United States
Environmental Protection
Agency

Office of Air Quality
Planning and Standards
Research Triangle Park NC 27711

EPA-450/3-91-022b
November 1991

Air

EPA

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

Volume II: Appendices

EPA-450/3-91-022b

Technical Guidance -

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

Volume II: Appendices

Emission Standards Division

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711
November 1991

This report has been reviewed by the Emission Standards Division of the Office of Air Quality Planning and Standards, EPA, and approved for publication. Mention of trade names or commercial products is not intended to constitute endorsement or recommendation for use.

Copies of this report are available, as supplies permit through the Library Services Office (MD-35), U.S. Environmental Protection Agency, Research Triangle Park NC 27711, (919) 541-2777, or for a nominal fee, from National Technical Information Services, 5285 Port Royal Road, Springfield VA 22161, (703) 487-4650.

TABLE OF CONTENTS

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.

APPENDIX B

STAGE II FACILITY COSTS

This appendix is taken in its entirety from Draft Regulatory Impact Analysis: Proposed Refueling Emission Regulations for Gasoline-Fueled Motor Vehicles - Volume I Analysis of Gasoline Marketing Regulatory Strategies. EPA-450/3-87-001a. U.S. EPA, Research Triangle Park, N.C. July 1987.

APPENDIX B

STAGE II PER-FACILITY COSTS

B.1 INTRODUCTION

Cost data were obtained and developed on a per-facility basis for each model plant size. These per-facility costs were then combined with data on the number of facilities requiring controls within each model plant category so that nationwide costs could be determined.

The Agency obtained cost data from numerous sources (vendors, equipment suppliers, and construction contractors) in determining reasonable estimates for the capital and annualized costs that would be incurred by installation of Stage II vapor recovery systems, due either to retrofit on an existing facility or to the incorporation of controls during construction of a new facility. All data were obtained during the third and fourth quarters of 1984, and these values are taken to represent third quarter 1984 costs. Information for determining Stage II costs was compiled based on vapor recovery systems currently available and certified in California; i.e., the individual balance system, the manifolded balance system, the hybrid system, and two types of vacuum assisted systems. The reasons for using only the systems currently certified in California are that these systems are in actual operation and have been demonstrated to meet the control efficiencies assumed in this analysis, and detailed information is available on the exact components that make up each approved system. The presented per-facility cost estimates are based upon the 95 percent theoretical efficiency since this is the efficiency at which the systems are certified. However, when extrapolating these per-facility costs to nationwide or nonattainment areas, in-use efficiencies are assumed.

Both the individual and manifolded balance systems are considered in this analysis because each is currently certified for use in California and because when the analysis effort was begun the magnitude of the cost difference between the two systems was not known. The cost analysis for the hybrid system is based solely on the Healy System, because this is the only one for which accurate cost data were available. Cost data were not available from the other hybrid manufacturer, Red Jacket, since this company's system is not currently being manufactured. The costs shown for the vacuum assist systems are based on the Hirt system and the Hasstech system. Throughout this appendix, the title Assist-1 is used to denote the Hirt System, Assist-2 is used for the Hasstech System, Hybrid is used for the Healy system, Bal-I is used to indicate an individual balance system, and Bal-M is used for a manifolded balance system.

Several terms are used during the discussion of Stage II capital costs. The "purchase cost" of an item represents the manufacturer's quoted selling price for the item. The "direct cost" of an item equals the item's purchase cost plus the direct expenses incurred during the installation of the item (e.g., labor, materials, and site preparation). The "capital cost" of an item equals the sum of the item's direct cost and its indirect cost (e.g., model study, contingencies, startup). However, since Stage II systems are relatively small and simple, no indirect costs are incurred. Therefore, in this case, the capital cost of an item is the same as its direct cost. The cost components that comprise the "annualized cost" of a Stage II system are defined as they appear later in this discussion.

A summary of the aboveground and underground component cost analysis is presented in Section B.2. Section B.3 presents the per-facility cost results for retrofitting an existing facility, and Section B.4 presents the costs for installation during the construction of a new facility.

B.2 COMPONENT COSTS

This section presents the capital and annualized costs of both the aboveground (B.2.1) and underground (B.2.2) equipment components of a Stage II system retrofitted to an existing service station. This analysis incorporates the conclusion of Appendix I, which evaluated Stage II dispenser configurations. The analysis presented here assumes that all existing and new facilities incorporate coaxial hose configurations and that one-fourth of the existing and three-fourths of the new facilities will incorporate multiproduct dispensers.

The capital cost data for all Stage II vapor recovery systems were re-evaluated and broken down into aboveground costs, which include the costs for dispenser components, and underground costs, which include the installation cost of an underground piping system. The capital recovery cost factor used to calculate annualized costs was based on an equipment life of 8 years for the dispenser and auxiliary equipment, and 35 years for the underground piping system.

B.2.1. Aboveground Costs

To calculate aboveground costs, EPA obtained a list of the aboveground components certified for use in California. The vendors of the components on this list were then contacted to obtain a current retail price for each component. Finally, the price range for each individual component type was averaged to arrive at a single price for each component type.

Table B-1 contains a component list of the equipment necessary to modify an existing dispenser into a balance, or Hirt, Stage II vapor recovery dispenser. This equipment list was obtained from an Executive Order issued by the State of California Air Resources Board (G-70-52-AE: Exhibit 2) (I-F-113)* and represents the equipment certified for use in the Stage II systems. This table provides a list of manufacturers and model numbers for each piece of equipment; other makes of the same equipment are not certified and, thus, may not be used in California. This Executive Order also presents exhibits (Exhibits 4-10) that depict the dispenser configurations that may be used (see Figures B-1, through B-7). Exhibits 8 through 10 depict multi-product dispensers. Multi-product dispensers, which are relatively new, offer three grades of product on each side of the dispenser (six nozzles per dispenser).

B.2.1.1 Dispenser Modification Equipment Costs (Not Including Nozzles)

A specific subset of the component list shown in Table B-1 is applicable to each exhibit, thereby providing a different cost for each exhibit. The manufacturers of the components listed in Table B-1 were contacted to obtain current costs. These costs for each dispenser type are summarized by exhibit number in Table B-2. This table lists the lowest, highest, and average price of each component within each exhibit configuration. In this manner, an average cost has been obtained for the exhibit configurations shown in Figures B-1 through B-7. Based on the conclusions of Appendix I, the cost analysis

*Numbers indicated in this format are references (Section B.5) and correspond to docket item numbers in Docket No. A-84-07.

Table B-1. COMPONENT LIST FOR BALANCE OR HIRT STAGE II VAPOR RECOVERY SYSTEMS (from Reference I-F-113)

Item/Manufacturer and Model No.	Exhibit						
	4	5	6	7	8	9	10
Nozzles							
Emco Wheaton A 3003	X		X	X			
Emco Wheaton A 3005		X	X		X	X	X
Emco Wheaton A 3006	X		X	X			
Emco Wheaton A 3007		X	X		X	X	X
OPW 7V-E (34,36,47,49)	X		X	X			
OPW 7V-H (34,36,47,49, 60-63)	X		X	X			
OPW 11V-C (22,24,47,49)	X	X	X	X	X	X	X
OPW 11V-E (34,36,47,49)	X	X	X	X	X	X	X
High-Retractor Hose Configurations							
Overhead Hose Retractors							
Pomeco 100A, B, C	X	X					
Pomeco 102	X	X					
Petro-Vend PV-8	X	X					
CNI Series 9900, 9910 and 9930	X	X				X	
Dresser Wayne Model 390-IL			X	X	X		
Gasboy Model 90-750-2	X	X					
Gilbarco						X	
High-Retractor Dispensers							
Dresser Wayne Series 370/380			X				
Dresser Wayne Decade Marketer Series 310/320				X			
Gasboy Series 50	X	X					
Tokheim Series 162	X	X					
Dresser Wayne Series 390 MGD					X		
Tokheim Models 330A and 333A MMD					X		
High-Hang Hose Configurations							
Dispensers							
Gilbarco MPD						X	X
Coaxial Hose Assembly							
B.F. Goodrich Co-Ax		X	X		X	X	X
Liquid Removal Systems							
Gilbarco Venturi							X

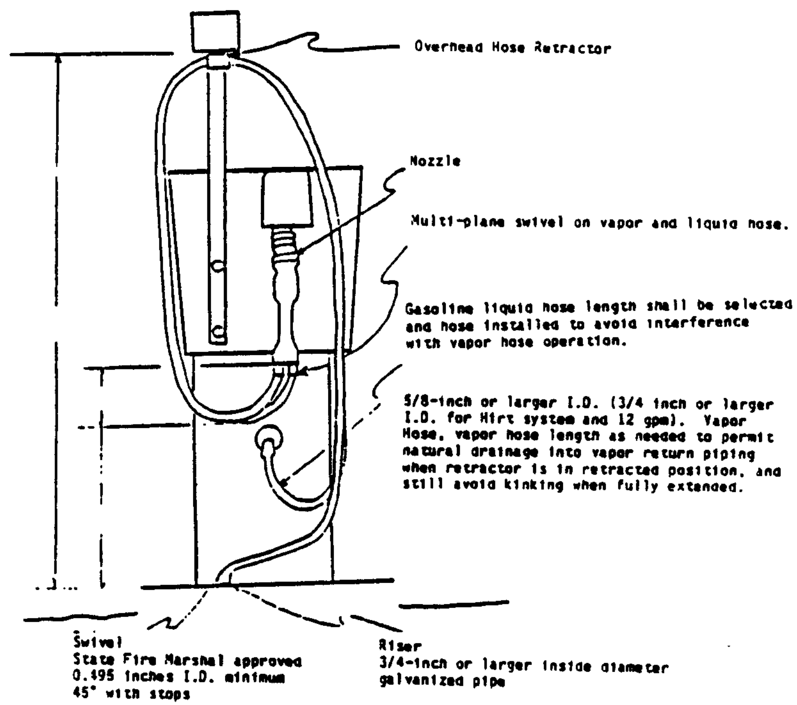
(Table concluded on next page.)

Table B-1. COMPONENT LIST FOR BALANCE OR HIRT STAGE II VAPOR RECOVERY SYSTEMS
(from Reference I-F-113) (concluded)

Item/Manufacturer and Model No.	Exhibit 4	5	6	7	8	9	10
Swivels							
Nozzle							
Pomeco Model 7	X		X	X			
Husky I-VI	X		X	X			
Emco Wheaton							
A 4110-001(45°)		X			X	X	
A 4113-001(90°)					X	X	
OPW 43	X		X	X			
OPW 43-C (45°)		X			X	X	
OPW 43-T	X		X	X			
OPW 33-CV	X		X	X			
Island							
Emco Wheaton							
A 93-001		X					
OPW 36-C		X					
Dispenser							
Emco Wheaton							
A 4113-001 (90°)					X		
Emco Wheaton							
A 92-001		X					
Wedgon PS 3445 VRM	X		X				
Retractor Swivel							
Searle Leather & Packing B-1399 or State Fire Marshal approved equivalent		X					
Flow Limiter							
Emco Wheaton A-10 or State Fire Marshal approved equivalent	X	X	X	X	X	X	X
Recirculation Traps[a]							
Emco Wheaton							
A 008-001	X	X	X	X			
Emco Wheaton							
A 94-001	X	X	X	X			
Emco Wheaton							
A 95-001	X	X	X	X			
OPW 78, 789-S, 78E, 78-ES	X	X	X	X			

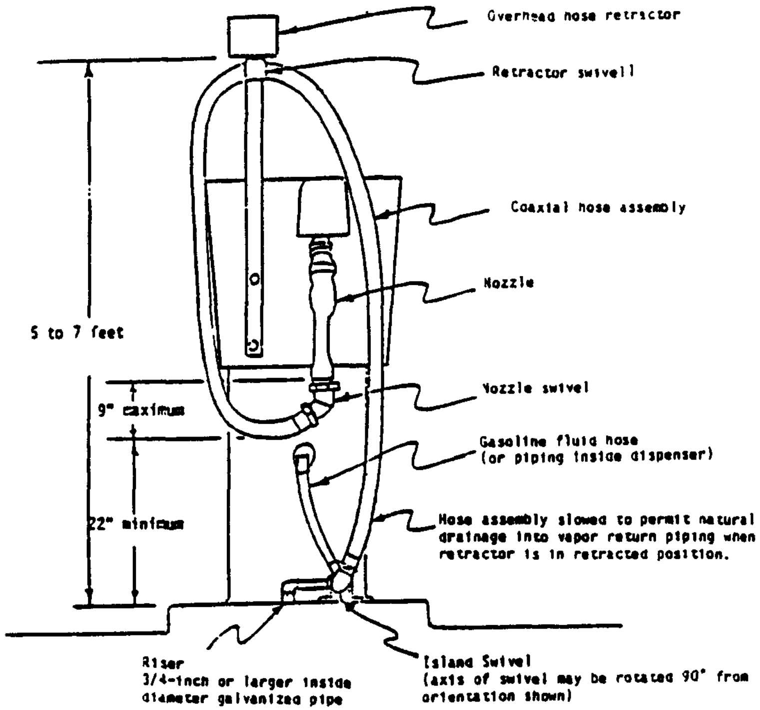
[a] Due to the law in California requiring all balance systems to have high-hang retractors by 1986, recirculation traps will no longer be required after 1986.

Figure B-1. Exhibit-4, Twin Hose Side-Mount High-Retractor Configuration
(from reference I-F-113)



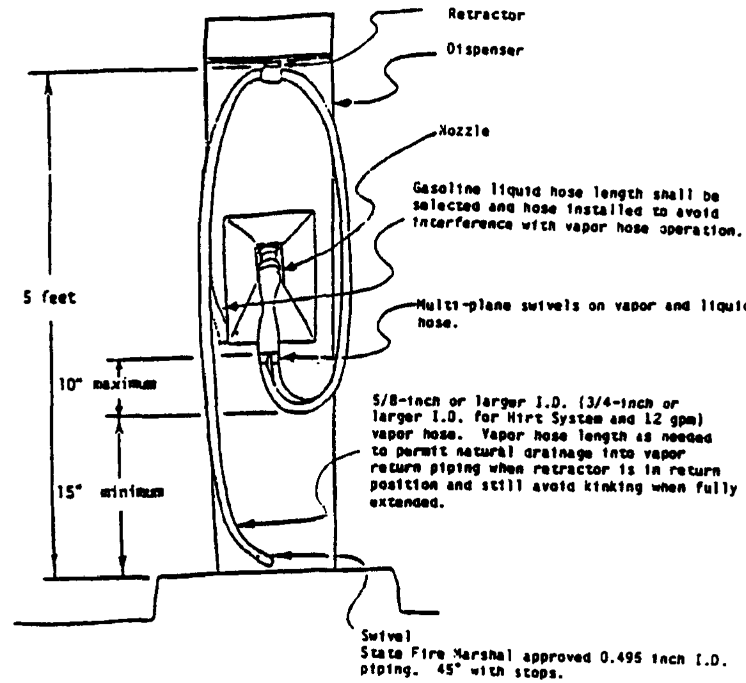
Notes:
1. See Exhibit 2 for the component list.
2. A flow limiter is required on all dispensers using Emco Wheaton nozzles except the Hirt system using Emco Wheaton Model A3096 and 3/4-inch vapor hoses.
3. A recirculation trap is not required.
4. Use appropriate hose ties.
5. Vapor return piping may be installed on the inside or on the outside of the dispenser cabinet.

Figure B-2. Exhibit-5, Coaxial Hose Side-Mount High-Retractor Configuration
(from reference I-F-113)



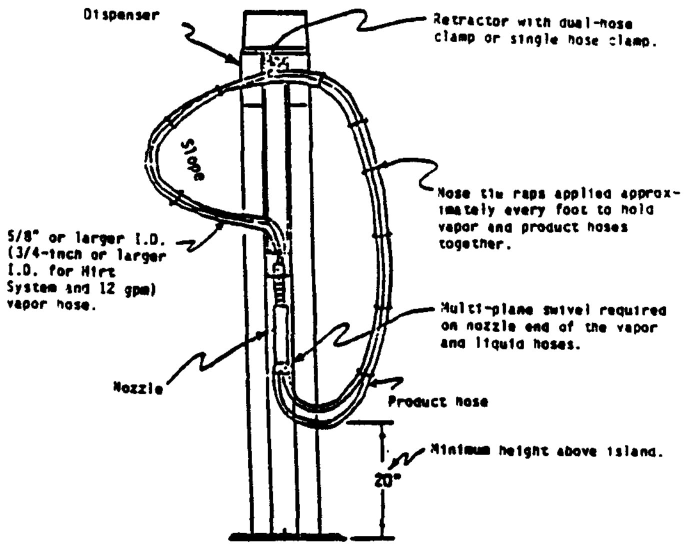
Notes:
1. See Exhibit 2 for the component list.
2. A flow limiter is required on all dispensers using Emco Wheaton nozzles except the Hirt system using Emco Wheaton Model A3096 and 3/4-inch vapor hoses.
3. A recirculation trap is not required.
4. Vapor return piping may be installed on the inside or on the outside of the dispenser cabinet.

Figure B-3. Exhibit-6, Twin Hose or Coaxial Hose Dispenser-Mount, High-Retractor Configuration
(from reference I-F-113)



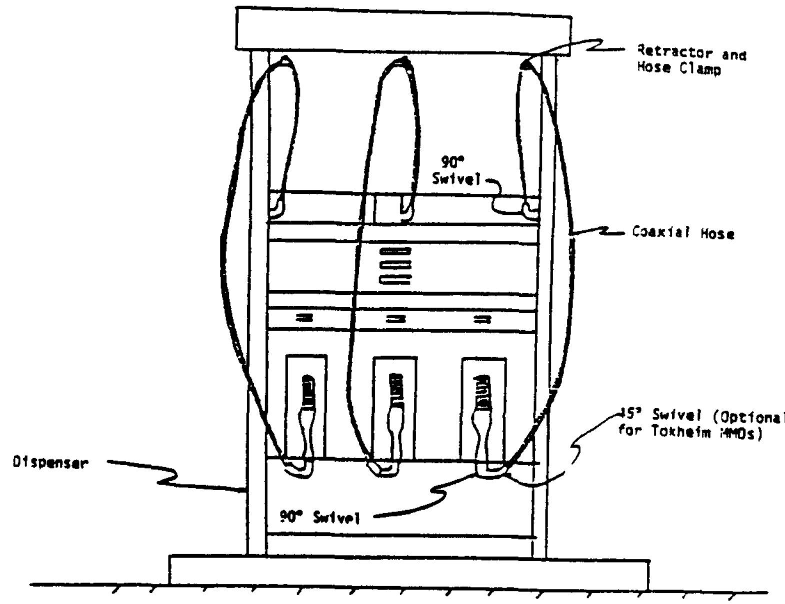
Notes:
1. See Exhibit 2 for the component list.
2. A flow limiter is required on all dispensers using Emco Wheaton nozzles except the Hirt system using Emco Wheaton Model A3096 and 3/4-inch vapor hoses.
3. A recirculation trap is not required.
4. Use appropriate hose ties.
5. Vapor return piping may be installed on the inside or on the outside of the dispenser cabinet.
6. Riser, 3/4-inch or larger inside diameter galvanized pipe.

Figure B-4. Exhibit-7, Twin Hose Dispenser-Mount, High-Retractor Configuration (from reference I-F-113)



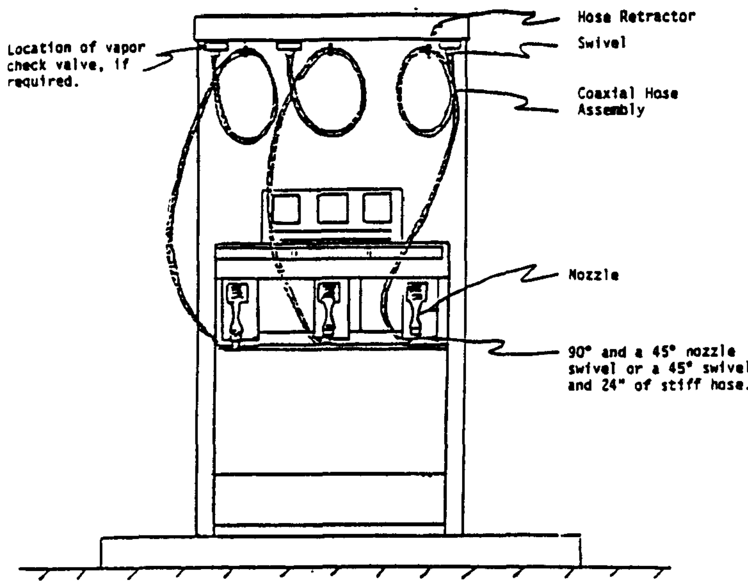
Notes:
1. See Exhibit 2 for the component list.
2. A flow limiter is required on all dispensers using Emco Wheaton nozzles except the Hirt system using Emco Wheaton Model A3096 and 3/4-inch vapor hoses.
3. A recirculation trap is not required.
4. Hose swivels not required at dispenser end of hoses.
5. Riser must be 3/4-inch or larger inside diameter galvanized pipe.

Figure B-5. Ext bit-8, High Retractor Dispenser-Coaxial Configuration For All New And Existing Installations (from Reference I-F-113)



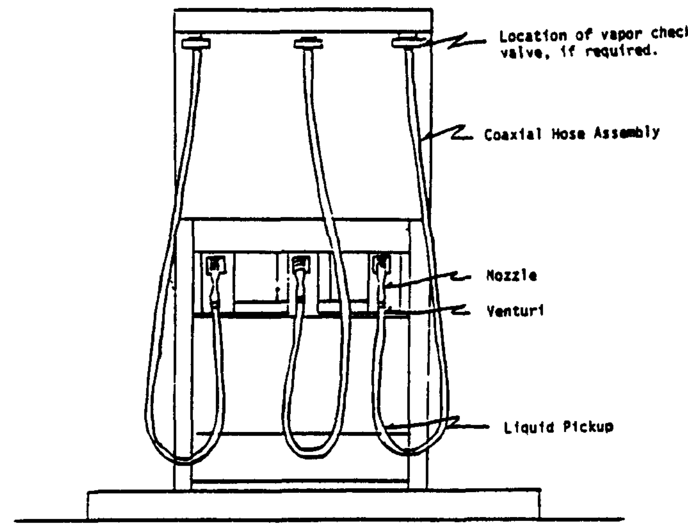
es:
1. Use a 1 inch or larger inside diameter galvanized pipe for riser.
2. A recirculation trap is not required.
3. A flow limiter is required on dispensers that have a maximum flowrate in excess of 10 gpm. A flow limiter may be required on all gasoline dispensers at the option of the local air pollution control district.
4. For dispenser islands greater than 4 feet in width, each vapor hose length, shall not be longer than the sum of one-half the dispenser island width, in feet, plus 7 feet.
5. For dispenser islands less than 4 feet, the maximum hose length is 9 feet.
6. Coaxial hose stiffeners must be included and long enough to prevent kinking or flattening of hose.
7. Retractor must retract coaxial hose to top of dispensers when not in use.
8. Tension on retractor hose clamp must not be in excess of that required to return hose to top of dispenser.
9. The Emco Wheaton Model A4000 series nozzles and the OPW 11V Model F vapor recovery nozzles are permitted only when used in conjunction with approved vapor check valves.

Figure B-6. Exhibit 9, High-Hang Hose Configuration With Retractor For All New And Existing Installations (from Reference I-F-113)



Notes:
1. Use a 1 inch or larger inside diameter galvanized pipe for riser.
2. A recirculation trap is not required.
3. A flow limiter is required on 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.
4. For dispensers islands greater than 4 feet in width, each vapor hose length shall not be longer than the sum of one-half the dispenser island width, in feet plus 7 1/2 feet.
5. For dispenser islands less than 4 feet, the maximum hose length is 9 1/2 feet.
6. Coaxial hose stiffeners must be included and long enough to prevent kinking or flattening of hose.
7. Retractor must retract coaxial hose to top of dispensers when not in use.
8. Tension on retractor hose clamp must not be in excess of that required to return hose to top of dispenser.
9. 90° swivel is not required if hose stiffener at nozzle is >24 inches in length.
10. The Emco Wheaton Model A4000 series nozzles and the OPW 11V Model F vapor recovery nozzles are permitted only when used in conjunction with approved vapor check valves.

Figure B-7. Exhibit 10, High-Hang Coaxial Hose Configuration With Liquid Removal System For All New And Existing Installations (from I-F-113)



Notes:
1. Use a 1 inch or larger inside diameter galvanized pipe for riser.
2. A recirculation trap is not required.
3. Hose length = 10 1/2 ft. maximum.
4. Coaxial hose stiffeners must be included and long enough to prevent kinking or flattening of hose.
5. An ARB certified liquid removal system must be installed and maintained according to manufacturer's specifications.
6. 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.
7. The Emco Wheaton Model A4000 series nozzles and the OPW 11V Model F vapor recovery nozzles are permitted only when used in conjunction with approved vapor check valves.

Table B-2. BALANCE SYSTEM DISPENSER MODIFICATION EQUIPMENT PURCHASE COST[a]
($/Nozzle)

	Cost of Component		
	LOW	HIGH	AVERAGE
EXHIBIT 4 - Twin Hose Side-Mount			
High Hose Retractor	94.00	102.50	96.08
Swivels for Nozzles	42.40	75.00	54.87
Swivels for Isl or Disp	21.50	21.50	21.50
Swivels for Retract	0.00	0.00	0.00
Flow Limiter	20.00	20.00	20.00
Hose	13.50	35.28	24.39
Disp-Hook & Handle	16.00	38.00	27.00
Total Purchase Cost	207.40	292.28	243.84
EXHIBIT 5 - Coaxial Hose Side-Mount			
High Hose Retractor	94.00	102.50	96.08
Swivels-Nozzles	40.00	58.80	49.40
Swivels-Isl or Disp	58.80	82.10	70.45
Swivels-Retract	8.08	8.08	8.08
Flow Limiter	20.00	20.00	20.00
Hose	100.00	100.00	100.00
Disp-Hook & Handle	16.00	38.00	27.00
Total Purchase Cost	336.88	409.48	371.01
EXHIBIT 6 - Twin or Coaxial Hose Dispenser-Mount (Average of twin and coaxial presented)			
High Hose Retractor	94.00	102.50	96.08
Swivels-Nozzles	42.40	75.00	54.87
Swivels-Isl or Disp	21.50	21.50	21.50
Swivels-Retract	0.00	0.00	0.00
Flow Limiter	20.00	20.00	20.00
Hose	56.75	67.64	62.20
Disp-Hook & Handle	16.00	38.00	27.00
Total Purchase Cost	250.65	324.64	281.65
EXHIBIT 7 - Twin Hose Dispenser-Mount			
High Hose Retractor	94.00	102.50	96.08
Swivels-Nozzles	42.40	75.00	54.87
Swivels-Isl or Disp	0.00	0.00	0.00
Swivels-Retract	8.08	8.08	8.08
Flow Limiter	20.00	20.00	20.00
Hose	13.50	35.28	24.39
Disp-Hook & Handle	16.00	38.00	27.00
Total Purchase Cost	193.98	278.86	230.42

[a]See docket entries I-E-18, I-E-19, I-E-20, I-E-22, I-E-26, I-E-27, I-E-28, I-E-31, I-E-32, I-E-58, I-E-62, I-E-63, I-E-64, I-E-65, I-E-66, I-E-67, I-F-110, and I-F-111.

