____ Eval. _____

Section D

(Use Form VEM-032 (Stage I) for each location which does not have a DEP ID Number.)

DEP ID #	Facility Location (City)	County	Throughput* (Gals.)	Log Number (DEP Use Only)

** Throughput in gallons dispensed at this location from 9-1-86 to 8-31-87.*

Section E

Please check *(only 1)* the certified Stage II Vapor Recovery equipment that will be installed at each location. The number next to each manufacturer represents the California executive order that certified that equipment.

____Atlantic Richfield (G-70-25-AA)

____Emco Wheaton (G-70-17-AA)

____Hasstech (G-70-7-AB)

____Hirt (G-70-33-AB)

____OPW (G-70-38-AA)

____Texaco (G-70-38-AA)

____Chevron (G-70-53-AA)

____Exxon (G-70-23-AA)

____Healy (G-70-70-AA)

____Mobil (G-70-48-AA)

____Red Jacket (G-70-14-AA)

____Union (G-70-46-AA)

____Other _____ Calif. Ex. Order # _____

FOR DEPARTMENT USE ONLY — DO NOT WRITE BELOW THIS LINE

Application for authorization to install the above indicated Stage II vapor recovery system is hereby: ____ **APPROVED** ____ **DENIED**

Reason for Denial: ____ No Fee ____ No Certified Controls
____ Application is Illegible ____ No Signature

NSR DECISION DATE: _____ BY: _____
Chief, Bureau of New Source Review

NOTE: If applications are approved, you will be sent form VEM-017 at a later date. Form VEM-017 will include your New Jersey Plant ID Numbers, New Jersey Stack Numbers, and Certificate Numbers. This form must be readily available at locations above until you receive your VEM-017 forms.

PERMIT CONDITIONS

- Equipment Requirements

  Aboveground

  Underground

- Monitoring Requirements

- Reporting and Recordkeeping

FACILITY EQUIPMENT REQUIREMENTS

- Infrastructure System (underground piping)

- Aboveground Equipment

ABOVEGROUND EQUIPMENT

- Certified system
- Proper working order
- Signs and Program Information
- Recordkeeping requirements
- Observation of Use

UNDERGROUND PIPING

- Observe before covering up

- Approval of Testing

  "Certified" testing contractors

  Engineer's approval

- Frequency of Testing

  Installation

  5 years

  Modification

VERIFICATION OF FACILITY COMPLIANCE

- Permitting records
- Station Operating License
- System Installation and Testing Results
- Stage II Maintenance Records
- Inspection Records
- Compliance Records
- Training Certification

PERMITTING PROCEDURES

- Massachusetts
- New Jersey
- Bay Area
- San Diego

MODEL PERMITTING PROCEDURES

- EPA working on "model permit" as discussed in Title V

- Procedures include:

  Identification of Sources

  Permit forms and applications

  Operating permits

  Testing Requirements

INSPECTION TECHNIQUES

POA REQUIREMENTS FOR FACILITY INSPECTIONS

- Minimum of 1 compliance inspection per facility per year

  - Records inspection

  - Equipment inspection

- mandatory follow-up at facilities found to be in violation

- Functional testing of equipment

ABOVEGROUND EQUIPMENT

- Certifed system
- Proper working order
- Signs and Program Information
- Recordkeeping Requirements
- Observation of Use

FUNCTIONAL TESTING REQUIREMENT

- Verify facility compliance of the leak test requirements
- Conduct Dynamic Backpressure Test
- Verify Facility compliance of the Liquid Blockage Test

EQUIPMENTS DEFECTS

NOZZLE BOOT DEFECTS

- Slit Greater than one inch in length
- Triangular tear greater than one-half inch per side
- Improperly installed
- Uncertified
- Missing

FACEPLATE DEFECT

- Less than 3/4 of faceplate contacts the fill inlet area
- Improperly installed
- Uncertified
- Missing

FACE CONE DEFECT

- Less than 3/4 of the face cone is present
- Improperly installed
- Uncertified
- Missing

CHECK VALVE DEFECTS

- frozen in open position
- improperly installed
- missing

HOSE DEFECTS

- Flattened or kinked
- Torn
- Improperly installed
- Uncertified
- Missing

PROCESS UNITS AND/OR VACUUM DEVICE DEFECTS

- Leaking return lines
- Intermittent process interruptions
- Low return pressures
- Non-operational
- Missing

POA TRAINING AND TESTING REQUIREMENTS FOR INSPECTORS

Training Program Should Cover the Following Subject Areas:

- Purposes and Effects of Stage II Vapor Control Programs
- System Types, Parts, Operations, and Functions
- Inspection Requirements
- Visual and Functional Identification Techniques of System and Equipment Failures
- Record Review and Recording Procedures
- Enforcement Procedures

PENALTIES

- **Penalties**

  - **Notices of Violations**

  - **Warnings**

  - **Cease and Desist Orders**

  - **Suspension od license or permit to operate**

  - **Revocation of license or permit to operate**

  - **"Tagging" equipment**

SUMMARY OF IMPORTANT POINTS OF STAGE II PROGRAM

HIGHLIGHTS

- **1990 CAAA requires Stage II :**

  In Particular Areas

  Optional & Allowable Exemption Levels

  Installation Dates

  Promulgation of Onboard Rule removes some requirements

- **General preamble:**

  Requires at least 95 percent efficient systems to be installed

  Alternative to Testing Each Station

  Announces Guidance Documents

- **Technical Guidance Document presents emission, control technology, costs, and implementation information**

REVIEW OF
FIVE AREAS OF PROGRAM GUIDANCE

- TRAINING AND PUBLIC EDUCATION PROGRAMS
- A METHOD TO DETERMINE WHICH FACILITIES COMPRISE THE REGULATED UNIVERSE
- DATA COLLECTION AND REVIEW TO MONITOR COMPLIANCE AMONG REGULATED FACILITIES
- PERIODIC INSPECTION OF REGULATED FACILITIES TO INSURE COMPLIANCE WITH PROGRAM REQUIREMENTS
- A METHOD TO ENSURE REGULATED FACILITY COMPLIANCE WITH PROGRAM REQUIREMENTS THROUGH ENFORCEMENT MECHANISMS

SUMMARY

- Accurately determine facility population

- Distribution of Stations by gasoline throughput

- Best approach is to obtain area-specific information

- Technical guidance document provides information to estimate in absence of area-specific information

SOURCES OF EMISSION

- Refueling Emission Sources
- Factors Influencing Emissions
- Emission Estimates
- Other Emission Sources

REVIEW

- Balance Systems
  - Simple Concept
  - Complex Equipment
  - "Untrained" User
- Effectiveness of Program
  - Maintenance of Aboveground Equipment
  - Underground Piping Installation
  - Exemption Level

SUMMARY

- EPA Model Considered Good Estimate of Stage II Costs
- 1991 Cost Presented
- Stage II is Cost Effective