Table B-2. BALANCE SYSTEM DISPENSER MODIFICATION EQUIPMENT PURCHASE COST[a]
($/Nozzle)
(concluded)

	Cost of Component		
	LOW	HIGH	AVERAGE
EXHIBIT 8 - Coaxial High Retractor			
Overhead Hose Retractor	94.00	102.50	96.08
Swivels for Nozzles	80.00	117.60	98.80
Swivels for Isl. or Disp.	0.00	0.00	0.00
Swivels for Retractor	40.00	58.80	49.40
Flow Limiter	20.00	20.00	20.00
Hose	90.00	112.50	103.45
Liquid Removal Venturi	0.00	0.00	0.00
Dispenser Modification	38.00	55.00	46.50
	362	466.4	414.23
EXHIBIT 9 - High-Hang Hose			
Overhead Hose Retractor	85.84	100.00	92.92
Swivels for Nozzles	80.00	117.60	98.80
Swivels for Isl. or Disp.	0.00	0.00	0.00
Swivels for Retractor	40.00	58.80	49.40
Flow Limiter	20.00	20.00	20.00
Hose	95.00	118.17	108.92
Liquid Removal Venturi	0.00	0.00	0.00
Dispenser Modification	54.17	54.17	54.17
	375.01	469.32	424.21
EXHIBIT 10 - Coaxial High-Hang Hose with Liquid Removal System			
Overhead Hose Retractor	0.00	0.00	0.00
Swivels for Nozzles	40.00	58.80	49.40
Swivels for Isl. or Disp.	0.00	0.00	0.00
Swivels for Retractor	40.00	58.80	49.40
Flow Limiter	20.00	20.00	20.00
Hose	105.00	131.25	119.82
Liquid Removal Venturi	200.00	200.00	200.00
Dispenser Modification	54.17	54.17	54.17
	459.17	523.02	492.79
Average Total Purchase Cost[b]			354.75

[b]Average cost analysis of 75 percent coaxial single dispensers (Exhibits 5 and 6) and 25 percent coaxial multiproduct dispensers (Exhibits 8 through 10).

is based on the use of all coaxial hoses and 75 percent single dispensers (average of exhibits 5 and 6) and 25 percent multiproduct dispensers (average of Exhibits 8-10). This weighted average cost was used as the purchase cost incurred when modifying a standard dispenser to a vapor recovery equipped dispenser utilizing a balance Stage II vapor recovery system.

The dispenser modification equipment list for the Hybrid system was obtained directly from the manufacturer of the hybrid system (I-E-25), and includes the Model 100 jet pump, Model CX-6 adapter, Model S swivel, Model CX hose, Model 143 control valve, and an installation kit. The total price is $435 per nozzle.

The dispenser modification equipment cost (excluding nozzles) for the Assist-1 system is the same as that for the balance system (i.e., about $355), plus the cost of a ball check valve ($16.95, I-E-23). Thus, the total unit price for dispenser modification equipment for the Assist-1 system was estimated to be $367 per nozzle.

The dispenser modification cost for the Assist-2 system was obtained directly from the manufacturer of the system (I-F-106), and includes the Hasstech vapor hose, ITT flow control valve, A.Y. McDonald impact valve, hose swivels, and Hasstech Model 1025 flame arrestor. The unit price is $205.

Tables B-3 through B-7 present the aboveground direct costs that would be incurred for each model plant. These tables include the component costs for the balance system, the Hybrid System (Healy) and the vacuum assist system (Hirt = Assist-1, Hasstech = Assist-2). Table B-8 outlines the information on nozzles and islands assumed in the cost analysis for each model plant. The data for single dispensers include the same nozzle-per-station assumptions used in the 1984 EPA analysis found in "Evaluation of Air Pollution Regulatory Strategies for Gasoline Marketing Industry," EPA-450/3-84-012a (I-A-55). The assumptions for the multiproduct dispensers (MPD's) include the installation of one 4-nozzle MPD to replace each 3-dispenser island. An uneven number of nozzles results from the 75/25 weighting of the nozzles associated with single/multiproduct dispensers.

TABLE B-3. MODEL PLANT 1 STAGE II ABOVEGROUND DIRECT COST

ABOVEGROUND COMPONENTS	UNIT COST	NUMBER OF COMPONENTS				
		BAL-I	BAL-M	HYBRID	ASSIST-1	ASSIST-2
DISPENSER COMPONENTS						
NOZZLE BALANCE (a)	197	2.50	2.50			
NOZZLE HYBRID (b)	215			2.50		
NOZZLE ASSIST-1 (c)	178				2.50	
NOZZLE ASSIST-2 (d)	124					2.50
MOD EQUIP BALANCE (e)	355	2.50	2.50			
MOD EQUIP HYBRID (f)	435			2.50		
MOD EQUIP ASSIST-1 (g)	372				2.50	
MOD EQUIP ASSIST-2 (h)	205					2.50
AUXILIARY ITEMS (i)						
ASSIST-1	3,975				1.00	
ASSIST-2	3,900					1.00
INSTALLATION						
BALANCE DISPENSER (j)	80	2.50	2.50			
HYBRID DISPENSER (k)	100			2.50		
ASSIST-1 DISPENSER (l)	45				2.50	
ASSIST-2 DISPENSER (m)	50					2.50
ASSIST-1 AUXILIARY (n)	1,400				1.00	
ASSIST-2 AUXILIARY (o)	1,200					1.00
DISPENSER PURCHASE COST		1,379	1,379	1,625	1,373	823
AUX ITEMS PURCHASE COST		0	0	0	3,975	3,900
DISP INSTALLATION COST		200	200	250	113	125
AUX INSTALLATION COST		0	0	0	1,400	1,200
DISPENSER DIRECT COST		1,579	1,579	1,875	1,486	948
AUX ITEMS DIRECT COST		0	0	0	5,375	5,100
TOTAL DIRECT COST		1,579	1,579	1,875	6,861	6,048

* Weighted average costs assuming 75 percent single dispensers and 25 percent multiproduct dispensers.

TABLE B-4. MODEL PLANT 2 STAGE II ABOVEGROUND DIRECT COST

ABOVEGROUND COMPONENTS	UNIT COST	NUMBER OF COMPONENTS				
		BAL-I	BAL-M	HYBRID	ASSIST-1	ASSIST-2
DISPENSER COMPONENTS						
NOZZLE BALANCE (a)	197	3.25	3.25			
NOZZLE HYBRID (b)	215			3.25		
NOZZLE ASSIST-1 (c)	178				3.25	
NOZZLE ASSIST-2 (d)	124					3.25
MOD EQUIP BALANCE (e)	355	3.25	3.25			
MOD EQUIP HYBRID (f)	435			3.25		
MOD EQUIP ASSIST-1 (g)	372				3.25	
MOD EQUIP ASSIST-2 (h)	205					3.25
AUXILIARY ITEMS (i)						
ASSIST-1	3,975				1.00	
ASSIST-2	3,900					1.00
INSTALLATION						
BALANCE DISPENSER (j)	80	3.25	3.25			
HYBRID DISPENSER (k)	100			3.25		
ASSIST-1 DISPENSER (l)	45				3.25	
ASSIST-2 DISPENSER (m)	50					3.25
ASSIST-1 AUXILIARY (n)	1,400				1.00	
ASSIST-2 AUXILIARY (o)	1,200					1.00
DISPENSER PURCHASE COST		1,793	1,793	2,113	1,785	1,069
AUX ITEMS PURCHASE COST		0	0	0	3,975	3,900
DISP INSTALLATION COST		260	260	325	146	163
AUX INSTALLATION COST		0	0	0	1,400	1,200
DISPENSER DIRECT COST		2,053	2,053	2,438	1,931	1,232
AUX ITEMS DIRECT COST		0	0	0	5,375	5,100
TOTAL DIRECT COST		2,053	2,053	2,438	7,306	6,332

* Weighted average costs assuming 75 percent single dispensers and 25 percent multiproduct dispensers.

TABLE B-5. MODEL PLANT 3 STAGE II ABOVEGROUND DIRECT COST

ABOVEGROUND COMPONENTS	UNIT COST	NUMBER OF COMPONENTS				
		BAL-I	BAL-M	HYBRID	ASSIST-1	ASSIST-2
DISPENSER COMPONENTS						
NOZZLE BALANCE (a)	197	6.50	6.50			
NOZZLE HYBRID (b)	215			6.50		
NOZZLE ASSIST-1 (c)	178				6.50	
NOZZLE ASSIST-2 (d)	124					6.50
MOD EQUIP BALANCE (e)	355	6.50	6.50			
MOD EQUIP HYBRID (f)	435			6.50		
MOD EQUIP ASSIST-1 (g)	372				6.50	
MOD EQUIP ASSIST-2 (h)	205					6.50
AUXILIARY ITEMS (i)						
ASSIST-1	3,975				1.00	
ASSIST-2	3,900					1.00
INSTALLATION						
BALANCE DISPENSER (j)	80	6.50	6.50			
HYBRID DISPENSER (k)	100			6.50		
ASSIST-1 DISPENSER (l)	45				6.50	
ASSIST-2 DISPENSER (m)	50					6.50
ASSIST-1 AUXILIARY (n)	1,400				1.00	
ASSIST-2 AUXILIARY (o)	1,200					1.00
DISPENSER PURCHASE COST		3,586	3,586	4,225	3,570	2,139
AUX ITEMS PURCHASE COST		0	0	0	3,975	3,900
DISP INSTALLATION COST		520	520	650	293	325
AUX INSTALLATION COST		0	0	0	1,400	1,200
DISPENSER DIRECT COST		4,106	4,106	4,875	3,863	2,464
AUX ITEMS DIRECT COST		0	0	0	5,375	5,100
TOTAL DIRECT COST		4,106	4,106	4,875	9,238	7,564

* Weighted average costs assuming 75 percent single dispensers and 25 percent multiproduct dispensers.

TABLE B-6. MODEL PLANT 4 STAGE II ABOVEGROUND DIRECT COST

ABOVEGROUND COMPONENTS	UNIT COST	NUMBER OF COMPONENTS				
		BAL-I	BAL-M	HYBRID	ASSIST-1	ASSIST-2
DISPENSER COMPONENTS						
NOZZLE BALANCE (a)	197	9.75	9.75			
NOZZLE HYBRID (b)	215			9.75		
NOZZLE ASSIST-1 (c)	178				9.75	
NOZZLE ASSIST-2 (d)	124					9.75
MOD EQUIP BALANCE (e)	355	9.75	9.75			
MOD EQUIP HYBRID (f)	435			9.75		
MOD EQUIP ASSIST-1 (g)	372				9.75	
MOD EQUIP ASSIST-2 (h)	285					9.75
AUXILIARY ITEMS (i)						
ASSIST-1	3,975				1.00	
ASSIST-2	3,900					1.00
INSTALLATION						
BALANCE DISPENSER (j)	80	9.75	9.75			
HYBRID DISPENSER (k)	100			9.75		
ASSIST-1 DISPENSER (l)	45				9.75	
ASSIST-2 DISPENSER (m)	50					9.75
ASSIST-1 AUXILIARY (n)	1,400				1.00	
ASSIST-2 AUXILIARY (o)	1,200					1.00
DISPENSER PURCHASE COST		5,380	5,380	6,338	5,355	3,208
AUX ITEMS PURCHASE COST		0	0	0	3,975	3,900
DISP INSTALLATION COST		780	780	975	439	488
AUX INSTALLATION COST		0	0	0	1,400	1,200
DISPENSER DIRECT COST		6,160	6,160	7,313	5,794	3.695
AUX ITEMS DIRECT COST		0	0	0	5,375	5,100
TOTAL DIRECT COST		6,160	6,160	7,313	11,169	8,795

* Weighted average costs assuming 75 percent single dispensers and 25 percent multiproduct dispensers.

TABLE B-7. MODEL PLANT 5 STAGE II ABOVEGROUND DIRECT COST

ABOVEGROUND COMPONENTS	UNIT COST	NUMBER OF COMPONENTS				
		BAL-I	BAL-M	HYBRID	ASSIST-1	ASSIST-2
DISPENSER COMPONENTS						
NOZZLE BALANCE (a)	197	16.25	16.25			
NOZZLE HYBRID (b)	215			16.25		
NOZZLE ASSIST-1 (c)	178				16.25	
NOZZLE ASSIST-2 (d)	124					16.25
MOD EQUIP BALANCE (e)	355	16.25	16.25			
MOD EQUIP HYBRID (f)	435			16.25		
MOD EQUIP ASSIST-1 (g)	372				16.25	
MOD EQUIP ASSIST-2 (h)	285					16.25
AUXILIARY ITEMS (i)						
ASSIST-1	3,975				1.00	
ASSIST-2	3,900					1.00
INSTALLATION						
BALANCE DISPENSER (j)	80	16.25	16.25			
HYBRID DISPENSER (k)	100			16.25		
ASSIST-1 DISPENSER (l)	45				16.25	
ASSIST-2 DISPENSER (m)	50					16.25
ASSIST-1 AUXILIARY (n)	1,400				1.00	
ASSIST-2 AUXILIARY (o)	1,200					1.00
DISPENSER PURCHASE COST		8,966	8,966	10,563	8,925	5,346
AUX ITEMS PURCHASE COST		0	0	0	3,975	3,900
DISP INSTALLATION COST		1,300	1,300	1,625	731	813
AUX INSTALLATION COST		0	0	0	1,400	1,200
DISPENSER DIRECT COST		10,266	10,266	12,188	9,657	6,159
AUX ITEMS DIRECT COST		0	0	0	5,375	5,100
TOTAL DIRECT COST		10,266	10,266	12,188	15,032	11,259

* Weighted average costs assuming 75 percent single dispensers and 25 percent multiproduct dispensers.

FOOTNOTES FOR TABLES B 3 THROUGH B-7

[a]Average cost of new nozzles certified by California for use with a balance system. Costs for new nozzles range from $196 to $198 (I-E-28, I-F-110, and I-F-111).

[b]Actual cost of a new Healy Model 200 nozzle (I-E-25).

[c]Average costs of new nozzles certified by California for use with the Hirt system. Costs of new nozzles range from $151 to $198 (I-E-28, I-F-110, and I-F-111).

[d]Actual costs of a new Husky Model HP-2 nozzle. Reference I-F-106 states that eight of these nozzles cost $992.

[e]Modification equipment includes the average cost of the high-hang retractor system, swivels, flow limiter, and hoses as certified by California (see Tables B-1 and B-2).

[f]Modification equipment includes the Model 100 jet pump, Model CX-6 adapter, Model S swivel, Model CX hose, Model 143 control valve, and an installation kit (I-E-25).

[g]Modification equipment includes the same equipment as listed for the balance system (footnote "f") plus a $16.95 ball check valve (I-E-23 and Tables B-1 and B-2).

[h]Modification equipment includes the Hasstech vapor hose, ITT flow control valve, A.Y. McDonald impact valve, hose swivels, and Hasstech Model 1025 flame arrestor (I-F-106).

[i]Auxiliary equipment includes a P/V valve, collection unit, and processing unit (I-E-35 and I-F-106).

[j]Reference I-E-46.

[k]Reference I-E-25.

[l]Reference I-E-35.

[m]Reference I-F-106 states installation for an 8-nozzle station costs $400.00.

[n]Reference I-E-35.

[o]Electrical installation costs $500 and base unit installation costs $700 (I-F-106).

Table B-8. MODEL PLANT CONFIGURATIONS[a]

Parameter	Model Plant 1	2	3	4	5
Average Monthly Throughput (gal/mo)	5,000	20,000	35,000	65,000	185,000
Throughput Range (gal/mo)	0-10,000	10,000-25,000	25,000-50,000	50,000-100,000	>100,000
No. of Islands	1	1	2	3	4
No. of Nozzles					
- Single Dispensers	2[c]	3	6	9	15[b]
- Multiproduct dispensers	4	4	8	12	20
- Weighted average[d]	2.50	3.25	6.50	9.75	16.25
No. of Dispensers	2[c]	3	6	9	12
- Single Dispensers	2[c]	3	6	9	12
- Multiproduct dispensers	1	1	2	3	5

[a]A typical island contains three single nozzle dispensers for each gasoline type (i.e., leaded, unleaded, and unleaded premium).

[b]Three islands have dual nozzle dispensers.

[c]Contains a single nozzle dispenser for leaded and unleaded only.

[d]Weighted average for existing facilities = 75 percent single dispensers and 25 percent multiproduct dispensers. (Weighted average for new facilities = 25 percent single dispensers and 75 percent multiproduct dispensers).

B.2.1.2 Nozzle Costs

The unit cost for each nozzle type shown in Tables B-3 through B-7 represents the cost of a new vapor recovery nozzle for each specific system manufacturer. The cost shown for a balance system nozzle is an average of several prices obtained from manufacturers of the approved nozzles listed in Table B-1 (i.e., Emco Wheaton, OPW, References I-E-28, I-F-110, and I-F-111). The new vapor recovery nozzles cost from $196 to $198, and thus a price of $197 for both balance-individual nozzles and balance-manifolded nozzles was used. These cost were later verified by again contacting the equipment manufacturers (I-E-65, I-E-66) and reflect the costs of the newest light-weight certified nozzles.

The unit cost shown in Tables B-3 through B-7 for the Assist-1 nozzle is an average cost of new nozzles certified by California for use with the Hirt system. Costs were obtained from the manufacturers of the nozzles used with this system (I-E-28, I-F-110, and I-F-111). The prices ranged from $157 to $198, and thus the average unit price of $178 was used.

The Assist-2 nozzle unit cost shown in Tables B-3 through B-7 is the actual cost of the Husky Model HP-2 nozzle (I-F-106).

While rebuilt nozzles are available as replacement equipment, new nozzle prices were used in the estimation of costs because information on the use and durability of rebuilt nozzles was not available to EPA when these costs were being collected.

B.2.1.3 Dispenser Installation Costs

The balance system costs were obtained from one contractor (I-E-46) who estimated that it would take 2 man-days to install all aboveground equipment at a two-island six-nozzle station. The following shows the information obtained and how the unit costs for a balance system were calculated:

2 man-days at $200/day	=	$400,
Profit (20%)	=	$ 80,
Total cost for 6-nozzle station	=	$480,
Unit cost for 1-nozzle station	=	$ 80.

The Hybrid, Assist-1, and Assist-2 dispenser installation costs, obtained directly from the manufacturers of these systems, are $100, $45, and $50 per nozzle, respectively (I-E-25, I-E-35, and I-F-106).

B.2.1.4 Auxiliary Equipment and Installation

The auxiliary items for the Assist-1 and Assist-2 systems include a pressure/vacuum (P/V) valve, blower collection unit, and processing unit. The costs for these items and their installation were obtained directly from the system manufacturers (I-E-35 and I-F-106). The costs for auxiliary items for Assist-1 and Assist-2 systems are $3,975 and $3,900, respectively, while the installation of these items costs $1,400 and $1,200, respectively.

B.2.2 Underground Costs

To estimate the costs of the underground piping systems, the layout of each model plant had to be determined. A representative equipment configuration was then determined for each model plant and, for each configuration, costs were estimated.

B.2.2.1 Station Layout and Equipment Configuration

A survey of about 40 service stations was performed around the Research Triangle Park area in North Carolina. No one specific layout was a rule for a specific model plant, but general tendencies in design and average distances between islands, storage tanks, and stations were determined. The general design guidelines chosen to establish the layout of each model plant are as follows:

1. The storage tanks are approximately 50 feet away from the main service island.
2. There is approximately 24 feet between adjacent service islands and station building.
3. Vent risers were typically located on the side of the station building.

Figures B-8 through B-12 incorporate these guidelines to provide a "reasonable" service station layout for each model plant. An infinite number of layouts is possible; however, the layouts presented supply the necessary means to calculate reasonable costs for the underground piping systems.

After the model plant layouts were determined, the underground piping was designed. Several guidelines were used:

1. Vapor recovery lines are located away from product lines as much as possible to avoid disruption of the existing product lines (I-E-39).

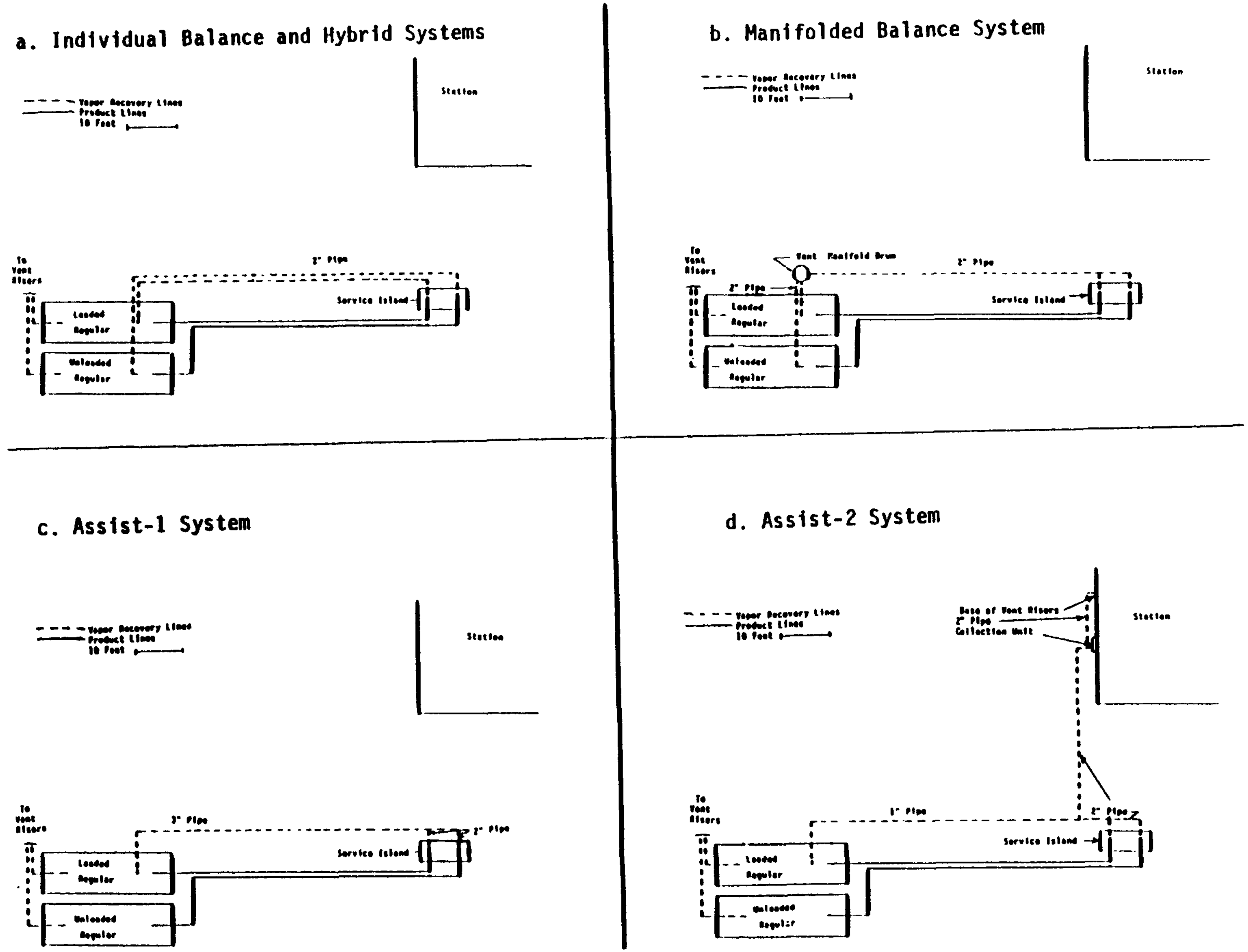


Figure B-8. Stage II Underground Piping Layouts for Model Plant 1

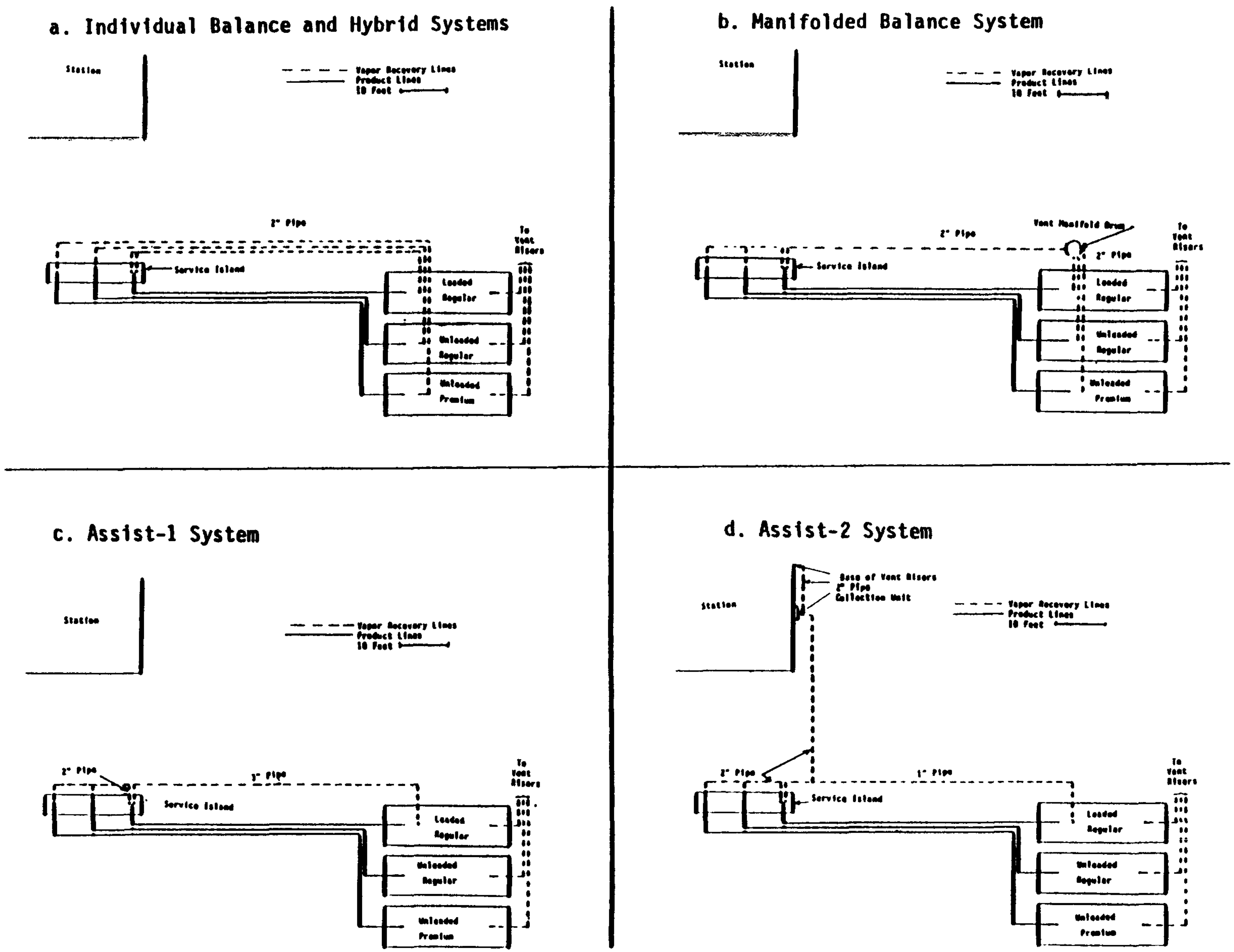


Figure B-9. Stage II Underground Piping Layouts for Model Plant 2

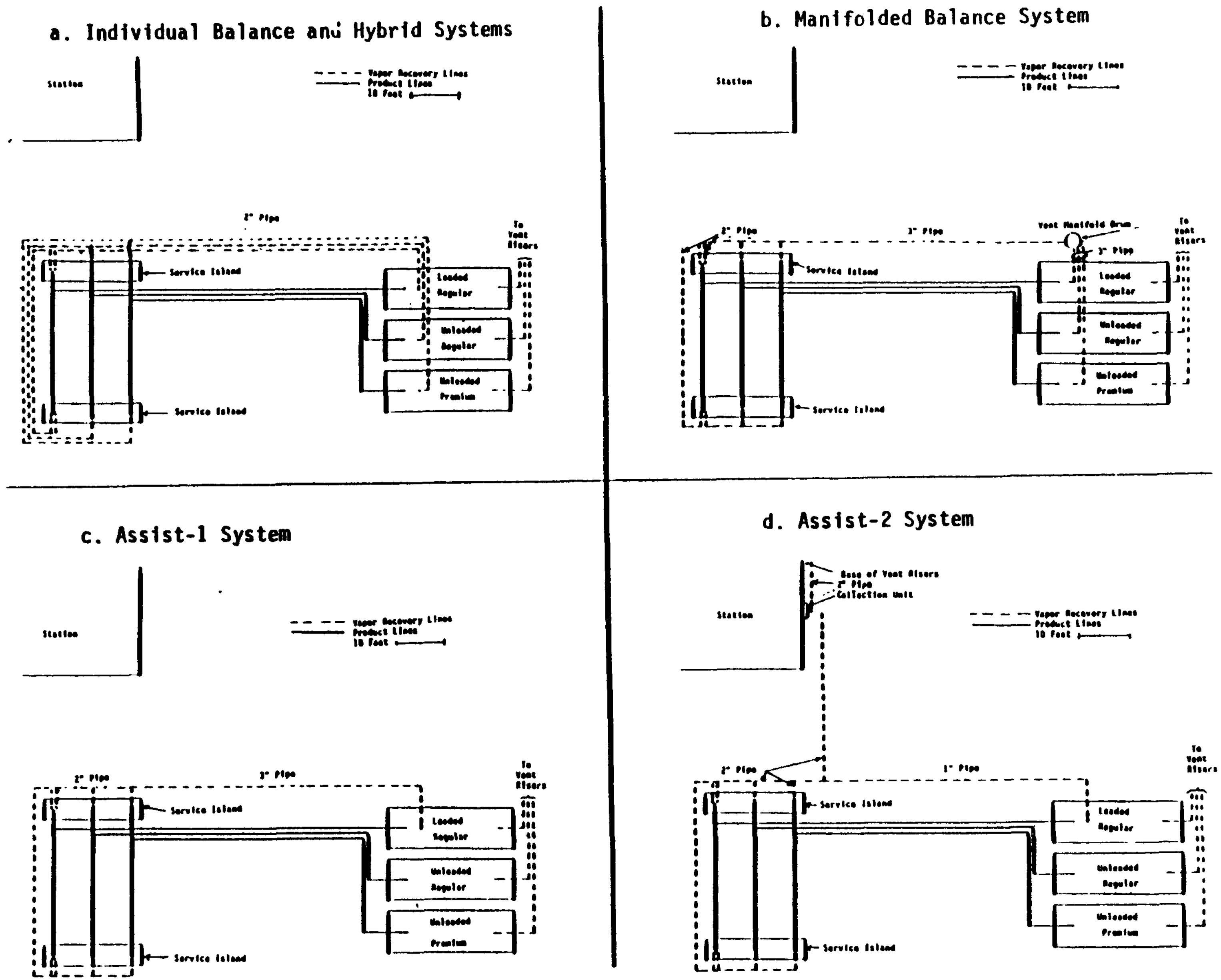


Figure B-10. Stage II Underground Piping Layouts for Model Plant 3

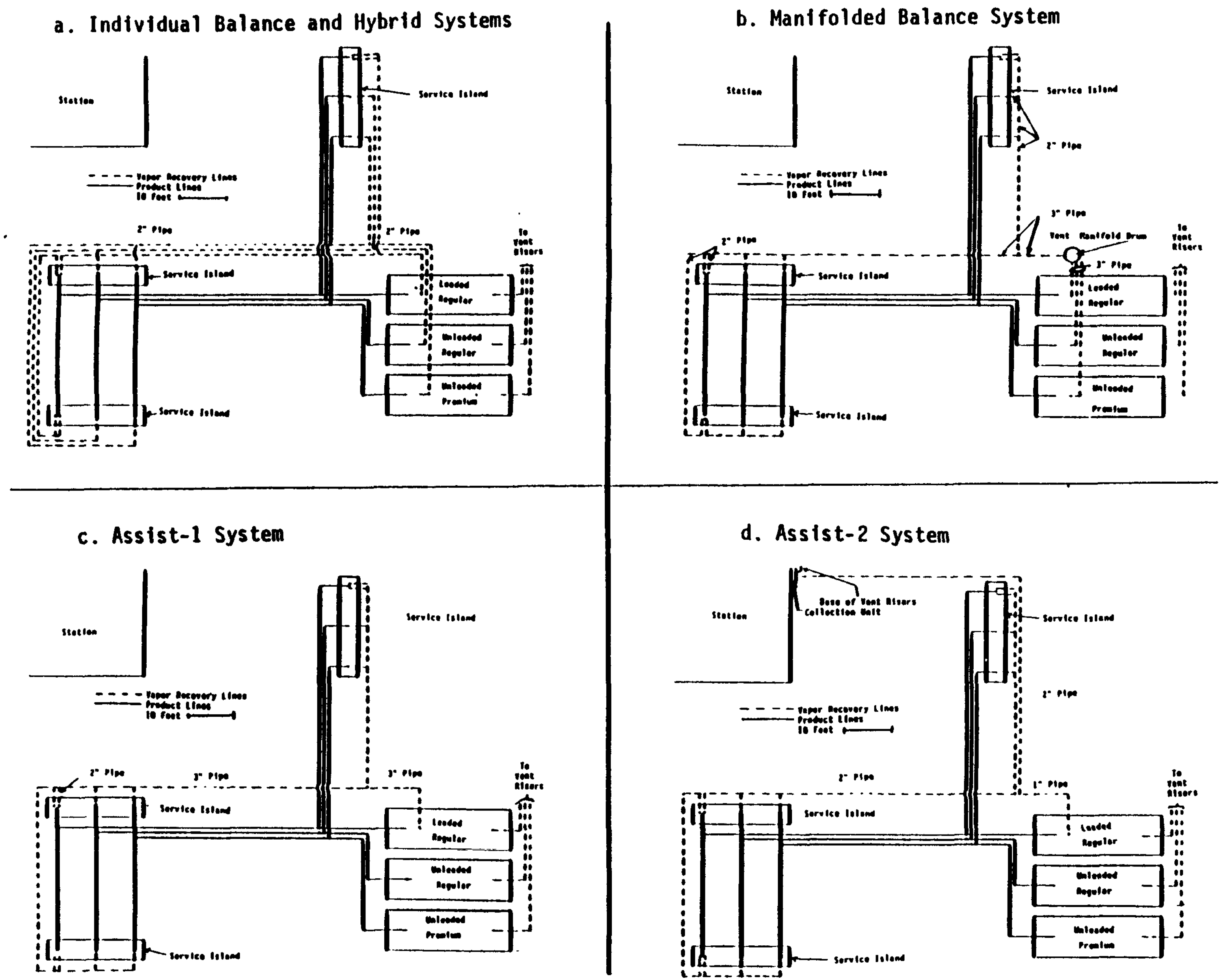


Figure B-11. Stage II Underground Piping Layouts for Model Plant 4

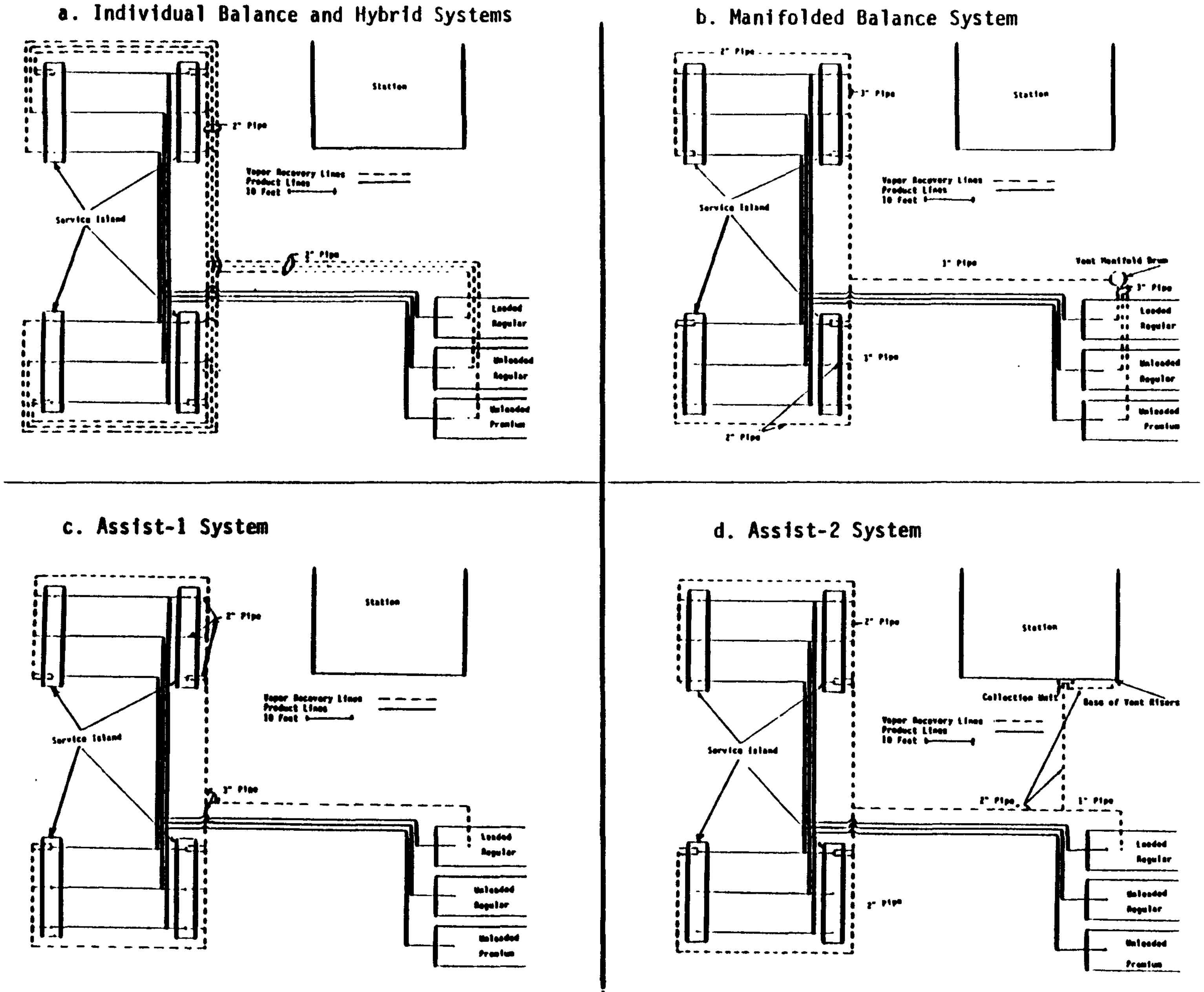


Figure B-12. Stage II Underground Piping Layouts for Model Plant 5

2. One trench holds one or more vapor recovery lines.
3. Maximum pipe lengths equal 20 feet (for determination of the number of pipe couplings) (I-E-34).
4. Pipe sizes were obtained from applicable California Executive Orders (I-F-114, I-F-115, I-F-116, and I-F-117).

B.2.2.2 Underground Equipment Costs

Tables B-9 through B-13 present the underground piping costs on a model plant basis, as depicted by Figures B-8 through B-12. All unit costs for pipe (galvanized and fiberglass) were obtained from pipe vendors in the Research Triangle Park area of North Carolina (I-E-33 and I-E-34). In addition, one salesman stated that his company typically gives a 15 percent discount on all components purchased by major plumbing contractors (I-E-33). For estimating purposes, it was assumed that the companies installing the underground piping would be major contractors, so the unit costs shown have been discounted 15 percent.

A complete breakdown of parts and prices is provided to enable the costing of various piping layouts; however, the trench length of the system is the overriding cost factor (about 70 percent of the total costs of the underground system).

The cost of the vent manifold drum for the manifolded balance system is an engineering estimate; i.e., no specific quote could be obtained at this time.

Information received from contractors (I-E-40 and I-E-44) also indicated that approximately 20 percent (or fewer) of the tanks currently in use would need to be equipped with an extra bung to accept the Stage II vapor recovery line. The installed cost would be about $300/bung (I-E-52). Since all the model plants, except model plant 1, have three tanks, the cost of the bungs can be calculated as: 1 bung/tank x $300/bung x .20 x 3 tanks/model plant = $180/model plant. For model plant 1 the cost is: 1 bung/tank x $300/bung x .20 x 2 tanks/model plant = $120.

B.2.2.3 Underground Installation Costs

Installation costs can be determined for the underground equipment necessary for model plants 1 through 5 (Tables B-9 through B-13). The cost of laying piping for an individual balance system is the same as for a manifolded balance system. This is because the additional time it takes to assemble the two extra lines to the storage tanks for

TABLE B-9. MODEL PLANT 1 STAGE II UNDERGROUND DIRECT COST

UNDERGROUND COMPONENTS	UNIT COST	NUMBER OF COMPONENTS				
		BAL-I	BAL-M	HYBRID	ASSIST-1	ASSIST-2
GALVANIZED PIPE (a)						
1" PIPE (FT)	0.89	4	4	4	4	65
2" PIPE (FT)	1.88	1	1	1		
3" PIPE (FT)	3.86					
3/4" CLOSE NIPPLE	0.46	3	3	3	3	3
1" CLOSE NIPPLE	0.70	5	5	5	5	7
2" CLOSE NIPPLE	1.42	2	2	2		
3" CLOSE NIPPLE	5.41				2	
1" ELBOW	1.51	5	5	5	5	8
2" ELBOW	4.48	4	4	4		
3" ELBOW	20.11				2	
1" X 3/4" REDUCER	1.73	3	3	3	3	3
2" X 1" REDUCER	3.84	3	3	3	3	4
3" X 2" REDUCER	13.14					
2" X 1" BUSHING	2.81					1
4" X 2" BUSHING	11.09	2		2		1
4" X 3" BUSHING	11.09				1	
1" UNION	1.13					1
2" TEE	6.43					1
FIBERGLASS PIPE (b)						
2" PIPE (FT)	1.89	152	98	152	10	70
3" PIPE (FT)	2.89				73	
2" THREADED ADAPTER	7.23	5	5	5	3	5
3" THREADED ADAPTER	10.58				1	
2" ELBOW	16.41	4	2	4		4
3" ELBOW	22.82				2	
2" TEE	23.50	0	2	0		3
3" TEE	26.61		0		2	
2" COUPLING	4.68	5	2	5		3
3" COUPLING	7.23				2	
3" X 2" REDUCER	11.14		0		3	
GLUED JUNCTIONS	3.25	11	9	11	11	13
ADDITIONAL ITEMS (c)						
4" X 2" TANK BUSHING	2.61		2			
4" X 3" TANK BUSHING	2.61					
2" FLOAT CHECK VALVE	32.55		2			
VENT MANIFOLD DRUM (d)	500.00		1			
BUNGS (e)	120.00	1	1	1	1	1
LABOR COMPONENTS						
TRENCHING (FT) (f)	30.00	85	85	85	75	120
ASSEMBLY (FT) (g)	6.00	85	85	85	75	120
TOTAL PURCHASE COST		640	1,065	640	632	580
TOTAL INSTALLATION COST		3,060	3,060	3,060	2,700	4,320
TOTAL DIRECT COST		3,700	4,125	3,700	3,332	4,900

See footnotes next page.

FOOTNOTES FOR TABLE B-9

[a]Reference I-E-33.

[b]Reference I-E-34.

[c]Reference I-F-110.

[d]Unit cost is an estimated cost since no information on this was readily available.

[e]References I-E-40 and I-E-44 (see text for discussion).

[f]References I-E-41 and I-E-46 (see text for discussion).

[g]Reference I-E-46 (see text for discussion).

TABLE B-10. MODEL PLANT 2 STAGE II UNDERGROUND DIRECT COST

UNDERGROUND COMPONENTS	UNIT COST	NUMBER OF COMPONENTS				
		BAL-1	BAL-M	HYBRID	ASSIST-1	ASSIST-2
GALVANIZED PIPE (a)						
1" PIPE (FT)	0.89	5	5	5	5	66
2" PIPE (FT)	1.88	2	2	2		
3" PIPE (FT)	3.86					
3/4" CLOSE NIPPLE	0.46	3	3	3	3	3
1" CLOSE NIPPLE	0.70	7	7	7	7	9
2" CLOSE NIPPLE	1.42	3	3	3		
3" CLOSE NIPPLE	5.41				2	
1" ELBOW	1.51	7	7	7	7	10
2" ELBOW	4.48	6	6	6		
3" ELBOW	20.11				2	
1" X 3/4" REDUCER	1.73	3	3	3	3	3
2" X 1" REDUCER	3.84	3	3	3	3	4
3" X 2" REDUCER	13.14					
2" X 1" BUSHING	2.81					1
4" X 2" BUSHING	11.09	3		3		1
4" X 3" BUSHING	11.09				1	
1" UNION	1.13					1
2" TEE	6.43					1
FIBERGLASS PIPE (b)						
2" PIPE (FT)	1.89	271	138	271	13	83
3" PIPE (FT)	2.89				83	
2" THREADED ADAPTER	7.23	6	6	6	3	5
3" THREADED ADAPTER	10.58				2	
2" ELBOW	16.41	6	3	6		4
3" ELBOW	22.82				2	
2" TEE	23.50	0	2	0		3
3" TEE	26.61		0		2	
2" COUPLING	4.68	8	2	8		3
3" COUPLING	7.23				2	
3" X 2" REDUCER	11.14		0		3	
GLUED JUNCTIONS	3.25	17	12	17	13	15
ADDITIONAL ITEMS (c)						
4" X 2" TANK BUSHING	2.61		3			
4" X 3" TANK BUSHING	2.61					
2" FLOAT CHECK VALVE	32.55		3			
VENT MANIFOLD DRUM (d)	500.00		1			
BUNGS (e)	100.00	1	1	1	1	1
LABOR COMPONENTS						
TRENCHING (FT) (f)	30.00	105	105	105	85	130
ASSEMBLY (FT) (g)	6.00	105	105	105	85	130
TOTAL PURCHASE COST		1,034	1,313	1,034	789	782
TOTAL INSTALLATION COST		3,780	3,780	3,780	3,060	4.680
TOTAL DIRECT COST		4,814	5,093	4,814	3,849	5,382

Footnotes are the same as those for Table B-9.

TABLE B-11. MODEL PLANT 3 STAGE II UNDERGROUND DIRECT COST

UNDERGROUND COMPONENTS	UNIT COST	NUMBER OF COMPONENTS				
		BAL-I	BAL-M	HYBRID	ASSIST-1	ASSIST-2
GALVANIZED PIPE (a)						
1" PIPE (FT)	0.89	10	10	10	10	71
2" PIPE (FT)	1.88	2		2		
3" PIPE (FT)	3.86		2			
3/4" CLOSE NIPPLE	0.46	7	7	7	7	7
1" CLOSE NIPPLE	0.70	13	13	13	13	15
2" CLOSE NIPPLE	1.42	3		3		
3" CLOSE NIPPLE	5.41		6		2	
1" ELBOW	1.51	13	13	13	13	16
2" ELBOW	4.48	6		6		
3" ELBOW	20.11		6		2	
1" X 3/4" REDUCER	1.73	7	7	7	7	7
2" X 1" REDUCER	3.84	7	7	7	7	8
3" X 2" REDUCER	13.14		3			
2" X 1" BUSHING	2.81					1
4" X 2" BUSHING	11.09	3		3		1
4" X 3" BUSHING	11.09				1	
1" UNION	1.13					1
2" TEE	6.43					1
FIBERGLASS PIPE (b)						
2" PIPE (FT)	1.89	476	86	476	26	156
3" PIPE (FT)	2.89		125		143	
2" THREADED ADAPTER	7.23	10	10	10	7	9
3" THREADED ADAPTER	10.58		3		1	
2" ELBOW	16.41	16	2	16		6
3" ELBOW	22.82		2		4	
2" TEE	23.50	3	2	3		7
3" TEE	26.61		3		6	
2" COUPLING	4.68	9	1	9		4
3" COUPLING	7.23		2		3	
3" X 2" REDUCER	11.14		4		7	
GLUED JUNCTIONS	3.25	34	26	34	26	24
ADDITIONAL ITEMS (c)						
4" X 2" TANK BUSHING	2.61					
4" X 3" TANK BUSHING	2.61		3			
2" FLOAT CHECK VALVE	32.55		3			
VENT MANIFOLD DRUM (d)	500.00		1			
BUNGS (e)	100.00	1	1	1	1	1
LABOR COMPONENTS						
TRENCHING (FT) (f)	30.00	165	165	165	140	185
ASSEMBLY (FT) (g)	6.00	165	165	165	140	185
TOTAL PURCHASE COST		1,779	2,053	1.779	1,253	1,046
TOTAL INSTALLATION COST		5,940	5,940	5,940	5.040	6.660
TOTAL DIRECT COST		7,719	7,993	7,719	6.293	7,706

Footnotes are the same as those for Table B-9.

TABLE B-12. MODEL PLANT 4 STAGE II UNDERGROUND DIRECT COST

UNDERGROUND COMPONENTS	UNIT COST	NUMBER OF COMPONENTS				
		BAL-I	BAL-M	HYBRID	ASSIST-1	ASSIST-2
GALVANIZED PIPE (a)						
1" PIPE (FT)	0.89	15	15	15	15	33
2" PIPE (FT)	1.88	2		2		
3" PIPE (FT)	3.86		2			
3/4" CLOSE NIPPLE	0.46	10	10	10	10	10
1" CLOSE NIPPLE	0.70	20	20	20	20	22
2" CLOSE NIPPLE	1.42	3		3		
3" CLOSE NIPPLE	5.41		6		2	
1" ELBOW	1.51	20	20	20	20	23
2" ELBOW	4.48	6		6		
3" ELBOW	20.11		6		2	
1" X 3/4" REDUCER	1.73	10	12	12	12	12
2" X 1" REDUCER	3.84	10	12	12	12	13
3" X 2" REDUCER	13.14		3			
2" X 1" BUSHING	2.81					1
4" X 2" BUSHING	11.09	3		3		1
4" X 3" BUSHING	11.09				1	
1" UNION	1.13					1
2" TEE	6.43					1
FIBERGLASS PIPE (b)						
2" PIPE (FT)	1.89	579	139	579	39	304
3" PIPE (FT)	2.89		125		183	
2" THREADED ADAPTER	7.23	13	13	13	10	12
3" THREADED ADAPTER	10.58		3		1	
2" ELBOW	16.41	22	3	22		7
3" ELBOW	22.82		2		5	
2" TEE	23.50	6	5	6		10
3" TEE	26.61		4		9	
2" COUPLING	4.68	11	2	11		8
3" COUPLING	7.23		2		4	
3" X 2" REDUCER	11.14		5		10	
GLUED JUNCTIONS	3.25	40	35	40	37	36
ADDITIONAL ITEMS (c)						
4" X 2" TANK BUSHING	2.61					
4" X 3" TANK BUSHING	2.61		3			
2" FLOAT CHECK VALVE	32.55		3			
VENT MANIFOLD DRUM (d)	500.00		1			
BUNGS (e)	100.00	1	1	1	1	1
LABOR COMPONENTS						
TRENCHING (FT) (f)	30.00	205	205	205	180	240
ASSEMBLY (FT) (g)	6.00	205	205	205	180	240
TOTAL PURCHASE COST		2,259	2,370	2,272	1,659	1,511
TOTAL INSTALLATION COST		7,380	7,380	7,380	6,480	8,640
TOTAL DIRECT COST		9,639	9,750	9.652	8,139	10,151

Footnotes are the same as those for Table B-9.

TABLE B-13. MODEL PLANT 5 STAGE II UNDERGROUND DIRECT COST

UNDERGROUND COMPONENTS	UNIT COST	NUMBER OF COMPONENTS				
		BAL-I	BAL-M	HYBRID	ASSIST-1	ASSIST-2
GALVANIZED PIPE (a)						
1" PIPE (FT)	0.89	24	24	24	24	44
2" PIPE (FT)	1.88	2		2		
3" PIPE (FT)	3.86		2			
3/4" CLOSE NIPPLE	0.46	16	16	16	16	16
1" CLOSE NIPPLE	0.70	33	33	33	33	35
2" CLOSE NIPPLE	1.42	3		3		
3" CLOSE NIPPLE	5.41		6		2	
1" ELBOW	1.51	33	33	33	33	36
2" ELBOW	4.48	6		6		
3" ELBOW	20.11		6		2	
1" X 3/4" REDUCER	1.73	16	16	16	16	16
2" X 1" REDUCER	3.84	16	16	16	16	17
3" X 2" REDUCER	13.14		3			
2" X 1" BUSHING	2.81					1
4" X 2" BUSHING	11.09	3		3		1
4" X 3" BUSHING	11.09				1	
1" UNION	1.13					1
2" TEE	6.43					1
FIBERGLASS PIPE (b)						
2" PIPE (FT)	1.89	797	185	797	65	331
3" PIPE (FT)	2.89		171		249	
2" THREADED ADAPTER	7.23	19	19	19	16	18
3" THREADED ADAPTER	10.58		3		1	
2" ELBOW	16.41	32	6	32		8
3" ELBOW	22.02		2		7	
2" TEE	23.50	12	6	12		16
3" TEE	26.61		9		15	
2" COUPLING	4.68	12	2	12		6
3" COUPLING	7.23		3		5	
3" X 2" REDUCER	11.14		10		16	
GLUED JUNCTIONS	3.25	72	57	72	60	40
ADDITIONAL ITEMS (c)						
4" X 2" TANK BUSHING	2.61					
4" X 3" TANK BUSHING	2.61		3			
2" FLOAT CHECK VALVE	32.55		3			
VENT MANIFOLD DRUM (d)	500.00		1			
BUNGS (e)	100.00	1	1	1	1	1
LABOR COMPONENTS						
TRENCHING (FT) (f)	30.00	265	265	265	245	280
ASSEMBLY (FT) (g)	6.00	265	265	265	245	280
TOTAL PURCHASE COST		3,180	3,041	3,180	2,381	1,874
TOTAL INSTALLATION COST		9,540	9,540	9,540	8,820	10,080
TOTAL DIRECT COST		12,720	12,581	12,720	11,201	11,954

Footnotes are the same as those for Table B-9.

the individual balance system (three lines from island to underground tank as opposed to one line for the manifolded system) is assumed equivalent to the additional time required to plumb the service islands when using the manifolded balance system (exact pipe lengths, sloping, additional pipe joints, etc.).

The physical characteristics of the trench for both the manifolded and individual balance systems are basically the same; therefore, the cost of trenching ($/ft) is the same for all systems.

Only two contractors provided the information necessary to determine the cost of installation for the underground piping (I-E-41 and I-E-46). All of those questioned, except one, said that a specific layout was needed before an estimate could be determined; the one exception said that he used a factor of $25 per foot of trench to estimate the cost of trenching (I-E-41).

Due to the time involved in preparing an estimate, only one contractor agreed to provide EPA with an approximate installation cost (I-E-46). The following is an estimate for installing the piping for model plant 3.

Day 1:	Dig Trench		$1,600
	4 man-days at	$200/day	
	1 backhoe-day at	$400/day	
	1 truck-day at	$400/day	
Days 2 & 3:	Lay Pipe		$ 800
	4 man-days at	$200/day	
	Modify Dispensers		$ 800*
	4 man-days at	$200/day	
Day 4:	Fill Trench and Pour Concrete		$1,750
	4 man-days at	$200/day	
	1 truck-day at	$400/day	
	pea gravel - 13 tons at $10/ton		
	concrete - 6 yds at $70/yd		
Day 5:	Lay Asphalt and Clean Up		$1,350
	3 man-days at	$200/day	
	1 truck-day at	$400/day	
	0.5 roller-day at	$400/day	
	asphalt - 5 tons at $30/ton		

Profit: 20-25 percent of total = 22.5%
Trench Length: 165 feet
Trenching = (1600 + 1750 + 1350)(1.225) = $5760/165 ft = $35/ft
Assembly = (800)(1.225) = $980/165 ft = $6/ft

*Not included in total.

The trenching cost estimate was calculated by averaging the above $35/ft and $25/ft value, previously discussed. The cost of pipe assembly was used as shown since $200/day for a pipefitter seemed reasonable. These figures were then combined with the model plant trench lengths (feet) to obtain the installation costs presented in Tables B-9 through B-13.

B.2.3 Summary of Capital Costs

The total capital cost of a control system is the sum of direct costs, indirect costs, and contingency costs. Direct costs include purchased equipment costs (i.e., control devices, auxiliary equipment, instrumentation and controls, and freight and taxes) and installation costs (i.e., foundation and supports, erection and handling, electrical, piping and insulation). Indirect costs consist of in-house engineering design and supervision costs, architect and engineering contractor expenses, contractor fees, construction fees, and preliminary testing costs. All indirect costs have been included in the installation costs, and freight and taxes were assumed to be included in the total purchased equipment costs obtained from control system vendors. Contingency costs include such fees as penalties incurred for failure to meet completion dates set out in performance specifications. Due to the nature of this analysis, contingency costs are not appropriate.

Table B-14 presents the direct cost summary for the five Stage II systems applied to the five model plants. This table summarizes the costs shown in Tables B-2 through B-7 and B-9 through B-13. As can be seen, the use of a single cost basis for a balance system and the use of a single cost basis for an assist system should not bias subsequent cost evaluation because the cost differences between individual and manifolded balance systems and between Assist-1 and Assist-2 systems are very small. In addition, the future installation ratio of these systems is not known.

B.2.4. Annual Costs and Cost Effectiveness

Table B-15 presents an annualized cost breakdown for the model plants. As was the case when determining capital costs, several assumptions had to be made. The following points should be noted in connection with Table B-15.

TABLE B-14. STAGE II DIRECT COST SUMMARY

COMPONENT	COST OF COMPONENT				
MODEL PLANT 1	BAL-I	BAL-M	HYBRID	ASSIST-1	ASSIST-2
DISPENSER PURCHASE COST	1,368	1,368	1,625	1,361	823
AUXILIARY PURCHASE COST	0	0	0	3,975	3,900
PIPING PURCHASE COST	640	1,065	640	632	580
TOTAL PURCHASE COST	2,010	2,430	2,260	5,970	5,300
INSTALLATION COST	3,260	3,260	3,310	4,210	5,650
TOTAL DIRECT COST	5,270	5,690	5,570	10,180	10,950
MODEL PLANT 2					
DISPENSER PURCHASE COST	1,780	1,780	2,110	1,770	1,070
AUXILIARY PURCHASE COST	0	0	0	3,975	3,900
PIPING PURCHASE COST	1,034	1,313	1,034	789	702
TOTAL PURCHASE COST	2,810	3,090	3,140	6,530	5,670
INSTALLATION COST	4,040	4,040	4,110	4,610	6,040
TOTAL DIRECT COST	6,850	7,130	7,250	11,140	11,710
MODEL PLANT 3					
DISPENSER PURCHASE COST	3,560	3,560	4,230	3,540	2,140
AUXILIARY PURCHASE COST	0	0	0	3,975	3,900
PIPING PURCHASE COST	1,780	2,050	1,780	1,250	1,050
TOTAL PURCHASE COST	5,340	5,610	6,010	8,770	7,090
INSTALLATION COST	6,460	6,460	6,590	6,730	8,190
TOTAL DIRECT COST	11,800	12,070	12,600	15,500	15,280
MODEL PLANT 4					
DISPENSER PURCHASE COST	5,330	5,330	6,340	5,310	3,210
AUXILIARY PURCHASE COST	0	0	0	3,975	3,900
PIPING PURCHASE COST	2,260	2,370	2,270	1,660	1,510
TOTAL PURCHASE COST	7,590	7,700	8,610	10,950	8,620
INSTALLATION COST	8,160	8,160	8,360	8,320	10,330
TOTAL DIRECT COST	15,750	15,860	16,970	19,270	18,950
MODEL PLANT 5					
DISPENSER PURCHASE COST	8,890	8,890	10,560	8,850	5,350
AUXILIARY PURCHASE COST	0	0	0	3,975	3,900
PIPING PURCHASE COST	3,180	3,040	3,180	2,380	1,870
TOTAL PURCHASE COST	12,070	11,930	13,740	15,210	11,120
INSTALLATION COST	10,840	10,840	11,170	10,950	12,090
TOTAL DIRECT COST	22,910	22,770	24,910	26,160	23,210

TABLE B-15. STAGE II ANNUAL COST SUMMARY

COMPONENT/SYSTEM (a)	BAL-I	BAL-M	HYBRID	ASSIST-1	ASSIST-2
CAPITAL RECOVERY COST (b)					
MODEL PLANT 1	677	722	735	1,630	1,640
MODEL PLANT 2	881	910	960	1,770	1,740
MODEL PLANT 3	1,560	1,590	1,710	2,380	2,220
MODEL PLANT 4	2,150	2,160	2,370	2,930	2,700
MODEL PLANT 5	3,230	3,210	3,600	3,960	3,350
MAINTENANCE COST (c)					
MODEL PLANT 1	475	475	497	465	406
MODEL PLANT 2	617	617	646	575	498
MODEL PLANT 3	1,234	1,234	1,292	1,050	897
MODEL PLANT 4	1,852	1,852	1,938	1,525	1,295
MODEL PLANT 5	3,086	3,086	3,230	2,475	2,091
INSPECTION COST (d)					
MODEL PLANT 1	0	0	0	0	0
MODEL PLANT 2	0	0	0	0	0
MODEL PLANT 3	0	0	0	0	0
MODEL PLANT 4	0	0	0	0	0
MODEL PLANT 5	0	0	0	0	0
OTHER INDIRECT COSTS (e)					
MODEL PLANT 1	211	228	223	407	438
MODEL PLANT 2	274	285	290	446	468
MODEL PLANT 3	472	483	504	620	611
MODEL PLANT 4	630	635	679	771	758
MODEL PLANT 5	916	911	996	1,046	928
RECOVERY CREDITS (f)					
MODEL PLANT 1	129	129	129	65	65
MODEL PLANT 2	518	518	518	259	259
MODEL PLANT 3	906	906	906	453	453
MODEL PLANT 4	1,683	1,683	1,683	841	841
MODEL PLANT 5	4,790	4,790	4,790	2,395	2,395
ADDITIONAL CREDITS (g)					
MODEL PLANT 1	0	0	0	0	0
MODEL PLANT 2	0	0	0	0	0
MODEL PLANT 3	0	0	0	0	0
MODEL PLANT 4	0	0	0	0	0
MODEL PLANT 5	0	0	0	0	0
TOTAL ANNUALIZED COST					
MODEL PLANT 1	1,230	1,300	1,330	2,440	2,420
MODEL PLANT 2	1,250	1,290	1,380	2,530	2,450
MODEL PLANT 3	2,360	2,400	2,600	3,600	3,270
MODEL PLANT 4	2,950	2,960	3,300	4,380	3,910
MODEL PLANT 5	2,440	2,420	3,040	5,090	3,970

See next page for footnotes.

FOOTNOTES FOR TABLE B-15

[a]Bal-I = Balance-Individual, Bal-M = Balance-Manifolded, Assist-1 = Hirt; Assist-2 = Hasstech; Hybrid = Healy.

[b]Capital Recovery Cost = (Capital Cost) $\frac{i\ (1 + i)^a}{(1 + i)^a - 1}$

where: i = interest rate (10 percent)
a = equipment life (8 years for dispenser and auxiliary equipment; 35 years for underground piping system)

[c]1. Nozzle Maintenance - All Systems.
Replace nozzle every 2 years with new nozzle (same lifetime as standard nozzle); therefore, annual cost equals half the incremental cost between standard nozzle ($50) and vapor recovery nozzle (see Table B-3 for costs). For multiproduct dispensers, the nozzles are assumed to last twice as long; therefore, maintenance costs are half ($25).

2. Hose Maintenance - All Systems.
Replace vapor hose every 2 years (same lifetime as liquid hose on standard dispenser); therefore, annual cost equals half the incremental cost between standard liquid hose ($24.39) and coaxial liquid/vapor recovery hose system ($110.73 from Exhibits B-10, Table B-2).

3. Boot/Faceplate Assembly Maintenance - Balance Systems.
Replace boot/faceplate assembly three times per year; parts cost $19 per replacement and it takes 20 minutes per replacement at $25 per hour.

4. Boot/Faceplate Assembly Maintenance - Assist Systems.
Replace boot/faceplate assembly two times per year; parts cost $15 per replacement and it takes 20 minutes per replacement at $25 per hour.

5. Boot/Faceplate Assembly Maintenance - Hybrid Systems.
Replace boot/faceplate assembly two times per year; parts cost $33 per replacement and it takes 20 minutes per replacement at $25 per hour.

6. Processing Unit Maintenance - Assist Systems.
Maintenance performed once a year by a qualified professional at a cost of $100 per visit.

[d]This expense is included in the government enforcement costs, and thus, it is not attributable to the model plant annual cost.

[e]Value includes property tax (1%), insurance (1%), and administration (2%), equalling 4 percent of the total capital cost.

FOOTNOTES FOR TABLE B-15
(concluded)

[f]Stage II recovery credit calculations:

Balance and Hybrid

Emission factors: Displacement = 1,552 mg/liter
Emptying loss = 120 mg/liter

Assuming 95% recovery of both displacement and emptying losses, recovery factor = (0.95)[(1,552 + 120)mg/liter] = 1,588 mg/liter.

Example of recovery credit:

$$1{,}588\ \text{mg/liter} \times 75{,}700^{*}\ \frac{\text{liters}}{\text{mo.}} \times \frac{\text{kg}}{10^{6}\text{mg}} \times \frac{\text{liter}}{0.67\text{kg}} \times \frac{12\ \text{mo.}}{\text{yr}} \times \$0.24/\text{liter}$$

$$= \$518/\text{year}.$$

Assist 1 & 2

Same emission factors as above.

Assuming 50% recovery of balance system losses, recovery factor = (0.50)(0.95)(1,552 mg/liter + 120 mg/liter) = 794 mg/liter.

Example of recovery credit:

$$794\ \text{mg/liter} \times 75{,}700^{*}\ \frac{\text{liters}}{\text{mo.}} \times \frac{\text{kg}}{10^{6}\text{mg}} \times \frac{\text{liter}}{0.67\text{kg}} \times \frac{12\ \text{mo.}}{\text{yr}} \times \$0.24/\text{liter}$$

$$= \$259/\text{year}.$$

Throughout this analysis, the Model Plant 1 throughput used was 5,000 gallons per month to allow a comparison with the July 1984 analysis. However, the new analysis uses recovery credits based on Model Plant 1a (2,000 gallons per month) and Model Plant 1b (6,000 gallons per month) when calculating nationwide or nonattainment area cost impacts.

[g]No additional credits taken. These could include investment tax credits or energy conservation tax credits.

*Throughput for model plant 2.

1. Discussions with dispenser equipment vendors and the manufacturers of the two assist systems indicated that the additional dispenser equipment needed for Stage II (retractors, flow limiters, hanger kits) and the processing unit equipment will last a minimum of 5 years and should last about 10 years; 8 years was assumed for capital recovery calculation purposes (I-D-45, I-E-22, I-E-23, and I-E-25).
2. Several vendors of fiberglass piping, used quite often for vapor recovery piping in California, were contacted about the expected life of fiberglass pipe used in underground situations. All vendors contacted, except one, indicated that there was no reason why the pipe should ever need replacing (I-E-37 and I-E-38). One indicated that it would last at least 30 years (I-E-38). For purposes of this analysis, the underground piping lifetime for fiberglass pipe was estimated to be 35 years.
3. Additional credits that could be included in the calculation of "Total Annualized Cost" are, for example, investment tax credits or energy conservation tax credits. However, these are not included in this analysis.
4. Rebuilt nozzles were not included in the maintenance scenario due to insufficient data on their use at this time.
5. Currently, the annualized costs do not include enforcement costs. These costs are calculated separately and on a nationwide basis, and are included in the regulatory strategy analysis.
6. The assumptions shown in the Table B-15 footnotes were made to calculate maintenance costs. These assumptions are based on conversations with vendors of Stage II equipment (I-E-20, I-E-22, I-E-24, I-E-26, I-E-27, and I-E-29).
7. Recovery credits are calculated as shown in footnote (f) of Table B-15, using a displacement emission factor of 1,552 mg/liter and an emptying loss emission factor of 120 mg/liter. Also, the cost credit for a liter of gasoline is based on $0.24/liter gasoline ($0.91/gallon).

For balance and hybrid systems, a 95 percent recovery o. both displacement and emptying losses was assumed, while for the assist systems a 50 percent recovery of balance system displacement and emptying losses was assumed. These are theoretical efficiencies used for the purpose of determining per-facility costs. For the regulatory analyses, actual in-use efficiencies were used to calculate recovery credits.

B.3 SUMMARY

Detailed costs were obtained for the five basic Stage II vapor recovery systems. The costs for the two balance systems and the costs for the two assist systems compared favorably enough that a single cost could be used for either balance system and for either assist system. The average cost of the two assist systems was taken to represent a generic cost for the assist system, since the future installation ratio of Assist-1 to Assist-2 systems is not known. Table B-16 presents the generic capital cost summary for each Stage II system type on a model plant basis. These costs are used to compute generic annualized costs on a model plant basis, as shown in Table B-17.

Information gathered also indicated that discounts on nozzles and modification equipment of approximately 30 percent are available to large volume buyers (I-E-18, I-E-24, I-E-26, and I-E-27). Table B-18 shows the generic Stage II capital cost summary with this 30 percent discount included. Table B-18 is used to calculate Table B-19, which shows the generic annualized cost summary including the 30 percent discount.

B.4 INSTALLATION OF STAGE II VAPOR RECOVERY SYSTEMS DURING THE CONSTRUCTION OF A NEW FACILITY

The additional dispenser costs incurred due to the installation of a Stage II system during the construction of a new facility are shown in Table B-20. This table is the same as Table B-2 except that incremental costs above the purchase of conventional refueling equipment were used.

The following specific changes were made:

1) The cost of a single nozzle swivel ($32.75 for an OPW-33 nozzle swivel, I-F-110) was subtracted from the cost of the vapor recovery swivel.

Table B-16. GENERIC STAGE II CAPITAL COST SUMMARY: NO DISCOUNTS
(Retrofit to Existing Facility)

COMPONENT	COST OF COMPONENT		
MODEL PLANT 1	BALANCE	HYBRID	ASSIST
DISPENSER DIRECT COST	1,568	1,880	1,211
AUXILIARY DIRECT COST	0	0	5,238
PIPING DIRECT COST	3,910	3,700	4,120
TOTAL DIRECT COST	5,480	5,580	10,570
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	5,480	5,580	10,570
MODEL PLANT 2			
DISPENSER DIRECT COST	2,040	2,440	1,570
AUXILIARY DIRECT COST	0	0	5,238
PIPING DIRECT COST	4,950	4,810	4,620
TOTAL DIRECT COST	6,990	7,250	11,430
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	6,990	7,250	11,430
MODEL PLANT 3			
DISPENSER DIRECT COST	4,080	4,880	3,150
AUXILIARY DIRECT COST	0	0	5,238
PIPING DIRECT COST	7,860	7,720	7,000
TOTAL DIRECT COST	11,940	12,600	15,390
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	11,940	12,600	15,390
MODEL PLANT 4			
DISPENSER DIRECT COST	6,110	7,310	4,720
AUXILIARY DIRECT COST	0	0	5,238
PIPING DIRECT COST	9,690	9,650	9,140
TOTAL DIRECT COST	15,800	16,960	19,100
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	15,800	16,960	19,100
MODEL PLANT 5			
DISPENSER DIRECT COST	10,190	12,190	7,870
AUXILIARY DIRECT COST	0	0	5,238
PIPING DIRECT COST	12,650	12,720	11,580
TOTAL DIRECT COST	22,840	24,910	24,690
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	22,840	24,910	24,690

Table B-17. GENERIC STAGE II ANNUAL COST SUMMARY: NO DISCOUNTS
(Retrofit to Existing Facility)

COMPONENT	ANNUAL COST OF COMPONENT		
	BALANCE	HYBRID	ASSIST
MODEL PLANT 1			
CAPITAL RECOVERY COST	700	735	1,640
MAINTENANCE COST	475	497	436
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	220	223	423
RECOVERY CREDIT	129	129	65
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	1,270	1,330	2,430
MODEL PLANT 2			
CAPITAL RECOVERY COST	896	960	1,760
MAINTENANCE COST	617	646	537
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	280	290	457
RECOVERY CREDIT	518	518	259
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	1,280	1,380	2,500
MODEL PLANT 3			
CAPITAL RECOVERY COST	1,580	1,710	2,300
MAINTENANCE COST	1,230	1,292	970
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	478	504	616
RECOVERY CREDIT	906	906	453
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	2,380	2,600	3,430
MODEL PLANT 4			
CAPITAL RECOVERY COST	2,160	2,370	2,820
MAINTENANCE COST	1,852	1,938	1,410
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	633	679	765
RECOVERY CREDIT	1,683	1,683	841
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	2,960	3,300	4,150
MODEL PLANT 5			
CAPITAL RECOVERY COST	3,220	3,600	3,660
MAINTENANCE COST	3,090	3,230	2,280
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	914	996	987
RECOVERY CREDIT	4,790	4,790	2,400
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	2,430	3,040	4,530

Table B-18. GENERIC STAGE II CAPITAL COST SUMMARY: WITH DISCOUNTS
(Retrofit to Existing Facility)

COMPONENT	COST OF COMPONENT		
MODEL PLANT 1	BALANCE	HYBRID	ASSIST
DISPENSER DIRECT COST	1,157	1,390	883
AUXILIARY DIRECT COST	0	0	5,238
PIPING DIRECT COST	3,910	3,700	4,120
TOTAL DIRECT COST	5,070	5,090	10,240
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	5,070	5,090	10,240
MODEL PLANT 2			
DISPENSER DIRECT COST	1,500	1,800	1,150
AUXILIARY DIRECT COST	0	0	5,238
PIPING DIRECT COST	4,950	4,810	4,620
TOTAL DIRECT COST	6,450	6,610	11,010
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	6,450	6,610	11,010
MODEL PLANT 3			
DISPENSER DIRECT COST	3,010	3,610	2,300
AUXILIARY DIRECT COST	0	0	5,238
PIPING DIRECT COST	7,860	7,720	7,000
TOTAL DIRECT COST	10,870	11,330	14,540
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	10,870	11,330	14,540
MODEL PLANT 4			
DISPENSER DIRECT COST	4,510	5,410	3,440
AUXILIARY DIRECT COST	0	0	5,238
PIPING DIRECT COST	9,690	9,650	9,140
TOTAL DIRECT COST	14,200	15,060	17,820
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	14,200	15,060	17,820
MODEL PLANT 5			
DISPENSER DIRECT COST	7,520	9,020	5,740
AUXILIARY DIRECT COST	0	0	5,238
PIPING DIRECT COST	12,650	12,720	11,580
TOTAL DIRECT COST	20,170	21,740	22,560
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	20,170	21,740	22,560

Table B-19. GENERIC STAGE II ANNUAL COST SUMMARY: WITH DISCOUNTS
(Retrofit to Existing Facility)

COMPONENT	ANNUAL COST OF COMPONENT		
	BALANCE	HYBRID	ASSIST
MODEL PLANT 1			
CAPITAL RECOVERY COST	623	644	1,580
MAINTENANCE COST	475	497	436
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	203	204	410
RECOVERY CREDIT	129	129	65
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	1,170	1,220	2,360
MODEL PLANT 2			
CAPITAL RECOVERY COST	832	880	1,710
MAINTENANCE COST	617	646	537
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	266	273	446
RECOVERY CREDIT	518	518	259
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	1,200	1,280	2,430
MODEL PLANT 3			
CAPITAL RECOVERY COST	1,380	1,480	2,140
MAINTENANCE COST	1,230	1,292	970
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	435	453	581
RECOVERY CREDIT	906	906	453
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	2,140	2,320	3,240
MODEL PLANT 4			
CAPITAL RECOVERY COST	1,860	2,010	2,580
MAINTENANCE COST	1,852	1,938	1,410
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	569	602	713
RECOVERY CREDIT	1,683	1,683	841
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	2,600	2,870	3,860
MODEL PLANT 5			
CAPITAL RECOVERY COST	2,720	3,010	3,260
MAINTENANCE COST	3,090	3,230	2,280
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	807	870	902
RECOVERY CREDIT	4,790	4,790	2,400
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	1,830	2,320	4,040

TABLE B-20. BALANCE DISPENSE MODIFICATION EQUIPMENT PURCHASE COST[a]
(New Facility)

	COST OF COMPONENT		
EXHIBIT 4	LOW	HIGH	AVERAGE
HIGH HOSE RETRACTOR	94.00	102.50	96.08
SWIVELS-NOZZLES	9.65	42.25	22.12
SWIVELS-ISL OR DISP	21.50	21.50	21.50
SWIVELS-RETRACT	0.00	0.00	0.00
FLOW LIMITER	20.00	20.00	20.00
HOSE	13.50	35.28	24.39
DISP-HOOK & HANDLE	16.00	38.00	27.00
TOTAL PURCHASE COST	174.65	259.53	211.09
EXHIBIT 5	LOW	HIGH	AVERAGE
HIGH HOSE RETRACTOR	94.00	102.50	96.08
SWIVELS-NOZZLES	7.25	26.05	16.65
SWIVELS-ISL OR DISP	41.55	64.85	53.20
SWIVELS-RETRACT	8.08	8.08	8.08
FLOW LIMITER	20.00	20.00	20.00
HOSE	75.61	75.61	75.61
DISP-HOOK & HANDLE	16.00	38.00	27.00
TOTAL PURCHASE COST	262.49	335.09	296.62
EXHIBIT 6	LOW	HIGH	AVERAGE
HIGH HOSE RETRACTOR	94.00	102.50	96.08
SWIVELS-NOZZLES	9.65	42.25	22.12
SWIVELS-ISL OR DISP	21.50	21.50	21.50
SWIVELS-RETRACT	0.00	0.00	0.00
FLOW LIMITER	20.00	20.00	20.00
HOSE	44.56	55.45	50.00
DISP-HOOK & HANDLE	16.00	38.00	27.00
TOTAL PURCHASE COST	205.71	279.70	236.70
EXHIBIT 7	LOW	HIGH	AVERAGE
HIGH HOSE RETRACTOR	94.00	102.50	96.08
SWIVELS-NOZZLES	9.65	42.25	22.12
SWIVELS-ISL OR DISP	0.00	0.00	0.00
SWIVELS-RETRACT	8.08	8.08	8.08
FLOW LIMITER	20.00	20.00	20.00
HOSE	13.50	35.28	24.39
DISP-HOOK & HANDLE	16.00	38.00	27.00
TOTAL PURCHASE COST	161.23	246.11	197.67
AVG TOTAL PURCHASE COST	201.02	280.11	360.00

[a]See docket entries I-E-18, I-E-19, I-E-20, I-E-22, I-E-26, I-E-27, I-E-31, I-E-32, I-E-58, I-E-62, I-E-63, I-E-64, I-E-65, I-E-66, I-E-67, I-F-110, and I-F-111.

TABLE B-20. BALANCE DISPENSER MODIFICATION EQUIPMENT PURCHASE COST[a]
(New Facility) (concluded)

	Low	High	Avg.
Exhibit 8	Low	High	Avg.
Overhead Hose Retractor	94.00	102.50	96.08
Swivels for Nozzles	47.25	84.85	66.05
Swivels for Islands or Disp.	0.00	0.00	0.00
Swivel for Retractor	40.00	58.80	49.40
Flow Limiter	20.00	20.00	20.00
Hose	65.61	88.11	79.06
Liquid Removal Venturi	0.00	0.00	0.00
Dispenser Modification	38.00	55.00	46.50
	304.86	409.26	357.09
Exhibit 9	Low	High	Avg.
Overhead Hose Retractor	85.84	100.00	92.92
Swivels for Nozzles	47.25	84.85	66.05
Swivels for Islands or Disp.	0.00	0.00	0.00
Swivel for Retractor	40.00	58.80	49.40
Flow Limiter	20.00	20.00	20.00
Hose	70.61	94.36	84.53
Liquid Removal Venturi	0.00	0.00	0.00
Dispenser Modification	54.17	54.17	54.17
	317.87	412.18	367.07
Exhibit 10	Low	High	Avg.
Overhead Hose Retractor	0.00	0.00	0.00
Swivels for Nozzles	7.25	26.05	16.65
Swivels for Islands or Disp.	0.00	0.00	0.00
Swivel for Retractor	40.00	58.80	49.40
Flow Limiter	20.00	20.00	20.00
Hose	80.61	106.86	95.43
Liquid Removal Venturi	200.00	200.00	200.00
Dispenser Modification	54.17	54.17	54.17
	402.03	465.88	435.65

2) The cost of a single island or dispenser swivel ($17.25) was subtracted from the island or dispenser vapor recovery swivel cost. This subtracted cost is the average cost of the OPW-36E ($18.40), OPW-36S-5080 ($15.35), and the OPW-36S-5090 ($18.00) (I-F-110).

3) The cost of a single hose ($24.39) was subtracted from the coaxial hose cost shown in Exhibit 5.

4) For new facilities, it was assumed that 75 percent would use MPD's and 25 percent would use conventional dispensers.

Table B-21 shows the aboveground cost for the installation of a Stage II system during the construction of a new facility at model plant 2. This table is the same as Table B-4 except that the unit costs have changed as follows:

1) The nozzle cost for all the systems is the cost shown in Table B-4, minus the cost of a conventional nozzle ($50) (I-F-110 and I-F-111).

2) The modification equipment cost for a balance system is taken from Table B-20.

3) The modification cost for Assist-1 is the same as the balance cost plus the cost of a ball check valve ($17) (I-E-23).

4) The modification cost for the hybrid system includes the Model 100 jet pump, Model CX-6 adapter, Model S swivel, Model CX hoses, Model 143 control valve, and an installation kit, minus the cost of a single hose ($24.39) (I-E-25).

5) The installation cost for all systems is assumed to be zero. It was assumed that there would be no additional cost because the new dispensers would come equipped for Stage II.

The per-nozzle costs for model plants 1, 3, 4, and 5 are the same as those for model plant 2.

Table B-22 shows the underground cost incurred due to the installation of a Stage II system during the construction of a new facility at model plant 2. This table is the same as Table B-9 except it is assumed that there would be no additional cost for trenching since the product lines and vapor return lines could be put into the same trench, and no bungs are required since the tanks would already be equipped for Stage II. The same unit costs are used for piping lengths associated with model plants 1, 3, 4, and 5.

TABLE B-21. MODEL PLANT 2 STAGE II ABOVEGROUND DIRECT COST

ABOVEGROUND COMPONENTS	UNIT COST	NUMBER OF COMPONENTS				
		BAL-I	BAL-M	HYBRID	ASSIST-1	ASSIST-2
DISPENSER COMPONENTS						
NOZZLE BALANCE (a)	147	3.75	3.75			
NOZZLE HYBRID (b)	165			3.75		
NOZZLE ASSIST-1 (c)	129				3 75	
NOZZLE ASSIST-2 (d)	74					3.75
MOD EQUIP BALANCE (e)	360	3.75	3.75			
MOD EQUIP HYBRID (f)	411			3.75		
MOD EQUIP ASSIST-1 (g)	377				3.75	
MOD EQUIP ASSIST-2 (h)	205					3.75
AUXILIARY ITEMS (i)						
ASSIST-1	3,975				1 00	
ASSIST-2	3,900					1.00
INSTALLATION						
BALANCE DISPENSER	0	3.75	3.75			
HYBRID DISPENSER	0			3.75		
ASSIST-1 DISPENSER	0				3.75	
ASSIST-2 DISPENSER	0					3.75
ASSIST-1 AUXILIARY	1,400				1.00	
ASSIST-2 AUXILIARY	1,200					1.00
DISPENSER PURCHASE COST		1,901	1,901	2,159	1,892	1,046
AUX ITEMS PURCHASE COST		0	0	0	3,975	3,900
DISP INSTALLATION COST		0	0	0	0	0
AUX INSTALLATION COST		0	0	0	1,400	1,200
DISPENSER DIRECT COST		1,901	1,901	2,159	1,892	1,046
AUX ITEMS DIRECT COST		0	0	0	5,375	5,100
TOTAL DIRECT COST		1,901	1,901	2,159	7,267	6,146

(a) Average cost of nozzles certified by California for use with a balance system minus the cost of a normal nozzle ($50) (I-E-28, I-F-110, and I-F-111).

(b) Actual cost of the Healy Model 200 minus the cost of a normal nozzle ($50), (I-E-25).

(c) Average cost of the nozzles certified by California for use with the Hirt system minus the cost of a normal nozzle ($50), (I-E-28, I-F-110, and I-F-111).

(d) Actual cost of the Husky Model HP-2 nozzle minus the cost of a normal nozzle ($50), (I-F-106).

(e) Modification equipment includes the average cost of the high-hang retractor system, swivels, flow limiter, and hoses as certified by California (see Tables 1 and 20).

(f) Modification equipment includes the Model 100 jet pump, Model CX-6 adapter, Model S swivel, Model CX hose, Model 143 control valve, and an installation kit minus the cost of a single hose ($24.39), (I-E-25).

(g) Modification equipment includes the same equipment as listed for the balance system (footnote "f") plus a ball check valve (I-E-23 and Tables 1 and 2).

(h) Modification equipment includes the Hasstech vapor hose, ITT flow control valve, A.Y. McDonald impact valve, hose swivels, and Hasstech Model 1025 flame arrestor (I-F-106).

(i) Auxiliary equipment includes a P/V valve, collection unit, and processing unit (I-E-23)

TABLE B-22. MODEL PLANT 2 STAGE II UNDERGROUND DIRECT COST

UNDERGROUND COMPONENTS	UNIT COST	NUMBER OF COMPONENTS				
		BAL-I	BAL-M	HYBRID	ASSIST-1	ASSIST-2
GALVANIZED PIPE (a)						
1" PIPE (FT)	0.89	6	6	6	6	6[illegible]
2" PIPE (FT)	1.88	2	2	2		
3" PIPE (FT)	3.86					
3/4" CLOSE NIPPLE	0.46	4	4	4	4	4
1" CLOSE NIPPLE	0.70	8	8	8	8	1[illegible]
2" CLOSE NIPPLE	1.42	3	3	3		
3" CLOSE NIPPLE	5.41				2	
1" ELBOW	1.51	8	8	8	8	11
2" ELBOW	4.48	6	6	6		
3" ELBOW	20.11				2	
1" X 3/4" REDUCER	1.73	4	4	4	4	4
2" X 1" REDUCER	3.84	4	4	4	4	5
3" X 2" REDUCER	13.14					
2" X 1" BUSHING	2.81					1
4" X 2" BUSHING	11.09	3		3		1
4" X 3" BUSHING	11.09				1	
1" UNION	1.13					1
2" TEE	6.43					1
FIBERGLASS PIPE (b)						
2" PIPE (FT)	1.89	273	140	273	15	85
3" PIPE (FT)	2.89				83	
2" THREADED ADAPTER	7.23	7	7	7	4	6
3" THREADED ADAPTER	10.58				2	
2" ELBOW	16.41	6	3	6		4
3" ELBOW	22.82				2	
2" TEE	23.50	0	2	0		4
3" TEE	26.61		0		3	
2" COUPLING	4.68	8	2	8		3
3" COUPLING	7.23				2	
3" X 2" REDUCER	11.14		0		4	
GLUED JUNCTIONS	3.25	17	11	17	15	16
ADDITIONAL ITEMS (c)						
4" X 2" TANK BUSHING	2.61		3			
4" X 3" TANK BUSHING	2.61					
2" FLOAT CHECK VALVE	32.55		3			
VENT MANIFOLD DRUM (d)	500.00		1			
BUNGS (e)	0.00					
LABOR COMPONENTS						
TRENCHING (FT) (f)	0.00	105	105	105	85	130
ASSEMBLY (FT) (g)	6.00	105	105	105	85	130
TOTAL PURCHASE COST		869	1,140	869	646	550
TOTAL INSTALLATION COST		630	630	630	510	780
TOTAL DIRECT COST		1,499	1,770	1,499	1,156	1,330

See footnotes next page.

FOOTNOTES FOR TABLE B-22

[a]Reference I-E-33.

[b]Reference I-E-34.

[c]Reference I-F-110.

[d]Unit cost is an estimated cost since no information on this was readily available.

[e]Not needed on new tanks.

[f]Cost is absorbed in trenching cost for product lines.

[g]Reference I-E-46 (see text accompanying Table B-9 for discussion).

Tables B-23 and B-24 present the capital cost and annualized cost breakdown for the model plants. The same basic assumptions used in Tables B-14 and B-15 are used here; however, for new facilities more nozzles are assumed in the analysis based upon 25 percent single dispensers and 75 percent multiproduct dispensers (vs. 75 percent single dispensers and 25 percent multiproduct dispensers for existing facilities).

Table B-25 presents the generic capital cost summary for each Stage II system type on a model plant basis. The costs shown are used to compute generic annualized costs on a model plant basis, as shown in Table B-26. Table B-27 shows the generic Stage II capital cost summary, assuming the 30 percent discount for large volume buyers. This table is used to calculate Table B-28, which shows the generic annualized cost summary including the 30 percent discount.

TABLE B-23. STAGE II DIRECT COST SUMMARY (NEW FACILITY)

COMPONENT	COST OF COMPONENT				
MODEL PLANT 1	BAL-I	BAL-M	HYBRID	ASSIST-1	ASSIST-2
DISPENSER EQUIPMENT	1,775	1,775	2,015	1,766	977
AUXILIARY EQUIPMENT	0	0	0	3,975	3,900
UNDERGROUND PIPING	548	959	548	586	517
TOTAL PURCHASE COST	2,320	2,730	2,560	6,330	5,390
INSTALLATION COST	510	510	510	1,850	1,920
TOTAL DIRECT COST	2,830	3,240	3,070	8,180	7,310
MODEL PLANT 2					
DISPENSER EQUIPMENT	1,900	1,900	2,160	1,890	1,050
AUXILIARY EQUIPMENT	0	0	0	3,975	3,900
UNDERGROUND PIPING	869	1,140	869	646	550
TOTAL PURCHASE COST	2,770	3,040	3,030	6,510	5,500
INSTALLATION COST	630	630	630	1,910	1,980
TOTAL DIRECT COST	3,400	3,670	3,660	8,420	7,480
MODEL PLANT 3					
DISPENSER EQUIPMENT	3,800	3,800	4,320	3,780	2,090
AUXILIARY EQUIPMENT	0	0	0	3,975	3,900
UNDERGROUND PIPING	1,630	1,880	1,630	1,150	920
TOTAL PURCHASE COST	5,430	5,680	5,950	8,910	6,910
INSTALLATION COST	990	990	990	2,240	2,310
TOTAL DIRECT COST	6,420	6,670	6,940	11,150	9,220
MODEL PLANT 4					
DISPENSER EQUIPMENT	5,700	5,700	6,480	5,680	3,140
AUXILIARY EQUIPMENT	0	0	0	3,975	3,900
UNDERGROUND PIPING	2,120	2,200	2,130	1,580	1,410
TOTAL PURCHASE COST	7,820	7,900	8,610	11,240	8,450
INSTALLATION COST	1,230	1,230	1,230	2,480	2,640
TOTAL DIRECT COST	9,050	9,130	9,840	13,720	11,090
MODEL PLANT 5					
DISPENSER EQUIPMENT	9,510	9,510	10,790	9,460	5,230
AUXILIARY EQUIPMENT	0	0	0	3,975	3,900
UNDERGROUND PIPING	3,070	2,930	3,070	2,390	1,840
TOTAL PURCHASE COST	12,580	12,440	13,860	15,830	10,970
INSTALLATION COST	1,590	1,590	1,590	2,870	2,880
TOTAL DIRECT COST	14,170	14,030	15,450	18,700	13,850

Table B-24. STAGE II ANNUAL COST SUMMARY (NEW FACILITY)

COMPONENT/SYSTEM (a)	BAL-I	BAL-M	HYBRID	ASSIST-1	ASSIST-2
CAPITAL RECOVERY COST (b)					
MODEL PLANT 1	442	485	487	1,450	1,270
MODEL PLANT 2	512	540	560	1,480	1,290
MODEL PLANT 3	980	1,010	1,080	1,920	1,560
MODEL PLANT 4	1,420	1,420	1,560	2,350	1,840
MODEL PLANT 5	2,270	2,250	2,510	3,180	2,300
MAINTENANCE COST (c)					
MODEL PLANT 1	600	600	623	556	497
MODEL PLANT 2	643	643	668	588	525
MODEL PLANT 3	1,290	1,290	1,340	1,080	950
MODEL PLANT 4	1,930	1,930	2,000	1,560	1,370
MODEL PLANT 5	3,210	3,210	3,340	2,540	2,220
INSPECTION COST (d)					
MODEL PLANT 1	0	0	0	0	0
MODEL PLANT 2	0	0	0	0	0
MODEL PLANT 3	0	0	0	0	0
MODEL PLANT 4	0	0	0	0	0
MODEL PLANT 5	0	0	0	0	0
OTHER INDIRECT COSTS (e)					
MODEL PLANT 1	113	130	123	327	293
MODEL PLANT 2	136	147	146	337	299
MODEL PLANT 3	257	267	277	446	369
MODEL PLANT 4	362	365	393	548	444
MODEL PLANT 5	567	561	618	748	554
RECOVERY CREDITS (f)					
MODEL PLANT 1	129	129	129	65	65
MODEL PLANT 2	518	518	518	259	259
MODEL PLANT 3	906	906	906	453	453
MODEL PLANT 4	1,683	1,683	1,683	841	841
MODEL PLANT 5	4,790	4,790	4,790	2,395	2,395
ADDITIONAL CREDITS (g)					
MODEL PLANT 1	0	0	0	0	0
MODEL PLANT 2	0	0	0	0	0
MODEL PLANT 3	0	0	0	0	0
MODEL PLANT 4	0	0	0	0	0
MODEL PLANT 5	0	0	0	0	0
TOTAL ANNUALIZED COST					
MODEL PLANT 1	1,030	1,090	1,100	2,270	2,000
MODEL PLANT 2	770	810	860	2,150	1,860
MODEL PLANT 3	1,620	1,660	1,790	2,990	2,430
MODEL PLANT 4	2,030	2,030	2,270	3,620	2,810
MODEL PLANT 5	1,260	1,230	1,680	4,070	2,680

See next page for footnotes.

FOOTNOTES FOR TABLE B-24

[a]Assist-1 = Hirt; Assist-2 = Hasstech; Hybrid = Healy.

[b]Cost of Capital = (Capital Cost) $\frac{i(1+i)^a}{(1+i)^a - 1}$

where: i = interest rate (10 percent)
a = equipment life (8 years for dispenser and auxiliary equipment; 35 years for underground piping system)

[c]1. Nozzle Maintenance - All Systems.
Replace nozzle every 2 years with new nozzle (same lifetime as standard nozzle); therefore annual cost equals half the incremental cost between standard nozzle ($50) and vapor recovery nozzle.

2. Hose Maintenance - All Systems.
Replace vapor hose every 2 years (same lifetime as liquid hose on standard dispenser); therefore, annual cost equals half the incremental cost between standard liquid hose ($24.39) and liquid/vapor recovery hose system ($110.73 from Exhibits 8-10, Table B-2).

3. Boot/Faceplate Assembly Maintenance - Balance Systems.
Replace boot/faceplate assembly three times per year; parts cost $19 per replacement and it takes 20 minutes per replacement at $25 per hour.

4. Boot/Faceplate Assembly Maintenance - Assist Systems.
Replace boot/faceplate assembly two times per year; parts cost $15 per replacement and it takes 20 minutes per replacement at $25 per hour.

5. Boot/Faceplate Assembly Maintenance - Hybrid Systems.
Replace boot/faceplate assembly two times per year; parts cost $33 per replacement and it takes 20 minutes per replacement at $25 per hour.

6. Processing Unit Maintenance - Assist Systems.
Maintenance performed once a year by a qualified professional at a cost of $100 per visit.

[d]This expense is included in the government enforcement costs and, thus, it is not attributable to the model plant annual cost.

[e]Value includes property tax (1%), insurance (1%), and administration (2%), equalling 4 percent of the total capital cost.

[f]Stage II recovery credit calculations:

<u>Balance and Hybrid</u>

Emission factors: Displacement = 1,552 mg/liter
Emptying loss = 120 mg/liter

FOOTNOTES FOR TABLE B-24
(concluded)

Assuming 95% recovery of both displacement and emptying losses,

recovery factor = ((1,552 mg/liter)(.95)) + ((120 mg/liter)(.95)) =

1,588 mg/liter.

Example of recovery credit:

$$1{,}588 \text{ mg/liter} \times 75{,}700^* \frac{\text{liters}}{\text{mo.}} \times \frac{\text{kg}}{10^6\text{mg}} \times \frac{\text{liter}}{0.67\text{kg}} \times \frac{12 \text{ mo.}}{\text{yr}} \times \$0.24/\text{liter}$$

= $518/year.

<u>Assist 1 & 2</u>

Assuming 50% recovery of balance system losses, recovery factor =

(0.50)(0.95)(1,552 mg/liter) + (120 mg/liter) = 794 mg/liter.

Example of recovery credit:

$$794 \text{ mg/liter} \times 75{,}700^* \frac{\text{liters}}{\text{mo.}} \times \frac{\text{kg}}{10^6\text{mg}} \times \frac{\text{liter}}{0.67\text{kg}} \times \frac{12 \text{ mo.}}{\text{yr}} \times \$0.24/\text{liter}$$

= $259/year.

[f]Throughout this analysis, the Model Plant 1 throughput used was 5,000 gallons per month to allow a comparison with the July 1984 analysis. However, the new analysis uses recovery credits based on Model Plant 1a (2,000 gallons per month) and Model Plant 1b (6,000 gallons per month) when calculating nationwide or nonattainment area cost impacts.

[g]No additional credits taken. These could include investment tax credits or energy conservation tax credits.

*Throughput for model plant 2.

Table B-25. GENERIC STAGE II CAPITAL COST SUMMARY: N(DISCOUNTS
(NEW STATION COSTS)

COMPONENT	COST OF COMPONENT		
MODEL PLANT 1	BALANCE	HYBRID	ASSIST
DISPENSER DIRECT COST	1,775	2,010	1,371
AUXILIARY DIRECT COST	0	0	5,238
PIPING DIRECT COST	1,260	1,060	1,140
TOTAL DIRECT COST	3,030	3,070	7,750
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	3,030	3,070	7,750
MODEL PLANT 2			
DISPENSER DIRECT COST	1,900	2,160	1,470
AUXILIARY DIRECT COST	0	0	5,238
PIPING DIRECT COST	1,630	1,500	1,240
TOTAL DIRECT COST	3,530	3,660	7,950
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	3,530	3,660	7,950
MODEL PLANT 3			
DISPENSER DIRECT COST	3,800	4,320	2,940
AUXILIARY DIRECT COST	0	0	5,238
PIPING DIRECT COST	2,740	2,620	2,010
TOTAL DIRECT COST	6,540	6,940	10,190
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	6,540	6,940	10,190
MODEL PLANT 4			
DISPENSER DIRECT COST	5,700	6,480	4,410
AUXILIARY DIRECT COST	0	0	5,238
PIPING DIRECT COST	3,390	3,360	2,750
TOTAL DIRECT COST	9,090	9,840	12,400
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	9,090	9,840	12,400
MODEL PLANT 5			
DISPENSER DIRECT COST	9,510	10,790	7,350
AUXILIARY DIRECT COST	0	0	5,238
PIPING DIRECT COST	4,590	4,660	3,690
TOTAL DIRECT COST	14,100	15,450	16,280
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	14,100	15,450	16,280

Table B-26. GENERIC STAGE II ANNUAL COST SUMMARY: NO DISCOUNTS
(NEW STATION COSTS)

COMPONENT	ANNUAL COST OF COMPONENT		
	BALANCE	HYBRID	ASSIST
MODEL PLANT 1			
CAPITAL RECOVERY COST	464	487	1,360
MAINTENANCE COST	600	623	527
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	122	123	310
RECOVERY CREDIT	129	129	65
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	1,060	1,100	2,130
MODEL PLANT 2			
CAPITAL RECOVERY COST	526	560	1,390
MAINTENANCE COST	643	668	557
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	142	146	318
RECOVERY CREDIT	518	518	259
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	790	860	2,010
MODEL PLANT 3			
CAPITAL RECOVERY COST	1,000	1,080	1,740
MAINTENANCE COST	1,290	1,340	1,020
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	262	277	408
RECOVERY CREDIT	906	906	453
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	1,650	1,790	2,720
MODEL PLANT 4			
CAPITAL RECOVERY COST	1,420	1,560	2,100
MAINTENANCE COST	1,930	2,000	1,465
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	364	393	496
RECOVERY CREDIT	1,683	1,683	841
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	2,030	2,270	3,220
MODEL PLANT 5			
CAPITAL RECOVERY COST	2,260	2,510	2,740
MAINTENANCE COST	3,210	3,340	2,380
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	564	618	651
RECOVERY CREDIT	4,790	4,790	2,400
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	1,240	1,680	3,370

Table B-27. GENERIC STAGE II CAPITAL COST SUMMARY: WITH DISCOUNTS (NEW STATION COSTS)

COMPONENT	COST OF COMPONENT		
MODEL PLANT 1	BALANCE	HYBRID	ASSIST
DISPENSER EQUIPMENT	1,242	1,410	960
AUXILIARY EQUIPMENT	0	0	5,238
UNDERGROUND PIPING	1,260	1,060	1,140
TOTAL DIRECT COST	2,500	2,470	7,340
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	2,500	2,470	7,340
MODEL PLANT 2			
DISPENSER EQUIPMENT	1,330	1,510	1,030
AUXILIARY EQUIPMENT	0	0	5,238
UNDERGROUND PIPING	1,630	1,500	1,240
TOTAL DIRECT COST	2,960	3,010	7,510
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	2,960	3,010	7,510
MODEL PLANT 3			
DISPENSER EQUIPMENT	2,660	3,020	2,060
AUXILIARY EQUIPMENT	0	0	5,238
UNDERGROUND PIPING	2,740	2,620	2,010
TOTAL DIRECT COST	5,400	5,640	9,310
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	5,400	5,640	9,310
MODEL PLANT 4			
DISPENSER EQUIPMENT	3,990	4,530	3,090
AUXILIARY EQUIPMENT	0	0	5,238
UNDERGROUND PIPING	3,390	3,360	2,750
TOTAL DIRECT COST	7,380	7,890	11,080
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	7,380	7,890	11,080
MODEL PLANT 5			
DISPENSER EQUIPMENT	6,650	7,550	5,140
AUXILIARY EQUIPMENT	0	0	5,238
UNDERGROUND PIPING	4,590	4,660	3,690
TOTAL DIRECT COST	11,240	12,210	14,070
TOTAL INDIRECT COST	0	0	0
TOTAL CAPITAL COST	11,240	12,210	14,070

Table B-28. GENERIC STAGE II ANNUAL COST SUMMARY: WITH DISCOUNTS (NEW STATION COSTS)

COMPONENT	ANNUAL COST OF COMPONENT		
	BALANCE	HYBRID	ASSIST
MODEL PLANT 1			
CAPITAL RECOVERY COST	364	374	1,280
MAINTENANCE COST	600	623	527
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	100	99	294
RECOVERY CREDIT	129	129	65
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	940	970	2,040
MODEL PLANT 2			
CAPITAL RECOVERY COST	419	440	1,310
MAINTENANCE COST	643	668	557
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	119	120	300
RECOVERY CREDIT	518	518	259
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	660	710	1,910
MODEL PLANT 3			
CAPITAL RECOVERY COST	790	840	1,580
MAINTENANCE COST	1,290	1,340	1,020
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	216	226	373
RECOVERY CREDIT	906	906	453
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	1,390	1,500	2,520
MODEL PLANT 4			
CAPITAL RECOVERY COST	1,100	1,200	1,850
MAINTENANCE COST	1,930	2,000	1,465
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	296	316	443
RECOVERY CREDIT	1,683	1,683	841
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	1,640	1,830	2,920
MODEL PLANT 5			
CAPITAL RECOVERY COST	1,730	1,900	2,330
MAINTENANCE COST	3,210	3,340	2,380
INSPECTION COST	0	0	0
OTHER INDIRECT COSTS	450	489	563
RECOVERY CREDIT	4,790	4,790	2,400
ADDITIONAL CREDITS	0	0	0
TOTAL ANNUALIZED COST	600	940	2,870

B.5 REFERENCES[a]

I-A-55 Evaluation of Air Pollution Regulatory Strategies for Gasoline Marketing Industry. U.S. EPA. Research Triangle Park, NC. EPA-450/3-84-012a. July 1984.

I-D-45 Letter from Bradt, R.D., Hirt Combustion Engineers, to Purcell, R., Pacific Environmental Services, Incorporated. January 29, 1985. Stage II gasoline station vapor control.

I-D-39 Letter from Treadway, R.W., Dayco Corporation, to Eldridge, K.M., PES, Inc. December 26, 1984. Prices of various Dayco products.

I-E-18 Telecon. Eldridge, K., PES, Inc., with Nye, A., Zallay Packing & Seal, Cleveland, Ohio. October 16, 1984. Cost of the Searle Leather & Packing B-1399 Retractor.

I-E-19 Telecon. Eldridge, K., PES, Inc., with Strag, I., B.F. Goodrich, Akron, Ohio. October 16, 1984. Cost of B.F. Goodrich coaxial hose assembly (B.F. Goodrich Co-Ax).

I-E-20 Telecon. Levine, A., William M. Wilson's Sons, Inc. (Gasboy), Pomona, California, with Eldridge, K., PES, Inc. October 18, 1984. Cost of high-retractor hose configurations Gasboy Model 90-750-2 and high-retractor dispenser Gasboy Series 50.

I-E-21 Telecon. Purcell, R., PES, Inc., with Crist, J., W.F. Crist Company. October 26, 1984. Costs for certified P/V valves B-1 Varec.

I-E-22 Telecon. Eldridge, K., PES, Inc., with Simon, J., Petro Vending, Brookfield, Illinois. October 26, 1984. Cost and life expectancy of PV-8 cord.

I-E-23 Telecon. Purcell, R., PES, Inc., with Taylor, B., Hirt Combustion Engineers, Montebello, California. October 26, 1984. Costs for Hirt Stage II components.

I-E-24 Telecon. Crosby, B., Gilbarco, Greensboro, North Carolina, with Eldridge, K., PES, Inc. October 29, 1984. Price of Gilbarco components dispenser (high-hang hose configuration) MPD-2.

I-E-25 Telecon. Purcell, R., PES, Inc., with Healy, J., Cambridge Engineering, Inc. October 29, 1984. Costs for Healy Jet Pump Phase II system.

I-E-26 Telecon. Eldridge, K., PES, Inc., with Madden, M., Pomeco, Paramount, California. October 29, 1984. Cost of Pomeco equipment.

I-E-27 Telecon. Taygart, D., SMP Company (Wedgon), Denver, Colorado, with Eldridge, K., PES, Inc. October 29, 1984. Cost of Wedgon PS 3445 VRM.

I-E-28 Telecon. Eldridge, K., PES, Inc., with Funk, D., Emco Wheaton, Incorporated, Conneaut, Ohio. October 31, 1984. Prices of Emco Wheaton products.

I-E-29 Telecon. Panzer, J., Exxon Research, Linden, N.J., with Eldridge, K., PES, Inc. November 8, 1984. API Stage II report cost methodology and survey results.

I-E-31 Telecon. Powell, D., Parker Hanifin Corporation, Hose Products Division, Wickliffe, Ohio, with Eldridge, K., PES, Inc. November 9, 1984. Cost of vapor recovery and gasoline dispensing hoses.

I-E-32 Telecon. Treadway, B., Dayco Company, Dayton, Ohio, with Eldridge, K., PES, Inc. November 12, 1984. List price for Dayco hoses.

I-E-33 Telecon. Eldridge, K., PES, Inc., with Andrews, R., Union Supply Company, Durham, North Carolina. November 15, 1984. Galvanized schedule 40 pipe costs.

I-E-34 Telecon. Eldridge, K., PES, Inc., with Thompson, T., Jones Frank Company, Raleigh, North Carolina. November 16, 1984. Cost of fiberglass piping.

[a]Numbers correspond to docket item numbers in Docket No. A-84-07.

I-E-35	Telecon. Purcell, R., PES, Inc., with Bradt, R., Hirt Combustion Engineers. January 11, 1985. Differences in costs stated in Hirt's comment letter (see docket item I-H-129) and costs quoted during a telephone conversation with Hirt on 10/26/84.
I-E-36	Telecon. Purcell, R., PES, Inc., with Hasselman, E., Hasstech, Inc., San Diego, California. January 11, 1985. Large processor base unit cost and installation.
I-E-37	Telecon. Eldridge, K., PES, Inc., with Van Cleave, R., Ameron, Houston, Texas. January 7, 1985. Expected service life of fiberglass pipe used as vapor return lines for gasoline service stations.
I-E-38	Telecon. Oswald, K., A.O. Smith, Inc., Little Rock, Arkansas, with Eldridge, K., PES, Inc. January 9, 1985. Service life of fiberglass pipe used for Stage II vapor recovery systems.
I-E-39	Telecon. Eldridge, K., PES, Inc., with Freed, G., IWNN, Irwin, North Carolina. October 2, 1984. Costs associated with Stage II vapor recovery systems.
I-E-40	Telecon. Eldridge, K., PES, Inc., with Walker, L., Braswell Equipment Company, Hickory, N.C. October 18, 1984. Excavation costs in Stage II installation.
I-E-41	Telecon. Eldridge, K., PES, Inc., with DeLaHunt, R., Kearny Construction, National City, California. October 29, 1984. Price of retrofitting gasoline station to Stage II vapor recovery system.
I-E-44	Telecon. Eldridge, K., PES, Inc., with Byrne, J., Prime of California, Paramount, California. November 6, 1984. Excavation costs associated with installation of Stage II system.
I-E-46	Telecon. Eldridge, K., PES, Inc., with Johnston, G., R.W. Johnston Company, Oakland, California. November 16, 1984. Costs of installation for Stage II vapor recovery system.
I-E-52	Telecon. Eldridge, K., PES, Inc., with West, E., Spences and Jones, California. November 7, 1984. Stage II retrofit and labor costs.
I-E-65	Telecon. Norton, Bob, PES, Inc., with Rumble, John, Emco Wheaton. December 18, 1986. Costs of new nozzles.
I-E-66	Telecon. Norton, Bob, PES, Inc., with Brown, Bill, OPW. December 18, 1986. Nozzle costs.
I-E-67	Telecon. Norton, Bob, Pacific Environmental Services, Inc., with Robertson, Phil, B.F. Goodrich. December 18, 1986. Costs for Coaxial hose.
I-E-71	Telecon. Osbourn, Scott, Pacific Environmental Services, Inc., with Payne, Michael, Dresser-Wayne. January 7, 1987. Stage II costs.
I-E-72	Telecon. Osbourn, Scott, Pacific Environmental Services, Inc., with Rowan, Dave, Tokheim. January 7, 1987. Cost difference between standard and vapor recovery dispensers.
I-E-73	Telecon. Osbourn, Scott, Pacific Environmental Services, Inc., with Brown, Bill, OPW. January 7, 1987. Nozzle costs.
I-E-74	Telecon. Osbourn, Scott, Pacific Environmental Services, Inc., with Rumble, John, Emco-Wheaton. January 7, 1987. Nozzle costs.
I-E-75	Telecon. Osbourn, Scott, Pacific Environmental Services, Inc., with Zepoli, Frank, Gilbarco. January 8, 1987. Cost difference between conventional and VR dispensers.
I-E-76	Telecon. Osbourn, Scott, Pacific Environmental Services, Inc., with Alary, Roger, Goodyear. January 13, 1987. Cost of coaxial hose.
I-F-106	"Development of the Hasselmann Vacuum Assist Gasoline Vapor Recovery System." Prepared by Hasstech, Inc., San Diego, California.
I-F-110	OPW Fueling Components Group Distributor Price List Automatic Nozzles - Service Station Valves and Fittings, New Nozzles and Accessories, Vapor Recovery Nozzle Price Schedule, Replacement Parts for OPW Vapor Recovery Nozzles. Dover Corporation/OPW Division, Cincinnati, Ohio. June 11, 1984.

I-F-111 Emco Wheaton, Incorporated, Vapor Recovery Nozzle Pricing List. Emco Wheaton, Inc., Conneaut, Ohio. September 1, 1984.

I-F-113 State of California Air Resources Board Executive Order G-70-52-AC - Certification of Components and Alternative High-Hang/High-Retractor Hose Configurations for Red Jacket, Hirt, and Balance Phase II Vapor Recovery Systems. J.D. Boyd, Executive Officer. Sacramento, California. August 22, 1983.

I-F-114 State of California Air Resources Board Executive Order G-70-7-AA - Recertification of the Hasstech Model VCP-2 and VCP-2A Phase II Vapor Recovery Systems. J.D. Boyd, Executive Officer. Sacramento, California. August 22, 1983.

I-F-115 State of California Air Resources Board Executive Order G-70-36-AA - Recertification of the OPW Balance Phase II Vapor Recovery System. J.D. Boyd, Executive Officer. Sacramento, California. August 22, 1983.

I-F-116 State of California Air Resources Board Executive Order G-70-70-AA - Relating to the Certification of the Healy Phase II Vapor Recovery System for Service Stations. J.D. Boyd, Executive Officer. Sacramento, California. December 16, 1983.

I-F-117 State of California Air Resources Board Executive Order G-70-33-AB - Certification of Modified Hirt VCS-200 Vacuum Assist Phase II Vapor Recovery System. J.D. Boyd, Executive Officer. Sacramento, California. March 9, 1984.

APPENDIX C

CALIFORNIA AIR RESOURCES BOARD
STAGE II (PHASE II) CERTIFICATION TEST PROCEDURES

As discussed in Chapter 4, the California Air Resources Board tests and certifies Stage II systems to be capable of controlling VOC emissions from vehicle refueling at an efficiency of 95 percent of greater. Because it is not practical or necessary to test the efficiency of the vapor recovery system in each service station, CARB utilizes a "generic" equipment certification approach. In this program a prototype Stage II vapor system is evaluated and specifications developed. Systems that meet these "certified" specifications may be installed without individual efficiency tests. This Appendix provides CARB's certification requirements and test procedures used in this process. Specifically, this appendix contains:

Section C.1	CARB Test Method 2-2: Certification Procedures for Gasoline Vapor Recovery Systems at Service Stations. (includes "90 day test")
Section C.2	CARB Test Method 2-1: Test Procedures for Determining the Efficiency of gasoline Vapor Recovery Systems at Service Stations. ("100 car test")

As also discussed in Chapter 4, the approval of three other State agencies is required as a precondition to CARB certification. State law provides that the State Fire Marshal determine whether any component of system creates a fire hazard. The Department of Food and Agriculture, Division of Measurement Standards, is given sole responsibility for the measurement accuracy aspects, including gasoline recirculation, of any component or system. Finally, the Division of Occupational

Safety and Health is designated the agency responsible for determining whether any gasoline vapor control system or component creates a safety hazard other than a fire hazard. The regulations and test methods applicable to Stage II vapor recovery for these three organizations are also included in this appendix as follows:

Section C.3	California Department of Measurement Standards Requirements and Test Procedures
Section C.4	California Occupational Health and Safety Requirements
Section C.5	California Fire Marshal Requirements

APPENDIX C.1

CARB TEST METHOD 2-2: CERTIFICATION PROCEDURES FOR GASOLINE VAPOR RECOVERY SYSTEMS AT SERVICE STATIONS

State of California

AIR RESOURCES BOARD

Certification Procedures for Gasoline Vapor Recovery Systems at Service Stations

C.1-2

Adopted: March 30, 1976

Amended: August 25, 1977

Amended: *December 4, 1981*

Note: *To assist the user, the most recent amendments to these procedures are set forth in italics.*

TABLE OF CONTENTS

State of California

AIR RESOURCES BOARD

Certification Procedures for Gasoline Vapor Recovery Systems at Service Stations

I. General Applicability

These certification procedures are adopted pursuant to Section 41954 of the Health and Safety Code and are applicable to vapor recovery systems installed at gasoline service stations for controlling gasoline vapors emitted during the filling of storage tanks (Phase I) and vehicle fuel tanks (Phase II). Vapor recovery systems are complete systems and shall include all necessary piping, nozzles, couplers, processing units, underground tanks and any other equipment necessary for the control of gasoline vapors during fueling operations at service stations.

The certification procedures are not intended to be used to certify individual system components. For systems which are identical in design and include the same components as systems tested and certified, but differ, primarily in size, the manufacturer may demonstrate compliance capability and obtain certification by submitting engineering and test data demonstrating the relationship between capacity and throughput of each component whose performance is a function of throughput.

II. Definitions

A. Vapor-balance or displacement vapor recovery system - A gasoline vapor control system which uses direct displacement to force vapors into the underground tank (or bulk delivery tank) to prevent the emission of displaced vapors to the atmosphere during Phase I and/or Phase II operations.

B. Vacuum-assisted or vacuum-assisted secondary system - A gasoline vapor control system, which employs a pump, blower, or other vacuum inducing devices, to collect and/or process vapors generated during vehicle fueling (Phase II) operations.

C. Phase I - Control of vapors from underground tank fueling operations.

D. Phase II - Control of vapors from vehicle fueling operations.

E. Automatic Nozzle - ~~A nozzle which will dispense fuel without being hand held.~~ *A hose nozzle valve provided with automatic closing features to safeguard its use.*

F. On-Stream Efficiency Factor - That factor which indicates the fraction of time that the vapor recovery system is operating as the system was designed to operate.

$$\text{On-Stream Efficiency Factor} = \frac{t_s - t_d}{t_s}$$

Where t_s = System Time, Hours

t_d = System Down-Time, Hours

G. System Time - Hours that the system needs to be capable of controlling vapor emissions. For the 90-day reliability test period, this would be 2160 hours (24 hours per day x 90 days).

H. System Down-Time - The time (in hours) that the vapor recovery system is not operating as designed.

I. Spitback - A loss of more than one milliliter of liquid gasoline occurring during the dispensing of gasoline into the vehicle fuel tank.

J. Spillage - A loss of more than one milliliter of liquid gasoline from the gasoline nozzle occurring as a result of preparing to fuel a vehicle or at the end of a fueling operation in returning the nozzle to the dispenser.

III. General Standards

A. Certification of a system by the California Air Resources Board does not exempt the system from compliance with other applicable codes and regulations such as fire, weights and measures, and safety codes.

B. Phase II systems must be capable of fueling, without the use of nozzle spout extenders, any motor vehicle that may be fueled at service stations not equipped with vapor recovery systems.

C.1-4

IV. Performance Standards

A. The system shall complete an operational test of at least 90 days. During the test, replacement of components or alteration of the control system is not allowed, except that the Executive Officer may allow replacement or alteration of a component if the component has been damaged due to an accident or vandalism and if he/she determines that the replacement or alteration would not affect the operational test results. No maintenance or adjustment to the system will be allowed during the certification test unless such action is specifically called for in the system's maintenance manual. The control system will be sealed in such a manner that unauthorized maintenance or adjustment may be detected. Maintenance or adjustment is to be performed only after notification of the person in charge of the testing, except in case of an emergency. Unauthorized maintenance or adjustment may be reason for immediate failure of the test.

A system component submitted to the Executive Officer for evaluation subsequent to July 1, 1977, may be subjected to a shorter operational test, if the Executive Officer determines that the reliability of the component may be adequately demonstrated in a period shorter than 90 days.

B. The system shall prevent emission to the atmosphere of at least 90 percent or that percentage by weight of the gasoline vapors displaced during the filling of the stationary storage tank as required by applicable air pollution control district rules and regulations. The percentages of control shall be determined as described in Section 2.0 of the "Test Procedures for Determining the Efficiency of Gasoline Vapor Recovery Systems at Service Stations" as incorporated in Title 17, ~~subchapter-8~~, Section 94000, California Administrative Code.

C. The system shall prevent emission to the atmosphere of an average of at least 90 percent or that percentage by weight of the gasoline vapors displaced during the filling of the vehicle fuel tanks as required by applicable air pollution control district rules and regulations. The specified percentage of control shall be determined by multiplying the on-stream efficiency factor (definition F, Section II) by the efficiency of the system as determined by testing in accordance with the procedures in Section 3.0 of the "Test Procedures for Determining the Efficiency of Gasoline Vapor Recovery Systems at Service Stations" as incorporated in Title 17, ~~Chapter-1,-subchapter-8~~, Section 94000 of the California Administrative Code.

D. No more than ten spitbacks or twenty instances of spillage per 100 vehicle fuelings shall occur during the testing in accordance with the procedures in Section 3.0 of the "Test Procedures for Determining the Efficiency of Gasoline Vapor Recovery Systems at Service Stations" as incorporated in Title 17, Section 94000 of the California Administrative Code. In addition, the Executive Officer shall certify only those systems which he or she determines: (i) will not increase the quantity of liquid lost through spitback or spillage over that quantity typical of non-vapor recovery systems, (ii) can be expected to perform with such durability and reliability that excessive spitbacks or spillage will not be caused by failure of critical system components, and (iii) incorporate provisions to prevent a buildup, during fueling of the vehicle, of pressure in the vehicle fuel tank sufficient to cause forceful ejection of gasoline. This determination shall be based on data obtained during the testing in accordance with Section 3 of the Test Procedures referred to above, failure mode testing, evaluation of reliability and durability of the system, and such other performance testing as the Executive Officer deems necessary.

E. ~~D.~~ Prior to Air Resources Board certification of the vapor recovery system, plans and specifications for the intended generic system shall be submitted to the State Fire Marshal's Office for review to determine whether the system creates a hazardous condition or is contrary to adopted fire safety regulations. Final determination by the State Fire Marshal may be contingent upon a review of each pilot installation of the proposed system. Compliance with the State Fire Marshal's requirements shall be a precondition to certification by the Air Resources Board.

F. ~~E.~~ Prior to Air Resources Board certification, the system shall be submitted for type approval to the California Department of Food and Agriculture, Division of Measurement Standards and certified by such Division. Only those systems meeting the requirements of the California Business and Professions Code and the California Administrative Code will be issued certificates of approval by the Division of Measurement Standards; such certification shall be a precondition to certification by the Air Resources Board. Certification testing by Measurement Standards and the Air Resources Board may be conducted concurrently.

G. ~~F.~~ Prior to certification of the system, the manufacturer of the system shall submit the system to the California Occupational Safety and Health Administration (Cal OSHA) for determining compliance with appropriate safety regulations.

This may be conducted concurrently with certification testing by the Air Resources Board. Compliance with Cal OSHA requirements shall be a precondition to certification by the Air Resources Board.

V. <u>General Requirements Applicable to Certification of all Control Systems</u>

A. An operating and required maintenance manual shall be submitted to the Executive Officer for each gasoline vapor control system submitted for certification. The operating manual shall, as a minimum, contain:

1. Identification of critical operating parameters affecting system operation, e.g., maximum dispensing rates; liquid to vapor flow rate ratios; pressures; etc. The operating range of these parameters associated with normal, in-compliance operation of the control system shall be identified. These operating data shall be determined and/or verified during the performance test of the system.

2. Identification of specific maintenance requirements and maintenance schedules necessary to ensure on-going operation in compliance with the applicable standards. Maintenance requirements shall be clearly identified as being capable of performance by the operator, or as requiring authorized service only. Operating manuals shall provide clear instruction on operator

maintenance and shall provide clear warnings against unauthorized service. Maintenance schedules shall, at a minimum, reflect the life of individual components such as regulators, compressors, nozzles, pressure vacuum valves, catalysts, combustor components, etc. Systems requiring maintenance which the Executive Officer finds unreasonable will be disapproved.

3. Identification of system components for each control system certified. Components shall, as applicable, be identified by brand name, part number, and/or performance characteristics. The identification shall be sufficiently clear so as to allow determination of comparability between tested and untested models, and/or to allow determination of the adequacy of replacement parts.

4. A warranty statement which complies with the requirements of Paragraph V. C. herein.

B. Indicating gauges, or alarms, or detection devices, or combination thereof, shall be included in each control system as required to enable monitoring of the critical system operation parameters. The gauges and alarms shall serve to alert and warn the gasoline service station owner or operator with an audible signal or warning light when the gasoline vapor control system is malfunctioning. Such gauges and alarms shall, as applicable,

include temperature and pressure indicators, pass/fail hydrocarbon detectors, etc. These shall indicate the performance of critical components such as compressors, carbon canisters, etc. Specific examples of necessary devices are: temperature indicators installed in control systems which utilize refrigeration as a control technique; pressure indicators installed in control systems which utilize compression as a control technique; hydrocarbon breakthrough detectors installed in control systems which utilize carbon adsorption or flexible bladders or seals as a control technique, and pressure differential indicators on vapor return lines to detect liquid blockage of the lines.

C. The manufacturer of the vapor recovery system shall provide a three-year warranty for the system. An exception to the warranty may be for those components of the system which the maintenance manual identifies as having expected useful lives of less than three years; the warranty in these cases may specify the expected life.

The manufacturer of each vapor recovery system shall warrant in writing to the ultimate purchaser and each subsequent purchaser that such vapor recovery system is:

1. Designed, built, and equipped so as to conform at the time of sale with the applicable regulations; and
2. Free from defects in materials and workmanship which cause such vapor recovery system to fail to conform with applicable regulations for three years.

D. The adequacy of methods of distribution, replacement parts program, the financial responsibility of the applicant, and other factors affecting the economic interests of the system purchaser shall be evaluated by the Executive Officer and determined by him or her to be satisfactory to protect the purchaser. A determination of financial responsibility by the Executive Officer shall not be deemed to be a guarantee or endorsement of the applicant.

E. The Executive Officer shall certify only those systems which, on the basis of an engineering evaluation of the system design and component quality, can be expected to perform with reasonable durability and reliability over the three-year warranty period specified in Paragraph V.C. herein.

F. *Whenever these Certification Procedures are amended to include additional performance standards or other requirements for certification of systems, any system which is certified as of the effective date of the additional standards or requirements shall remain certified for a period of six months from such date, or until the Executive Officer has determined whether the system conforms to the additional standards or requirements, whichever occurs first. However, if during this period the system manufacturer does not comply with such conditions as the Executive Officer deems necessary to*

assure prompt evaluation of the system pursuant to the additional standards or requirements, the Executive Officer may revoke the prior certification.

In determining whether a previously certified system conforms with any additional performance standards or other requirements adopted subsequent to certification of the system, the Executive Officer may consider any appropriate data obtained in the previous certification testing or evaluation of the system in lieu of new testing or evaluation.

VI. <u>Application for Certification</u>

A. An application for certification of a vapor recovery system (Phase I or Phase II) may be made to the Air Resources Board by any manufacturer. Certification will be granted to any applicant meeting the applicable standards and criteria.

B. The application shall be in writing, signed by an authorized representative of the manufacturer, and shall include the following:

1. A detailed description of the configuration of the vapor recovery system including but not limited to the following:
   a. The underground piping configuration and specifications (pipe sizes, lengths, fittings, material(s), etc.);
   b. Gasoline dispensing nozzle to be used for Phase II;

c. Engineering parameters for pumps and vapor processing units to be used as part of the vapor recovery system; and

d. Allowable pressure drops through the system.

2. Evidence demonstrating the vapor recovery reliability of the system or device for 90 days;

3. A description of tests performed to ascertain compliance with the general standards, and the results of such tests;

4. A statement of recommended maintenance procedures, equipment performance checkout procedures, and equipment necessary to assure that the vapor recovery system, in operation, conforms to the regulations, plus a description of the program for training personnel for such maintenance, and the proposed replacement parts program;

5. Six copies of the service and operating manuals that will be supplied to the purchaser;

6. A statement that a vapor recovery system, installed at an operating facility, will be available for certification testing no later than one month after submission of the application for certification. The facility submitted for certification testing shall have a minimum throughput of 100,000 gallons per month and shall include at least six nozzles of each type submitted for approval. There shall

not be more than two types of nozzles at any one test facility.

7. The retail price of the system and an estimate of the installation and yearly maintenance costs;

8. A copy of the warranty or warranties provided with the system;

9. If the application is for a system previously tested, but not certified, the application shall include identification of the system components which have been changed; including all new physical and operational characteristics; together with any new test results obtained by the applicant; and

10. Such other information as the Executive Officer may reasonably require.

VII. Fees and Testing

A. A fee not to exceed the actual cost of certification will be charged by the Air Resources Board to each applicant submitting system(s) for certification. The applicant is required to demonstrate ability to pay the cost of testing prior to certification testing. This may take the form of posting a bond of not less than $20,000. A resolution of certification of the system will not be issued until the test fee has been paid in full to the Air Resources Board.

B. Testing may be conducted by an independent contractor under contract to the Air Resources Board. The contractor will be responsible solely to the Air Resources Board for the conduct of the certification test and the test results.

VIII. Certification

A. If the Executive Officer determines that a vapor recovery system conforms to all requirements set forth in paragraphs I through VII herein, he or she shall issue an order of certification. The order may prescribe the conditions for issuance of the certification including but not limited to: a minimum allowable on-stream factor, maximum allowable monthly throughput, installation constraints, operating parameters, compliance with safety codes and regulations, compliance with measurement standards regulations, and approval for use at self-service stations or at only attendant-serve stations.

B. If after certification of a system the manufacturer wishes to modify the system, the proposed modifications must be submitted to the Executive Officer in a format specified by the Executive Officer for approval prior to their implementation. Such modifications may include substitution of components, elimination of components and modification of the system configuration. No person shall install or operate a system which is different in any significant respect from the system certified by the Air Resouces Board.

C.1-10

C. If after certification of a system, the Executive Officer finds the system to no longer meet the specified certification specifications, the Executive Officer may, as appropriate, revoke or modify his or her prior certification. Except in cases where the public safety requires immediate protection, the Executive Officer shall not revoke or modify a prior certification without the manufacturer's consent unless the Executive Officer conducts a public hearing. The manufacturer shall be notified of the public hearing in writing and the notification shall be given so as to be received by the manufacturer at least ten days before the hearing date.

D. Any manufacturer of a system shall, as a condition of certification of the system by the Air Resources Board, agree that so long as only one such system is certified by the Air Resources Board, such manufacturer shall either: (1) agree to enter into such cross-licensing or other agreements as the Executive Officer determines are necessary to ensure adequate competition among manufacturers of such systems to protect the public interest; and (2) agree as a condition to such certification that if only such system from one manufacturer is made available for sale to the public, the Executive Officer shall, taking into consideration the cost of manufacturing the system and the manufacturer's suggested retail price, and in order to protect the public interest, determine the fair and reasonable retail price of such system, and may require, as a condition to continued certification of such system, that the retail price not exceed the retail price determined by the Executive Officer.

APPENDIX C.2

CARB TEST METHOD 2-1: TEST PROCEDURES FOR DETERMINING THE EFFICIENCY OF GASOLINE VAPOR RECOVERY SYSTEMS AT SERVICE STATIONS

State of California

AIR RESOURCES BOARD

Test Procedures for Determining the Efficiency of Gasoline Vapor Recovery Systems at Service Stations

Adopted: December 9, 1975

Amended: March 30, 1976

Amended: August 9, 1978

Amended: December 4, 1981

Amended: September 1, 1982

Note: To assist the user, the most recent amendments to these procedures are set forth in italics and deletions are shown as struck through.

State of California

AIR RESOURCES BOARD

Test Procedures for Determining the Efficiency of Gasoline Vapor Recovery Systems at Service Stations

1. <u>Introduction</u>

The following test procedures are for determining the efficiency of vapor recovery systems (Sections 2 and 3) for controlling gasoline vapors emitted during the filling of storage tanks and vehicle fuel tanks.

The test procedures for determining the efficiency of systems for controlling gasoline vapors displaced during filling of underground storage tanks requires determination of the weight of gasoline vapors vented through the storage tank vent and the volume of gasoline dispensed. The percentage effectiveness of control is then calculated from these values.

The test procedures for determining the efficiency of systems to control gasoline vapors displaced during vehicle fueling requires that the weight of vapors collected at the vehicle, corrected for vent losses, be compared to the potential mass emission calculated for that vehicle. A standard test sample of the vehicle population is to be tested and an average efficiency calculated.

The potential mass emissions are determined during the fueling of vehicles by measuring the mass of hydrocarbons collected from vehicles from which no leak occurred. Potential emissions are expressed as a function of the vapor pressures of the dispensed fuel, the temperature of the dispensed fuel and the temperature of the gasoline in the test vehicle tank. The relationship is used as the baseline or reference from which the efficiency of a vehicle fueling vapor control system is evaluated.

The sample of vehicles to be used for testing control systems shall be comprised of vehicles representative of the on-the-road vehicle population in terms of vehicle miles travelled.

The test will be conducted during the normal operation of the service station. For vehicle fueling at a self-servce station, the customers shall fuel the vehicles; at a full-service station, the service station attendant shall fuel the vehicles during the test period. No more than 30 days prior to the 100 vehicle efficiency test, the entire vapor recovery system is to be tested for leaks. ~~In accordance with the criteria specified in Title 19 Chapter 1 Subchapter 11.5 Section 1918.26 (j) and 1918.56 (j), in the State Fire Marshal's regulations.~~ *The vapor piping system, including the storage tanks, dispensing nozzles and hoses, shall be pneumatically tested to 150% of the maximum working pressure of the system, or to 10 inches of water column pressure, whichever is greatest. Test pressure shall be maintained for not less than 5 minutes, with the system sealed, with a pressure drop not to exceed 10% of the test pressure. An inert gas,*

C.2-3

e.g., nitrogen, shall be used. At no time shall air be used from an external power source to pressurize the system.

In addition, the total ullage space shall not be more than 6,000 gallons. During the performance test, maintenance, adjustment, replacement of components or other such alteration of the control system is not allowed unless such action is specifically called for in the system's maintenance manual. Any such alteration shall be recorded on the day on which the alteration was performed. During the testing, the control system will be sealed in such a manner that unauthorized maintenance may be detected. Maintenance is to be performed only after notification of the person in charge of the testing except in case of an emergency. Unauthorized maintenance may be reason for immediate failure of the test.

For systems which are identical in design and include the same components as systems tested and found to comply with the test procedures, but differ, primarily in size, the owner or vendor may demonstrate compliance capability and obtain approval by submitting engineering and/or test data demonstrating the relationship between capacity and throughput of each component whose performance is a function of throughput. Examples of such components include: blowers, catalyst, carbon or other adsorbant, compressors, heat exchangers, combustors, piping, etc.

C.2-4

2. Underground Tank Fueling Test Procedure (Phase I Systems)

2.1 Principle and Applicability

(a) Principle. During a fuel delivery, the volume of gasoline delivered from the tank truck to the underground tank is recorded and the concentration of gasoline vapor returning to the tank truck is measured. The weight of gasoline vapor discharged from the vent of the underground tank and, if applicable, from the vent of the vacuum assisted secondary processing unit during the same period is determined. The efficiency of control is calculated from these determinations.

(b) Applicability. The method is applicable to all control systems which have a vapor line connecting the underground tank to the tank truck.

2.2 Apparatus

(a) For each vent, including restricted vents and vents of any processing units, a positive displacement meter, with a capacity of 3,000 SCFH, a pressure drop of no more than 0.05 inches of water at an air flow of 30 SCFH, and equipped with an automatic data gathering system that can differentiate direction of flow and records volume vented in such a manner that this data can be correlated with simultaneously recorded hydrocarbon

concentration data. A manifold for meter outlet with taps for an HC analyzer, a thermocouple*; and a pressure sensor is to be used with the positive displacement meter.

(b) Coupling for the vent vapor line to connect the gas meter. Coupling to be sized for a minimum pressure drop.

(c) Coupling for the vent of the vacuum assisted secondary processing unit to connect the gas meter. Coupling to be sized so as to create no significant additional pressure drop on the system.

(d) Coupling for tank truck vapor return line with thermocouple, manometer† and HC analyzer taps. Coupling to be the same diameter as the vapor return line.

(e) Coupling for tank truck fuel drop line with thermocouple tap. Coupling to be the same diameter as the fuel line.

(f) Two (2) hydrocarbon analyzers (FID or ARB approved equivalent) with recorders and with a capability of measuring total gasoline vapor concentration of 100 percent as propane. Both analyzers to be of same make and model.

* ~~The use of the word thermocouple is to imply temperature sensing device throughout this procedure.~~ *Wherever in this procedure the use of a "thermocouple" is specified, another equally effective temperature sensing device may alternatively be used.*

† ~~The use of the word manometer is to imply pressure sensing device throughout this procedure.~~ *Wherever in this procedure the use of a "manometer" is specified, another equally effective pressure sensing device may alternatively be used.*

(g) Three (3) flexible thermocouples or thermistors (0-150°F) with a recorder system.

(h) Explosimeter

(i) Barometer

(j) Three manometers or other pressure sensing devices capable of measuring zero to ten inches of water.

(k) Thermometer

2.3 Procedure

(a) The test for underground fueling will be conducted under, as closely as feasible, normal conditions for the station. Normal conditions will include delivery time and station operating conditions.

(b) Connect manifold to outlet of positive displacement meter and resulting to system vent of underground tank using the coupler or if the vent has a restriction, remove the restriction and connect the coupler, manifold and the meter system to the vent and connect restrictor to manifold outlet. If appropriate, connect another manifold and meter to the vent of the vacuum assisted secondary processing unit, or, if appropriate, use E.P.A. stack sampling techniques. If the system uses an incinerator to control emissions, use the test procedures set forth in Section 3.6.

(c) Connect the HC analyzer with recorder, thermocouple and manometer to the vent manifold. Calibrate the equipment in accordance with Section 3.3.

(d) Connect the couplers to the tank truck fuel and vapor return lines.

(e) Connect an HC analyzer with a recorder, a manometer and a thermocouple to the taps on the coupler on the vapor return line. Connect thermocouple to the tap on the coupler on the fuel line.

(f) Connect tank truck fuel and vapor return lines to appropriate underground tank lines in accordance with written procedure for the system.

(g) Check the tank truck and all vapor return line connections for a tight seal before and during the test with the explosimeter.

(h) Record the initial reading of gas meter(s).

(i) Start fueling of the underground tank in accordance with manufacturers' established normal procedure.

(j) Hydrocarbon concentrations, temperature and pressure measurements should be recorded using stripchart recorders within the first 15 seconds of the unloading period. The gas meter reading is to be taken at 120 second intervals,

(k) Record at the start and the end of the test barometric pressure and ambient temperature.

(l) At the end of the drop, disconnect the tank truck from the underground tank in accordance with manufacturers' instructions (normal procedure). Leave the underground tank vent instrumentation in place.

(m) Continue recording hydrocarbon concentrations, temperatures, pressure and gas meter readings at the underground tank vent and/or the exhaust of any processing unit at 20-minute intervals. Do this for one hour for balance systems and until the system returns to normal conditions as specified by the manufacturer for secondary systems.

(n) Disconnect instrumentation from the vent(s).

(o) Record volume of gasoline that is delivered.

(p) Record final reading of gas meter.

2.4 Calculations

(a) Volume of gas discharged through "i th" vent. This includes underground tank vent and any control system vent.

$$V_{vsi} = \frac{V_{vi} \times 520 \times P_b}{T_{vi} \times 29.92}$$

Where:

V_{vsi} = Volume of gas discharged through "i th" vent, corrected to 60°F and 29.92 in. Hg; Ft^3.

P_b = Barometric Pressure, in. Hg.

V_{vi} = Volume of gas recorded by meter on "i th" vent, corrected for amount of vapor removed for the hydrocarbon analysis, Ft^3.

T_{vi} = Average temperature in "i th" vent line, °R.

i = *The vent under consideration.*

(b) Volume of gas returned to the tank truck.

$$V_t = \frac{0.1337G_t\ (520 \times [P_b + \Delta H])}{T_t \times 29.92}$$

Where:

V_t = Volume of gas returned to the tank truck at 60°F and 29.92 in. Hg; Ft^3.

G_t = Volume of gasoline delivered, gal.

ΔH = Final gauge pressure of tank truck; in. Hg.

T_t = Average temperature of gas returned to tank truck, °R.

P_b = Barometric pressure, in. Hg.

0.1337 = Conversion factor gallons to Ft^3.

(c) Collection efficiency

$$E = \frac{V_t \times C_t \times 100}{(V_t \times C_t) + \Sigma[C_{vi} \times V_{vsi}]}$$

Where E is the efficiency of control in percent.

V_t = Form (b) above.

C_t = The average fractional volume concentration of gasoline vapor in the return line to the truck as determined by the hydrocarbon analyzer, decimal fraction.

C_{vi} = The average fractional volume concentration of gasoline vapors in the "i th" vent as determined by the hydrocarbon analyzer, decimal fraction.

V_{vsi} = From (a) above.

3. <u>Vehicle Fueling Test Procedure</u>

3.1 Principle and Applicability

3.1.1 Principle. Tests are conducted on a sample of vehicles representative of the vehicle population to determine the weight of gasoline vapor returned to the underground tank and the weight of vapor lost through any vents in the system. Baseline data (the weight of gasoline vapor displaced per gallon of gasoline dispensed for given temperatures of the gasoline in the vehicle tank and the dispensed gasoline, and given vapor pressure of the dispensed gasoline) are determined from vehicles from which no significant leaks occurred during fueling. The efficiency of the vapor recovery system is then calculated by comparing the amount of vapor returned during fueling, corrected for vent losses, to the baseline data.

3.1.2 Applicability. The method is applicable to all control systems in which vapors are returned from the vehicle tank to the underground tank or disposal system through a vapor line.

3.2 Determination of Gasoline Vapor Transferred to Underground Tank and Discharged through Vent of Underground Tank and Control System During Vehicle Fueling.

3.2.1 Apparatus

(a) Positive displacement meter with a capacity of 3000 SCFH and a pressure drop of no more than 0.05 inches water at 30 SCFH. If testing is to be conducted concurrently at more than one pump, an additional positive-displacement meter will be required for each additional pump. The positive displacement meter must be calibrated at 10, 30, 50, 60, 90, 120, 180, 300, and 3000 SCFH.

(b) A manifold, for connection to the nozzle vapor line at the nozzle, with ports for a thermocouple, a pressure sensor, and HC analyzer sample line. A manifold, for connection to the nozzle gasoline line at the nozzle, with a tap for a thermocouple. A set of these manifold will be required for each pump to be included in the test.

(c) A modified nozzle (of the type to be tested) with a 1/8 inch copper tube as a pressure tap. The tube enters through the nozzle body into the dispensing spout and exits through the wall of the dispensing spout about two inches from the end of the spout. The pressure tap is connected to the pressure transducer with 1/8 inch teflon tubing.

(d) A manifold for the inlet to the positive displacement meter with taps for a thermocouple and a pressure transducer.

(e) A manifold for the outlet of the positive displacement meter. The manifold will have a one inch I.D. valve for closing off flow to the vapor return line. Between the valve and positive displacement meter will be a 1/4 inch or 3/8 inch tap for connecting the flow system for pressurizing the vehicle fill neck for the leak rate check.

(f) The pressure system for conducting the pre-fueling leak rate check consists of a nitrogen bottle (2000 psig), commercial grade), a control valve for regulating the bottle pressure to 1 psig, a needle valve, two Magnehelic gauges (0 - 30 and 0 - 10 inches water) for determining the pressure upstream and downstream of the needle valve, and a dry gas meter (175 SCFH), alternately an adequate flowmeter), a device for ensuring a tight seal with the vehicle fill-pipe, and a hose for supplying pressure to the vehicle tank. The device (see Figure 3) is to have a tap for allowing monitoring of the pressure in the fill-pipe during the leak check.

(g) The pressure system for conducting the post-fueling leak rate check consists of a nitrogen bottle (2000 psig), commercial grade, a control valve for regulating the bottle pressure to 1 psig, a needle valve, two Magnehelic gauges (0 - 30 and 0 - 10 inches water, for determining pressure upstream and downstream of the needle valve, and a dry gas meter (175 SCFH), alternately an adequate flowmeter.

(h) A positive displacement meter, with a capacity of 3000 SCFH, a pressure drop of no more than 0.05 inches at 30 SCFH, and equipped with automatic data gathering system that can differentiate direction of flow and records volume vented in such a manner that this data can be correlated with simultaneously recorded HC data. A manifold with taps for an HC analyzer, a thermocouple, and a pressure sensor is to be used with the positive displacement meter.

Such a system is required for each vent of the station unless the vents can be manifolded together without affecting the vapor recovery system operation. If the underground tanks are vented separately then only the vent(s) of the underground tank for the grade of gasoline used during the test is (are) required to be instrumented.

(i) Four flexible thermocouples or thermistors (0 - 150°F) with recorders.

(j) Two pressure transducers (± .5 psi) with recorder.

(k) Two HC analyzers (FID or ARB approved equivalent) with recorders and with a capability of measuring gasoline vapor concentrations of 100 percent as propane.

It is suggested that the recorder for the HC analyzer to be used at the vent manifold be equipped with an event marker that will record when out-breathing occurs on the HC strip chart. If not, then periodic readings of the dry gas meter will be required and the time of the readings must be noted on the HC strip chart.

(l) Barometer.

(m) Thermometer.

(n) Explosimeter.

(o) Containers for RVP samples.

(p) Apparatus for determining RVP by ASTM test method D323-72, and/or apparatus for determining RVP by the Chevron Research Corporation's micro-technique.

(q) Flexible thermocouple (0 - 150°F) or type for determining vehicle tank temperatures with system to ensure contact with liquid.

3.2.2 *Procedure for Determination of Gasoline Vapor Transferred to Underground Tank and Discharged Through Vent of Underground Tank During Vehicle Fueling.*

(a) Connect the appropriate manifolds to the nozzle. Connect a thermocouple, and an HC analyzer to the manifold on the vapor return side of the nozzle. Connect a thermocouple and the gasoline delivery line to the manifold on the gasoline inlet side of the nozzle. Connect pressure transducer line to the nozzle pressure tube.

(b) Connect the appropriate inlet manifold to the inlet of the positive-displacement meter and connect a thermocouple and pressure transducer to the inlet manifold. Connect the appropriate outlet manifold to the outlet of the positive-displacement meter and connect the leak-rate pressure line to the outlet manifold. For a balance system, connect a one-inch polypropylene line from the outlet manifold on the vapor return side of the nozzle to the inlet manifold of the

positive-displacement meter, and connect a one-inch polypropylene line from the outlet of the one-inch valve downstream of the meter to the underground vapor recovery line. (System should be arranged so that pressure drop through the system is approximately the same with measuring devices connected as when system is operated normally.)

(c) Connect the manifold with dry gas meter, thermocouple, and HC analyzer to the vent of the underground tank. If the vents cannot be manifolded together, when a vacuum-assisted system is being tested, connect similar instrumentation to the vent of the gasoline vapor control system. When an incinerator is used to process gasoline vapors, install the positive displacement meter and manifold into the line to the incinerator. Connect HC analyzer, thermocouple, and pressure sensor to manifold taps.

(d) Assemble apparatus for conducting leak check of vehicle fuel tank. Connect 3/8 inch pressure supply hose and pressure sensor to leak check device. Connect supply hose to needle valve and pressure sensors upstream and downstream of needle valve. Connect regulator to bottle of nitrogen and exhaust of regulator by 3/8 inch line to the needle valve.

(e) Calibrate all instruments according to their manufacturers operating manuals for spans appropriate to the test requirements (Section 3.3). Calibrate the instruments at least at the start and end of the day's testing.

(f) Record the ambient barometric pressure and temperature after each vehicle test.

(g) Take five samples of gasoline from the underground tank in accordance with ASTM Method D270-65 and determine their RVP by ASTM test Method D323-72 or the Chevron micro-technique. Repeat after each fuel delivery to the underground tank.

(h) At the start and end of the test day, record the liquid volume readings on each gasoline pump at the service station. For systems using an incinerator, record the meter reading of the positive-displacement meter installed in the vapor line to the incinerator.

(i) At the start and end of the test period, record the positive-displacement vapor meter readings of the meters in the vents. Monitoring of vent emissions shall be 24 hours per day.

3.2.2.1 Leak check of vehicle fuel tanks to be done prior to vehicle tests is described below.

(a) Connect device for determining vehicle tank leak rate to vehicle fill-pipe.

(b) Open main valve on the nitrogen supply bottle and adjust the needle valve until the pressure in the fill neck reaches one half (1/2) inch water (gauge) and is stable.

(c) Determine the rate at which vapor is leaking by either timing a volume of 0.1 ft.^{3} or by selecting a time period of 15 seconds, whichever results in a smaller volume being transferred to the vehicle tank. Record readings. If a stable pressure cannot be maintained due to too large a leak, note this.

(d) Remove device from the vehicle fill-pipe and proceed with the procedures as described in Section 3.2.2.2.

(e) If a leak-rate greater than 0.01 cfm is determined the vehicle may not be a base-line vehicle and the post-fueling leak check need not be conducted.

3.2.2.2 The following steps are for performing the individual vehicle tests.

(a) All dispensing from any nozzle not being tested, but connected to the same vapor return line as the test nozzle, must be done carefully by a service station attendant and not bey a self-service customer. This procedure applies regardless of the mode of operation used during the 90-day reliability period. Even if certification is being sought for a totally manifolded system that is to be used in the self-service mode, all dispensing during the 100-car test, except dispensing which is done with the test nozzle, must be done very carefully by an attendant.

(b) For each vehicle tested insert a thermocouple into the vehicle tank, ensure thermocouple comes in contact with the liquid, allow sufficient time for the instrument to stabilize, and record the initial temperature of gasoline in its fuel tank.

(c) Instruct station attendant or self-service customer to connect nozzle. Note the type of fit obtained and note the make, model and year of vehicle being tested. The note on the type of fit obtained should include:

1) whether or not the nozzle could be latched,
2) problems encountered when inserting the nozzle, and
3) whether or not the nozzle was hand-held.

(d) Record the initial positive-displacement meter reading, turn chart recorders on, and verify operation of sensors. Set HC sample flowrate to approximately 500 cubic centimeters per minute.

(e) Instruct station attendant or self-service customer to start fueling vehicle at the maximum desired automatic flow-rate. Record the setting.

(f) Indicate on charts and/or other data printouts the point at which fueling commences.

(g) Record the dispensed liquid and returned vapor temperatures and record the positive-displacement meter readings at five gallon intervals. Indicate on the chart recordings the point at which each five gallon increment is passed. Take background explosimeter reading.

Use explosimeter to detect any leaks at the nozzle-fillneck interface. (Warn person dispensing gasoline that an explosimeter will be used and this is not to affect the person's normal mode of operation.)

(h) Indicate on the chart recordings the point at which fueling is terminated. Need a minimum of four gallons of fuel dispensed for an acceptable test. This is to allow for instrumentation responses to stabilize.

Record the total gallons dispensed and the final positive-displacement meter readings. Note any incidents of "spitbacks" or spills. Note the combustible gas detector readings. Instruct station attendant or self-service customer not to disturb the nozzle.

3.2.2.3 The post-fueling leak rate check is not to be conducted for vacuum assisted systems. Steps (a) through (e) are for leak rate check for displacement systems.

(a) Close the valve in the vapor return line under test so that the vapor return line is closed to gas flow. (Be sure HC analyzer sample pump has been turned off.)

(b) Open the main valve on the nitrogen supply bottle and adjust the needle valve until the pressure in the fillneck is at the desired level and is stable. It is suggested that the leak rate be determined at three fillneck pressures, one point below the average pressure experienced during fueling, one at average pressure and one above average pressure.

(c) Determine the rate at which vapor is leaking by timing a convenient volume (suggest a minimum of 0.1 ft.^{3} or 15 seconds). Mark the chart pressure trace at the start and finish of each timed interval. Record the time and volume. Repeat for each pressure setting. If a stable pressure cannot be maintained due to too small a leak (probably through vehicle's evaporative emission control system) so note. If the pressure experienced during the fueling cannot be obtained because the leak is too large, note this also.

(d) Remove the nozzle from the vehicle fill-neck and replace on the gasoline pump. Purge HC analyzer system and zero pressure transducers. Open the valve in the vapor return line.

(e) Measure the final temperature of the gasoline in the vehicle tank and record.

3.2.2.4 Continue tests for the test sample. The sample shall be statistically representative of the vehicle population, weighted according to vehicle miles travelled (Section 3.4 5).

(a) The vehicle population is to meet the specified vehicle matrix within three vehicles. The test vehicles are to be selected on a first-in-first tested basis. The exception to this is when a vehicle is rejected for one of the reasons in (b) below.

(b) The only acceptable reasons for rejection of a vehicle are: (1) incomplete test data, (2) vehicle has been modified in the vicinity of the fill-pipe opening or vehicle fill-pipe has been modified or damaged, (3) vehicle test matrix category already full, (4) less than required minimum fuel dispensed, (5) vehicle did not have fill-pipe cap upon arrival at station.

3.2.2.5 At the end of the testing determine the number of baseline vehicles (those vehicles which met the conditions of 3.2.3 (g)) if this number is not 40 or more, continue testing until this number is obtained. These additional vehicles will only be used in estimating actual vehicle emissions and will not be used in calculating the system efficiency. (Any additional baseline vehicles have to meet the conditions in 3.2.3 (g).

3.2.2.6 Any test vehicle which had an initial vehicle tank temperature more than 10°F outside the range of temperatures for the baseline vehicles will be discarded from the test fleet.

3.2.2.7 Record pressure of the vehicle tank and the underground tank during various rates of fueling and determine the pressure drop in the line from the nozzle to the underground tank.

C.2-15

3.2.3 Calculations

(a) Volume of gas transferred to underground tank during vehicle fueling.

$$V_{rs} = \frac{V_r \times 520 \times (P_b + \Delta H_r/13.6)}{T_r \times 29.92}$$

Where:

V_{rs} = Volume of gas corrected to 60°F and 29.92 in. Hg. passing through dry gas meter in nozzle vapor line for each vehicle, Ft.^{3}.

V_r = Actual volume of gas passing through the dry gas meter in the nozzle vapor line for each vehicle. Corrected for amount of vapor removed for the hydrocarbon analysis, Ft.^{3}.

P_b = Average barometric pressure, in. Hg.

ΔH_r = Average manometer pressure, in. H_2O.

T_r = Average temperature in the nozzle vapor line, °R taken at meter inlet.

(b) Weight of gasoline vapor transferred to underground tank during vehicle fueling.

$$W_r = \frac{C_r \times V_{rs} \times M_r \times 454}{379}$$

Where:

W_r = Weight of gasoline vapor transferred to underground tank for each vehicle, Gm.

C_r = Average fractional concentration of hydrocarbons, decimal fraction.

V_{rs} = From (a) above.

M_r = Molecular weight of hydrocarbon used to calibrate hydrocarbon analyzer, lbs/lb. Mole.

(c) Volume of gas discharged from vent of underground tank during vehicle fueling.

$$V_{as} = \frac{V_a \times 520 \times P_b}{T_a \times 29.92}$$

Where:

V_{as} = Total volume of gas discharged from vent of the underground tank plus from vent of control system if a vacuum-assisted system, corrected to 60°F and 29.92 in. Hg, Ft.^{3}.

V_a = Actual volume of gas passing through dry gas meter, or meters, corrected for amount of vapor removed for the hydrocarbon analysis, Ft.^{3}.

P_b = Average barometric pressure, in. Hg.

T_a = Average temperature of gas discharging from vent, or vents, °R.

(d) Weight of gasoline vapor discharged from vent of underground tank during vehicle fueling.

$$W_a = \frac{C_a \times V_{as} \times M_a \times 454\ G_d}{379\ G_s}$$

Where:

W_a = Weight of gasoline vapor discharged from the vent of the underground tank, plus from vent of control system if a vacuum-assisted system, weighted for the gallons of gasoline sold through the pump where vehicle testing occurs, Gm.

C_a = Average fractional concentration of hydrocarbons at vent, decimal fraction.

V_{as} = From (c) above.

M_a = Molecular weight of hydrocarbons compound used to calibrate hydrocarbon analyzer, lbs/lb. Mole.

Note: If an incinerator is used to process vapors, see Section 3.6 for calculation of incinerator emissions.

G_d = Total volume of gasoline dispensed to the test vehicles, gal.

G_s = Total volume of gasoline dispensed from all the station pumps, gal.

Note: If the rate of volume emissions and the hydrocarbon concentrations of the vent emissions are not constant with time, the product of $C_a \times V_{as}$ must be integrated with respect to time. Numerical integration techniques are recommended.

(e) Weight of gasoline vapor displaced during vehicle fueling of the test fleet.

$$W_x = \sum_{i=1}^{n} \left[\frac{U}{L}\right]_i (G)_i$$

Where:

W_x = Baseline weight of total gasoline vapor displaced during vehicle fueling, Gm.

$\left[\frac{U}{L}\right]_i$ = From regression equations developed from baseline vehicle data. Gm/gal.

$(G)_i$ = Number of gallons transferred during "i th" fueling.

i = Individual fueling.

Note: For calculating W_x for baseline vehicles, use W_{ri} instead of $\left[\frac{U}{L}\right]_i G_i$.

(f) Efficiency of fueling control system.

$$E_r = \frac{\left[\sum_{i=1}^{n} W_{ri} - W_{ai}\right] \times 100}{W_x}$$

Where:

E_r = Efficiency of vehicle fueling control system, percent.

W_r = From (b) above.

W_a = From (d) above.

W_x = From (e) above.

i = Individual fueling.

(g) Regression equations for estimating the actual weight of gasoline vapor displaced during vehicle fueling of the test fleet.

For a balance system, select those vehicles from the total list of vehicles tested which had: (1) complete test data, (2) a pre-fueling leak rate of equal to or less than 0.01 CFM, (3) a post-fueling leak rate of equal to or less than 0.01 CFM, (4) explosimeter readings for the fueling period equal to or less than 0.1 LEL (except for a monetary spike such as the end of fueling). It is desireable that baseline vehicles be those where "hands-off" fueling occurred; however, this may not be possible due to the nature or mode of operation of the system being tested. These vehicles and their measured data will be used to develop the regression equation to determine $[\frac{U}{L}]$; for a balance type vapor recovery system.

For a vacuum-assisted system, select those vehicles from the total list of vehicles tested which had: (1) a pre-fueling leak rate of equal to or less than 0.01 CFM, (2) a zero or negative pressure in the vehicle fillneck for the fueling period, (3) explosimeter readings for the fueling period equal to or less than 0.1 LEL (except for a monetary spike such as at the end of fueling), and (4) a complete set of data. These vehicles and their measured data will be used to develop the regression equation to determine $[\frac{U}{L}]$; for a vacuum-assisted type vapor recovery system. Using step-wise regression techniques, determine a multi-variable linear regression equation for the

emissions from baseline vehicles (those vehicles selected by the above criteria) using as the dependent variable - grams HC vapor per gallon of gasoline dispensed,

$$\left(\frac{W_r}{\text{gallons of gasoline dispensed to vehicle}}\right)$$

and as the independent variables - the vapor pressure of the dispensed gasoline, the initial temperature of the gasoline in the vehicle tank (T_v), and the average temperature of the dispensed gasoline (T_d). An equation of a different form (such as a quadratic) or an equation using different independent variables may be used if the alternate equation gives a statistically better fit at the 0.01 level of confidence.

3.3 Calibrations

3.3.1 Flow meters. Standard methods and equipment shall be used to calibrate the flow meters. The calibration curves are to be traceable to National Bureau of Standards (NBS) standards.

3.3.2 Temperature recording instruments. Calibrate daily prior to test period and immediately following test period using ice water (32°F) and a known temperature source about 100°F.

3.3.3 Pressure recording instruments. Calibrate pressure transducers prior to the 100 vehicle Phase II test with a static pressure calibrator for a range of -3 to +3 inches water or appropriate range of operation. Zero the transducers after each individual vehicle test.

3.3.4 Total hydrocarbon analyzer. Follow the manufacturer's instructions concerning warm-up time and adjustments. On each test day prior to testing and at the end of the day's testing, zero the analyzer with a zero gas (<3 ppm C) and span with 30 percent and 70 percent concentrations of propane. Prior to the Phase I and Phase II testing perform a comprehensive calibration in the laboratory. Check the analyzer with several known concentrations of propane to determine linearity. The HC calibration cylinders must be checked against a reference cylinder maintained in the laboratory before each field test. This information must be entered into a log identifying each cylinder by serial number. The reference cylinder must be checked against a primary standard every six months and the results recorded. The reference cylinder is to be discarded when the assayed value changes more than one percent. Any cylinder is to be discarded when the cylinder pressure drops to 10 percent of the original pressure.

3.3.5 A record of all calibrations made is to be maintained.

3.4 Acceptance of Systems

When a system is accepted, it will have certain physical features such as piping sizes and configurations which may have to be modified to accomodate the requirements of each installation. Because the pressure drops and other characteristics of the system are influenced by these features and these in turn influence effectiveness, it may be necessary to condition acceptance upon certain criteria which account for physical parameters such as pressure drops and flow rates. When systems are tested for acceptance, these parameters will be ascertained.

Some of the conditions that may be imposed upon an acceptance are:

(a) Allowable pressure drop in the lines leading from the dispensing nozzle to the underground tank.

(b) The method of calculating the pressure drop.

(c) The model of dispensing nozzle which may be used.

(d) The manner in which vapor return lines may be manifolded.

(e) The type of restriction to be placed on the vent of the underground tank.

(f) The number of dispensing nozzles which may be serviced by a secondary system.

(g) Allowable delivery rates.

(h) Use of the system on full-service stations only.

3.5 Test Sample

A total of 100 vehicles are required to be tested for determining the efficiency of a Phase II system. The vehicle distribution based on model year, vehicle miles travelled and manufacturer for use until September 1976 is given in Table I. An up-date table will be issued in September of each subsequent year. Vehicles will be tested as they enter the station ("first in" basis) until a specific matrix block of the distribution is filled. Additional tested cars that fit into a completed matrix block can be used as baseline vehicles but may not be substituted for earlier complete tests. Exception to this is when more than two identical vehicles arrive to be tested, only the first two will be used. (An example of this would be if three 1975 Impala station wagons come in for testing, only the first two would be used unless one was rejected for other reasons such as missing data.) The only other reasons for excluding a vehicle from the test fleet are: (1) incomplete data for vehicle (missing vehicle temperature, HC concentration, volume

C.2-20

returned); (2) less than require minimum fuel dispensed; (3) vehicle has been modified in the vicinity of the fillpipe opening or has significantly damaged or modified fuel tank fillpipe; (4) vehicle was agreed upon by applicant and ARB as being unacceptable; (5) vehicle did not have fillpipe cap upon arrival at station.

3.6 Test Procedures for Determining Incineration Emissions

3.6.1 Principle and Applicability

3.6.1.1 Hydrocarbon and carbon dioxide concentrations in the exhaust gases, and gas volume and HC concentrations in the inlet vapor, and ambient carbon dioxide concentrations are measured. These values are used to calculate the incinerator HC control efficiency and mass emission rate based on a carbon balance.

3.6.1.2 Applicability: This method is applicable as a performance test method for gasoline vapor control incinerators used at service stations equipped for Phase I and II vapor control.

3.6.2 Test Scope and Conditions

3.6.2.1 Station Test Status: The procedure is designed to measure incinerator control efficiency under conditions that may be considered normal for the station under test. All dispensing pumps interconnected with or sharing the control system under test shall remain open as is normal for the station operation. Vehicles shall be fueled as is normal for the test period. As underground tank filling produces vapor volumes different from vehicle tank filling, no underground tank filling should be performed during the test period. A separate test is to be made to determine vapor control efficiency during Phase I operations.

3.6.2.2 Fuel RVP: The RVP of the fuel dispensed during the test shall be within the range normal for the geographic location and time of the year.

3.6.3 Test Equipment

3.6.3.1 HC Analyzers: HC analyzers using flame ionization detectors calibrated with known concentrations of propane in air are used to measure HC concentrations at both the incinerator inlet and exhaust. A suitable continuous recorder is required to record real-time output from the HC analyzer.

3.6.3.2 Sample System: The sample probe is to be of a material unaffected by combustion gases (S.S. 365). The sample pump should be oil-less and leak-tight. Sample lines are to be inert, teflon is recommended. A thermocouple (0-2000°F) shall be used to monitor temperature of exhaust gases at the inlet to sampling system.

3.6.3.3 Carbon Dioxide Analyzer: A nondispersive infrared analyzer calibrated with known quantities of CO_2 in air is used to measure CO_2 concentrations in the exhaust gas.

3.6.3.4 Other equipment is specified in Section 3.2.1.

3.6.4 Test Procedure

3.6.4.1 Visual Inspection: Any visual emissions except for steam, from vapor incinerators are an indication of poor combustion. An incinerator shall not emit air contaminants (not including moisture) in such a manner that the opacity of the emission is greater than 10 percent for a period or periods aggregating more than one minute in any 60 consecutive minutes; or greater than 40 percent opacity at any time. Should such visible emissions from the exhaust be detected, the control system is unacceptable and the problem must be corrected and an application made to the ARB for reconsideration for certification.

3.6.4.2 Sample Location: The sampling point should be located in the exhaust stack down-stream of the burner far enough to permit complete mixing of the combustion gases. For most sources, this point is at least eight stack diameters downstream of any interference and two diameters upstream of the stack exit. There are many cases where these conditions cannot be met. The sample point should be no less than one stack diameter from the stack exit and one stack diameter above the high point of the flame and be at a point of maximum velocity head as determined by the number of equal areas of cross-sectional area of the stack. The inlet sampling location is in the system inlet line routing

vapors to the burner. A HC sample tap, a pressure sensor tap, and a thermocouple connection to monitor gas temperature must be installed on the inlet side of the volume meter.

3.6.4.3 Monitoring Equipment Set-Ups: Span and calibrate all monitors. Connect sampling probes, pumps and recorders to the monitors and mount sampling probes in the stack and at the inlet.

3.6.4.4 Measurements: Mark strip charts at the start of the test period and proceed with HC, CO_2, and volume measurements for at least three burning cycles of the system. The total sampling time should be at least three hours. Sampling for HC's and CO_2 must occur simultaneously. At the end of each cycle, disconnect CO_2 instrument and obtain an ambient air sample. This step requires that the CO_2 instrument be calibrated for the lower concentrations expected at ambient levels.

3.6.4.5 Gasoline Liquid Volume: Record the gasoline liquid dispensed during the test period.

3.6.5 Calculations

3.6.5.1 Symbols

CO_2	=	Carbon dioxide concentration in the exhaust gas (ppmv).
CO_{2a}	=	Average carbon dioxide concentration in the ambient air (ppmv).
HC_i	=	Hydrocarbon concentration in the inlet gas to the burner (ppmv as propane).
HC_e	=	Hydrocarbon concentration in the exhaust (ppmv as propane).
L_d	=	Gasoline liquid volume dispensed during test period (gallons).
P_i	=	Static pressure at inlet meter (in H_g).
T_i	=	Temperature of gas at inlet meter (°F).
V_i	=	Inlet gas volume (ft^3).
F	=	Dilution Factor
51.6×10^{-6}	=	Correction factor for grams of hydrocarbon per gas volume parts per million propane $\left(\frac{g}{(SCF)\ (ppmv)}\right)$
3	=	Number of carbon atoms per propane molecule.

C.2-23

3.6.5.2(a) Calculate the standard total gas volume (V_s) at the burner inlet for each test. (Standard temperature 60°F, standard pressure 29.92 in Hg).

$$V_s = V_i \frac{(P_i + 29.92)}{(T_i + 460)} \frac{520}{29.92} \quad (1)$$

(b) Calculate an average vapor volume to liquid volume (v/l) at the inlet for each test.

$$(v/l)_i = \frac{V_s}{L_d} \quad \left(\frac{SCF}{gal}\right) \quad (2)$$

(c) A carbon dilution factor, F, can be calculated for the incinerator using the inlet and outlet CO_2 concentrations, the inlet and outlet HC concentrations and the ambient CO_2 concentration. The important criterion for this calculation is that all the significant carbon sources be measured. The values used in the calculation should represent average values obtained from strip chart readings using integration techniques. Some systems have more than one burning mode of operation. For these it is desirable to have high and low emission levels calculated. This requires that corresponding dilution factors (v/L) values and $(m/L)_i$, values be calculated for each period in question.

$$F = \frac{HC_i}{HC_e + \frac{CO_{2e} - CO_{2a}}{3}} \qquad (3)$$

(d) The mass emission rate $(m/L)_e$ is calculated using the inlet $(m/L)_i$ from equation (3) and the carbon dilution factor from equation (4). The exhaust HC concentration will vary with time and operation of the system. It is likely that, in addition to an overall average mass emission rate using an average HC_i, several peak values of $(m/L)_e$ will be required as discussed above. If some correlations between HC_i and HC_e occurs over the burning cycle of the system, this calculation should be used to show the change in mass emission rate.

$$(m/L)_e = F \left(\frac{HC_e}{HC_i}\right) (m/L)_i \quad (g/gal) \qquad (5)$$

(e) Mass control efficiency (% E) can be calculated for an average value over each test interval. It represents the reduction of hydrocarbon mass

achieved by the incinerator system and this efficiency can vary depending on the loading cycle or the inlet loading.

$$\%E = 100 \left[1 - \frac{(F)(HC_e)}{(HC_i)}\right] \qquad (6)$$

3.6.6 Calibrations

3.6.6.1 Total Hydrocarbon Analyzers: Flame ionization detectors or equivalent total hydrocarbon analyzers are acceptable for measurement of exhaust hydrocarbon concentrations. Calibrations should be performed following the manufacturer's instructions for warm-up time and adjustments. Calibration gases should be propane in hydrocarbon-free air of known concentrations prepared gravimetrically with measured mass quantities of 100 percent propane. A calibration curve shall be produced using a minimum of five (5) prepared calibration gases in the range of concentrations expected during testing. The calibration curve shall be used in determining measured levels during testing. The calibration of the instrument need not be performed on site, but shall be performed prior to and immediately following the test program. During the test program, the HC analyzer shall be spanned on site with zero gas (<3 ppmv C) and with known concentrations of propane in hydrocarbon-free air at a level near the highest concentration expected. The spanning procedure shall be performed at least twice each test day.

3.6.6.2 Carbon Dioxide Analyzer: Nondispersive infrared analyzers are acceptable for measurement of exhaust CO_2 concentrations. Calibrations should be performed following the manufacturer's instructions. Calibration gases should be known concentrations of CO_2 in air. A calibration shall be prepared using a minimum of five prepared calibration gases in the range of concentrations expected. The calibration of the instrument need not be performed on site but shall be performed immediately prior to and immediately following the test program. During the testing the analyzer shall be spanned with a known concentration of CO_2 in air at a level near the highest concentration expected. The spanning procedure shall occur at least twice per test day.

3.7 Alternate equipment and techniques may be used if prior approval is obtained from the ARB.

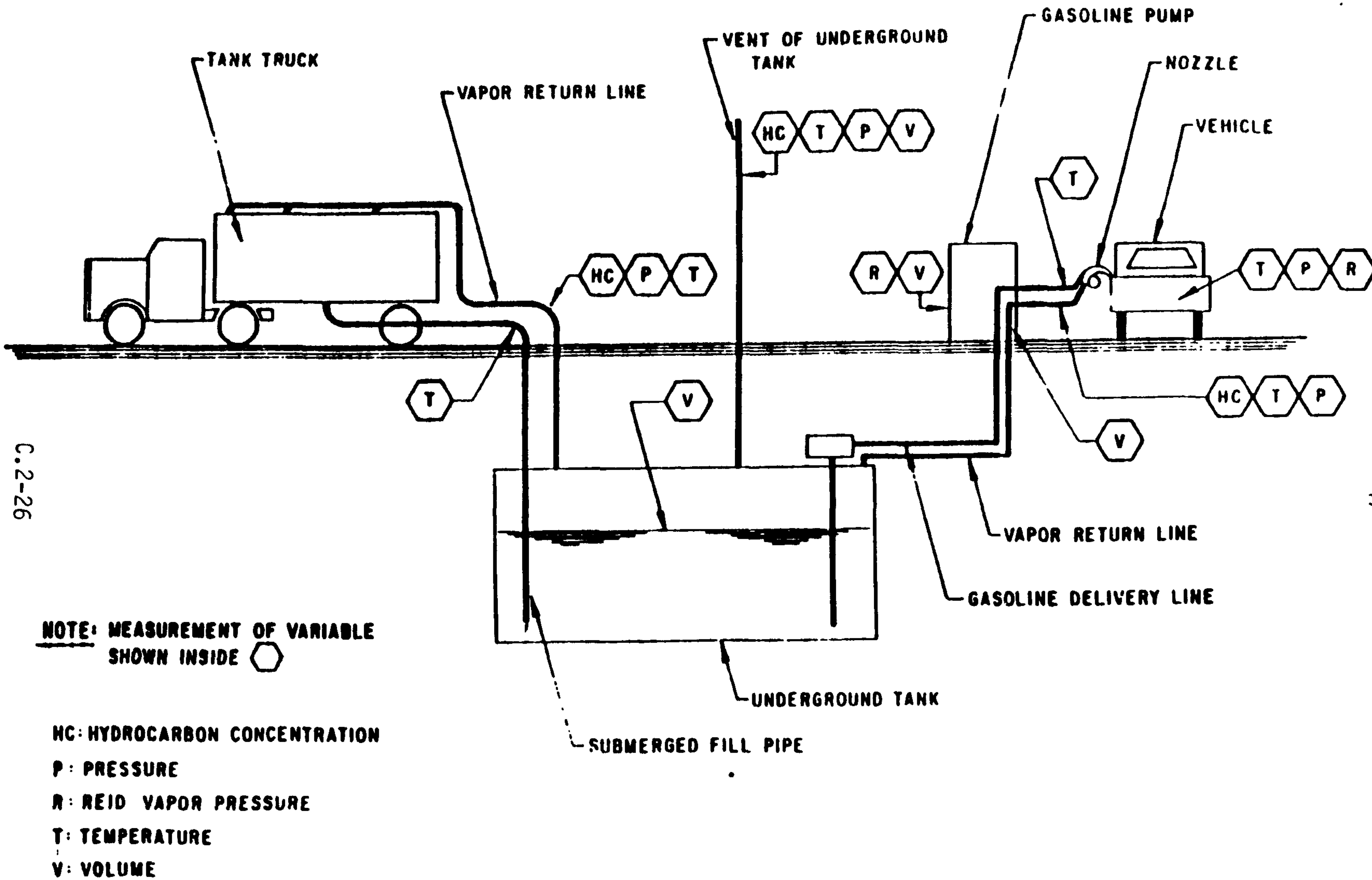
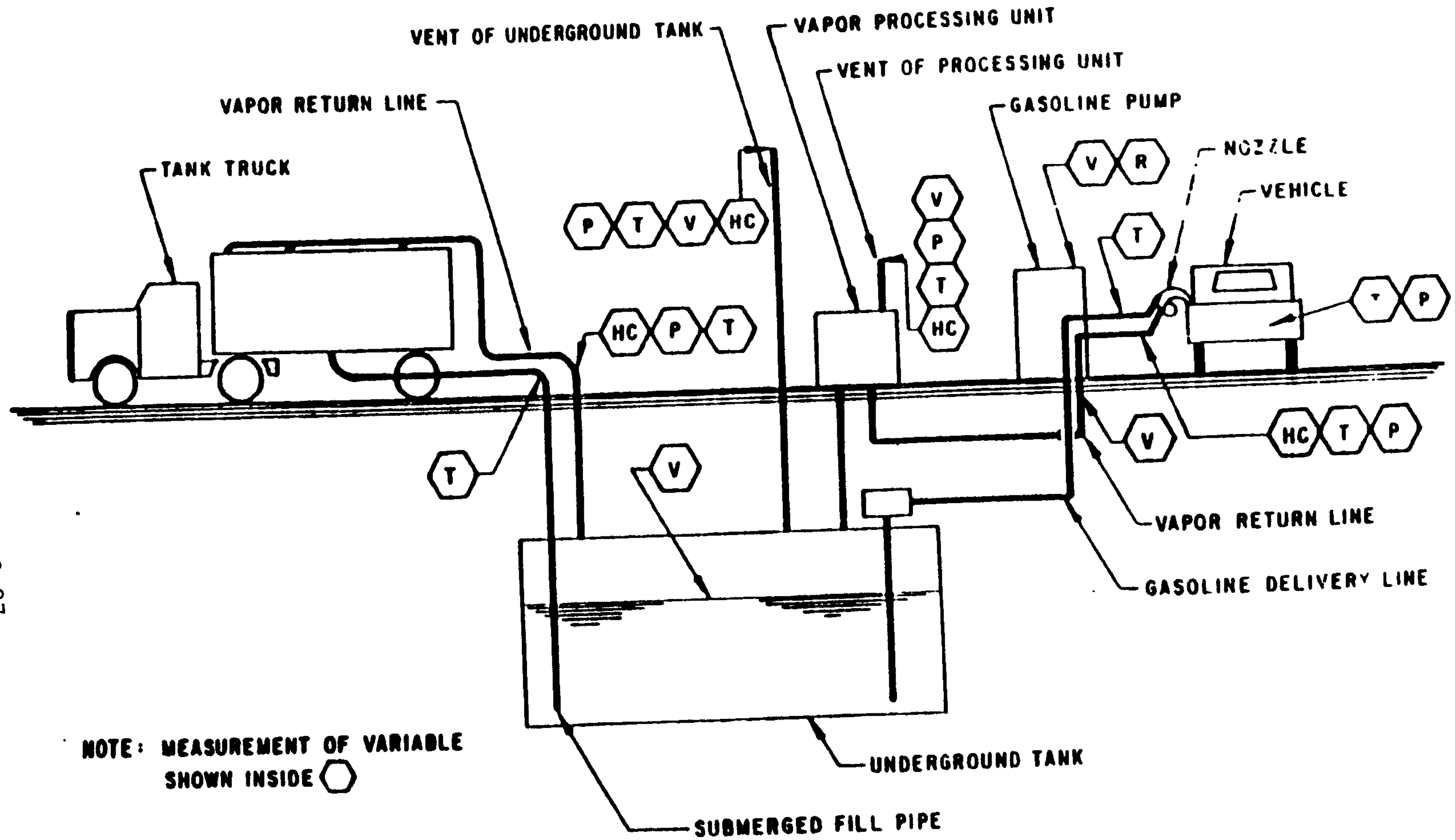


FIGURE 1 DISPLACEMENT SYSTEM



NOTE: MEASUREMENT OF VARIABLE SHOWN INSIDE ⬡

HC = HYDROCARBON CONCENTRATION

P = PRESSURE

R = REID VAPOR PRESSURE

T = TEMPERATURE

V = VOLUME

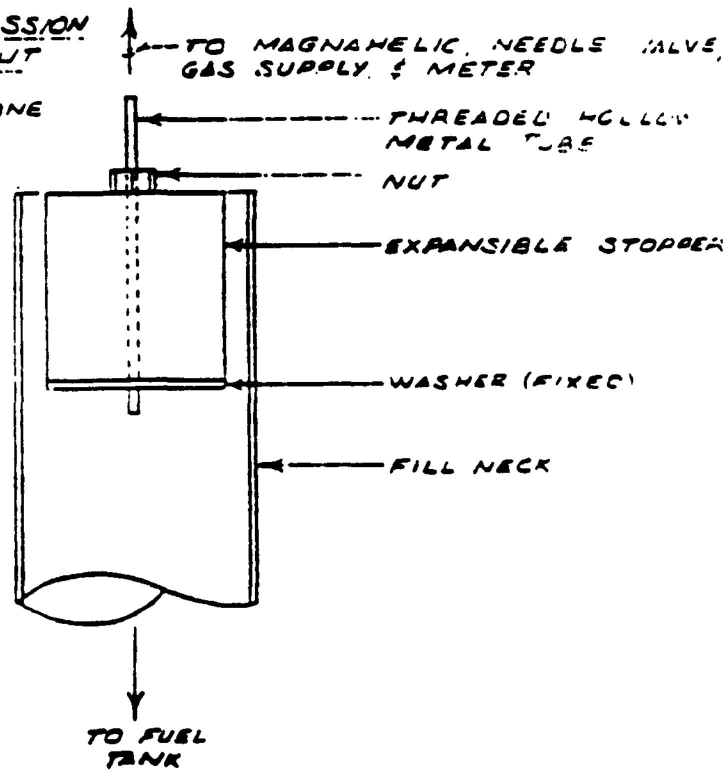
FIGURE 1! VACUUM ASSISTED SECONDARY

FIGURE 3

PRE-FUELING LEAK CHECK DEVICE

1. BEFORE COMPRESSION TIGHTENING OF NUT

SCALE — NONE



2. AFTER COMPRESSION TIGHTENING OF NUT

SCALE — NONE

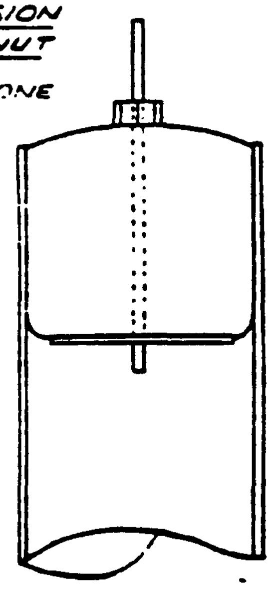


TABLE I

Test Sample for Determining the Efficiency of Phase Two Systems by Model Year, Vehicle Miles Travelled and Manufacturer

Model Year	Percent Distribution by VMT	Automobile Manufactured				
		General Motors	Ford Motor Company	Chrysler Corporation	American Motors Corporation	Imports
Pre 1970	12	5	3	2	0	2
1970	5	2	1	1	0	1
1971	7	2	2	1	0	2
1972	9	3	2	1	0	3
1973	10	4	3	1	0	3
1974	12	4	3	1	0	3
1975	15	5	4	1	1	5
1976	17	5	4	2	1	5
1977	12	4	2	1	0	5
1978	1	0	0	0	0	0

October 1977

APPENDIX C.3

CALIFORNIA DEPARTMENT OF MEASUREMENT STANDARDS REQUIREMENTS AND TEST PROCEDURES

TYPE EVALUATION APPLICATION PROCEDURES

I. INTRODUCTION

The Pre-Sale and Pre-Use type approval of new models of commercial weighing and measuring devices is required by Division 5, Section 12500.5 of the California Business and Professions Code:

> 12500.5. The Director by rules and regulations shall provide for submission for approval of types or designs of weights, measures, or weighing, measuring, or counting instruments or devices, used for commercial purposes, and shall issue certificates of approval of such types or designs as he shall find to meet the requirements of this code and the tolerances and specifications thereunder.
>
> It shall be unlawful to sell or use for commercial purposes any weight or measure, or any weighing, measuring, or counting instrument or device, of a type or design which has not first been so approved by the department; provided, however, that any such weight, measure, instrument, or device in sue for commercial purposes prior to the effective date of this act may be continued in use unless and until condemned under the provisions of this code.

II. NATIONAL TYPE EVALUATION PROGRAM (NTEP)

California is a participant in the National Type Evaluation Program (NTEP) and is authorized to conduct NTEP evaluations.

III. REQUEST FOR TYPE EVALUATION

1. To obtain National Type Evaluation, submit a letter of request to:

   National Type Evaluation Program
   c/o National Conference on Weights and Measures
   National Institute of Standards and Technology
   Gaithersburg, MD 20899

2. To obtain California only type evaluation, submit a letter of request to:

   Division of Measurement Standards
   8500 Fruitridge Road
   Sacramento, California 95826
   Attn: Type Approval Program

   The request for California evaluation should include the requesting company's federal or California tax identification number.

3. For National or California type evaluation:

   A. Authorize the billing of all incurred costs by the Participating Laboratory conducting the evaluation.

B. Complete the attached Application Form giving the requested description of the device, including its operating characteristics and instructions, its intended application, model number, capacity, size, and shipping weight.

C. Following acknowledgement of request, ship the device intact and ready for evaluation to the assigned testing location (if special installation arrangements are required, they must be made by the requestor prior to the time of evaluation).

NOTE: Manufacturers who have not previously submitted their equipment for approval in California or have a record of delinquent payments will be required to remit a deposit in advance. This payment will be based upon our estimate of the cost to conduct the necessary tests. In such cases, evaluation of the equipment cannot begin until the estimated amount is received by the "Cashier" of the Department of Food and Agriculture.

IV. PUBLICATIONS

Both the California Business and Professions Code, containing the basic laws, and the California Code of Regulations, Title 4, Chapter 9, containing the tolerances and specifications, may assist the manufacturer before and during the approval process. These publications may be obtained by sending a check or money order for the appropriate amount, payable to "Cashier", to the Department of Food and Agriculture, 1220 N Street, Sacramento, California 95814.

#400 California Business and Professions Code
(Weights and Measures) $4.50

#401 California Code of Regulations
Title 4, Chapter 9, Weights and Measures . . . $7.00

#402 Examination Procedure Outline - Commercial
Weighing and Measuring Devices $7.00

The National Institute of Standards and Technology Handbook 44, 1989 Edition, is available for $15.00, postpaid, from:

Superintendent of Documents
U. S. Government Printing Office
Washington, D.C. 20402

(Stock No. 003-003-02888-6)

(Telephone No.: (202) 783-3238)

Publication 14 "National Type Evaluation Program" is available in limited quantities from the NIST Office of Weights and Measures (301) 975-4004.

Article 2 is adopted:

ARTICLE 2. PROCEDURES FOR TYPE APPROVAL CERTIFICATION EVALUATION AND FIELD COMPLIANCE TESTING OF VAPOR RECOVERY SYSTEMS

4054. A. Application.

A.1. Vapor recovery systems.

This code applies to Stage II vapor recovery systems designed to control motor vehicle fuel vapors which result from fueling operations pursuant to Sections 41954, 41956, and 41956.1 of the Health and Safety Code. This code establishes regulations to govern some design characteristics of those systems and their operation to ensure liquid recirculation is prevented.

A.1.1. Balance system.

The balance vapor recovery system utilizes fuel delivery nozzles with a bellows and face plate designed to make an "intended tight seal" with the vehicle fill pipe opening. Liquid filling a fuel tank displaces the existing vapor space creating a positive pressure in the tank. That higher pressure achieves equilibrium with the supply tank's vapor pressure through the vapor return line making the system "balanced".

A.1.2. Assist system.

Assist vapor recovery systems may utilize more than one type of fuel delivery nozzle. One has a bellows and face plate designed to make a "non-intended tight seal" with the vehicle fill pipe opening. Another has no bellows, uses a coaxial metal fill spout with perforations in the outer tube to remove vapors, and allows visual observation of the fill pipe opening. These systems employ a mechanism to create vacuum which "evacuates" displaced vehicle fuel tank vapors by a negative pressure in the vapor return line.

A.2. Responsibility of Director and manufacturer.

A.2.1. Director.

As specified in subsection A.1., a system submitted for type approval certification shall be evaluated by the Director applying the procedures established in this article plus any additional tests he determines necessary to assure compliance of the system with the specifications and performance requirements contained herein.

A.2.2. Manufacturer.

Prior to type approval certification testing, the applicant shall submit information to the Director pertaining to the design of a system, including schematics, blueprints, instruction manuals, brochures, components, and all other information necessary for preliminary review. If defects are found in the design, manufacture, service, repair, or any other characteristic of the system, the Director may permit the applicant to modify and resubmit the system for further review. After successful completion of preliminary review, the applicant shall be authorized to install its system of a specified number of components in a prescribed location for use in the type approval certification testing.

A.3. Revocation of type approval certification.

The Director's issuance of type approval certification pursuant to Section 4054 obligates the manufacturer to continue producing its system in accordance with the same specifications and proper performance characteristics as when submitted and approved. The Director by his own motion, or upon the request of any county sealer or other interested person, may reexamine any type-approved system to determine if the system continues to meet the applicable requirements. If testing of the systems operating within the State reveals a defect involving more than one percent of the sample selected and examined, the Director may initiate a proceeding pursuant to the California Administrative Procedure Act (Government Code Section 11500 *et seq.*) to determine if the type approval should be revoked or modified. Nothing herein, however, shall prevent the Director from undertaking discussions with the manufacturer to resolve any problem prior to initiating adverse action.

A.4. Procedure.

The Director shall, in cooperation with the county sealer of weights and measures for the designated location, observe and examine the system in operation normally within 30 to 90 days. One or more examinations shall be conducted during the prescribed test period to determine compliance with Sections 4054.1, 4054.2, and 4054.3 which relate to specifications, performance, and accuracy. If, during or at the conclusion of any examination, the system fails to maintain reliability and accuracy within the tolerances specified in Section 4054.3, the Director shall so advise the applicant and may refuse further testing unless the defects are corrected. However, type approval certification shall not be issued until the applicant submits a report of evaluation by an independent testing laboratory as specified in Section 4054.2, N.6.

A.5. General code application.

The general code requirements for weighing and measuring devices as specified in Section 4000 shall also apply.

NOTE: Authority cited: Sections 12107 and 12500.5, Business and Professions Code; and Sections 41956(a) and 41956(c), Health and Safety Code. Reference: Sections 12107 and 12500.5, Business and Professions Code; and Sections 41956(a) and 41956(c), Health and Safety Code.

4054.1. S. Specifications.

S.1. System Components.

Systems governed by this article utilizing motor vehicle fuel nozzles shall contain in each nozzle adequate and automatic means to prevent measured liquid from either recirculating (entering the vapor return line) or overflowing a vehicle fill pipe opening.

S.1.1. Nozzles.

(a) All nozzle types shall have a primary shut-off device which automatically activates when liquid covers the nozzle primary shut-off sensing mechanism.

(b) Balance type nozzles shall have a secondary shut-off device or other effective means to prevent liquid recirculation. Secondary shut-off devices shall automatically activate after liquid has entered the vapor return line because the primary shut-off device has failed. (Typically, secondary shut-off devices are pressure-activated and shut off when liquid in the vapor return line blocks the return of vapors).

(c) Assist type nozzles may have a secondary shut-off device or else some other effective means to avoid liquid overflowing a vehicle fuel tank because the primary shut-off device has failed. "Other effective means" include, but are not limited to, permitting liquid to be seen either by observing the fill pipe opening or hearing and seeing liquid overflow spillage.

S.2. Field compliance test unit.

S.2.1. Use.

The field compliance test unit shall be used to examine the proper operation of:

(a) primary shut-off devices,

(b) secondary shut-off devices, and

(c) inches of H_2O column vacuum for assist systems.

S.2.2. Design.

S.2.2.1. Tank.

The test unit shall be a rigid metal vessel 13-inches high and 9-inches in diameter with a liquid capacity of 3 gallons (all measurements approximate). A commercial-sized, 30 pound Freon recharging tank is typically used.

S.2.2.2. Base support/stand.

The test unit may be supported either:

(a) on a metal base 3/16-inch thick, 6-inches wide, and 17-1/2 inches long (all measurements approximate) or,

(b) by a stand which elevates the test unit to accommodate a bottom-inserted 3/4 inch ball valve for emptying purposes.

S.2.2.3. Fuel fill pipe.

The test unit shall have a metal fuel fill pipe welded to the tank at a 45 degree angle from horizontal. Placement of the fill pipe is critical. It shall enter the test unit at the middle of the curvature between the top and sides of the vessel so that a specified ullage (vapor space) is created. The fill pipe shall have no internal vent, shall be 2-1/4- inch outside diameter and 10 inches long (both measurements approximate), and shall extend inside the tank no more than 1/4 inch. A longitudinal part of the fill pipe near its fill opening shall be cut away in order to observe that the nozzle primary shut-off device sensing mechanism is immersed in liquid. The cut-away is approximately 5 inches long to a depth of 1/2 the pipe's diameter. The fill pipe shall have transparent flexible tubing slipped over its entire length. The fill opening shall be modified to accommodate nozzle spouts at least 15/16 inch outside diameter (leaded fuel). The test unit shall be airtight when the fill pipe opening is sealed.

S.2.2.4. Other equipment.

A rigid, transparent plastic tube approximately 12 inches long and 3-7/8 inches inside diameter should be installed around the fill pipe to contain liquid overflow. A 5/16-inch valve with an outlet to attach a hose shall be installed at the top center of the vessel for obtaining pressure readings. Handles for carrying and emptying the test unit may be attached. All metal parts of the test unit shall be electrically bonded together. Refer to the test unit illustrations in Figure 1.

S.3. Assist system inches of H_2O column vacuum.

Assist vapor recovery systems shall be designed to operate at not more than -10 inches H_2O column vacuum as measured at the nozzle or test unit during a delivery typical of customer usage.

NOTE: Authority cited: Sections 12107 and 12500.5, Business and Professions Code; and Sections 41956(a) and 41956(c), Health and Safety Code. Reference: Sections 12107 and 12500.5, Business and Professions Code; and Sections 41956(a) and 41956(c), Health and Safety Code.

4054.2. N. Notes - Type Approval Certification Evaluation.

N.1. System installation.

A minimum of 6 nozzles shall be installed in a test location on hoses of both leaded and unleaded fuels. Hoses may be selected to anticipate maximum customer usage and efficient observer interaction. The test nozzles shall not fail to operate as designed for the duration of the evaluation.

N.2. Dispenser measurement accuracy.

Prior to the field examination of a vapor recovery system, the dispenser meters for the test nozzles shall be tested and adjusted, if necessary, to be within maintenance tolerance.

N.3. Performance accuracy - primary and secondary shut-off devices.

N.3.1. Test method.

Examination of the test nozzles shall be performed with a field compliance test unit as specified in subsection S.2.

NOTE: Two or more test units will expedite the examination significantly.

N.3.1.1. Test procedure - primary shut-off device.

N.3.1.1.1. Initial test.

Dispense fuel into the test unit with each nozzle. All nozzles shall shut off automatically at any delivery flow rate as the test unit becomes full as specified in subsection S.1.1.(a).

N.3.1.1.2. Override test.

After the initial primary shut-off device activates, dispense enough additional fuel into the test unit to immerse the nozzle primary shut-off sensing mechanism in liquid. Record the dispenser indicator gallons.

Make 10 additional consecutive override attempts duplicating a range of customer usage and record the new indicated gallons. All 10 attempts shall result in automatic nozzle shut off before the dispenser volume indicator increases more than the 1/10 gallon limit as specified in subsection T.1.1. The 10 override attempts shall be performed on a minimum of 6 nozzles, each tested a minimum of 3 times during this examination.

N.3.1.2. Test procedure - secondary shut-off device (if equipped).

Introduce sufficient fuel into the vapor return line (approximately 1/10 gallon or 375 milliliter) to block the return of vapors through the line. Hold in place a "U-shaped" configuration of the fuel discharge hose at a level lower than the nozzle to concentrate the liquid. Make a minimum of 10 attempts to dispense fuel into an empty test unit. Record the dispenser indicator gallons before and after each attempt. (Balance-type nozzles must make their intended tight seal at the fill pipe opening.) The nozzle shall shut off automatically before the dispenser volume indicator increases more than the 3/10 gallon limit for each attempt as specified in subsection T.1.2. This procedure shall be performed on a minimum of 6 nozzles.

NOTES: (1) The test unit must be empty initially to insure liquid does NOT interact with the primary shut-off device sensing mechanism. (2) For some hose configurations, introducing additional fuel into the vapor return line during the test procedure may be necessary. Introduced liquid can be returned to storage by building vapor line pressure produced by this procedure.

N.4. Delivery accuracy - 150 vehicle test.

N.4.1. Test method.

Compliance with delivery accuracy requirements shall be based upon data recorded for at least 150 vehicles while observing customers fueling (self-serve) with the test nozzles under normal field conditions.

N.4.2. Test procedure.

Install a transparent trap, or other suitable means, between each nozzle and dispenser outlet connection for the hose. Any liquid entering a vapor return line will be collected while observing the fueling operations. Then after each fueling, the liquid shall be drained into the trap, removed, and measured. Trap placement and observer actions shall produce the least possible interference with normal operations at the test location.

The liquid collected from both one individual delivery and the total of all individual deliveries shall not exceed the tolerances as specified in subsections T.3.(a) and T.3.(b), respectively.

The 150 or more vehicles should be representative of California vehicles, including various sizes of passenger vehicles, vans, and trucks. This examination should include varied fuel delivery rates and nozzle orientations plus complete and partial fills. The system may be retested if the Director by his own initiative, or at the request of the applicant, determines the test was not representative of field conditions.

N.5. Performance accuracy - assist system evaporation and volume change.

N.5.1. Test method.

An appropriate means (manometer, column gauge, etc.) shall be used to determine the inches of H_2O column vacuum. Excessive vacuum may result in artificial evaporation of customer fuel which would decrease the measured volume and also cause possible implosion of vehicle fuel tanks.

N.5.2. Test procedure.

Install the vacuum indicator at the nozzle or test unit. Record the value of the reading while the system is operating in a normal manner to determine if it is functioning within the -10 inches H_2O column vacuum limit as specified in subsection T.2.

N.6. Independent laboratory evaluation.

Pursuant to Section 41958 of the Health and Safety Code, type approval certification regarding recirculation shall include evaluation by an independent testing laboratory approved by the Director. The laboratory evaluation shall determine, but is not limited to, proper secondary shut-off device operation with the primary shut-off device inoperable.

NOTE: Authority cited: Sections 12107 and 12500.5, Business and Professions Code; and Sections 41956(a) and 41956(c), Health and Safety Code. Reference: Sections 12107 and 12500.5, Business and Professions Code; and Sections 41956(a) and 41956(c), Health and Safety Code.

4054.3. T. Tolerances.

T.1. Performance accuracy - primary and secondary shut-off devices.

T.1.1. Primary shut-off device overrides.

The required, additional attempts, in total, to override any nozzle primary shut-off device shall not increase the dispenser volume indication by more than 1/10 gallon.

T.1.2. Secondary shut-off device.

With the vapor return line blocked by fuel (simulating recirculation due to primary shut-off device failure), each attempt to dispense fuel shall result in automatic nozzle shut off before the dispenser volume indication increases more than 3/10 gallon.

T.2. Assist system inches of H_2O column vacuum.

Assist vapor recovery systems shall operate at the inches of H_2O column vacuum recommended by the manufacturer, but shall not exceed -10 inches of H_2O column vacuum.

T.3. Delivery accuracy - 150 vehicle test.

The quantity of measured liquid collected in the vapor return line/lines shall not exceed both:

(a) 0.2 percent of any one individual vehicle fuel delivery, and

(b) 0.02 percent of the sum of the fuel deliveries to all vehicles observed (150 or more) during the delivery accuracy tests.

NOTE: Authority cited: Sections 12107 and 12500.5, Business and Professions Code; and Sections 41956(a) and 41956(c), Health and Safety Code. Reference: Sections 12107 and 12500.5, Business and Professions Code; and Sections 41956(a) and 41956(c), Health and Safety Code.

4055. N. Notes - Field Compliance Testing.

N.1. Test method - primary and secondary shut-off devices.

Examination of primary and secondary shut-off devices to determine the acceptability of an individual nozzle shall be performed using motor vehicles with fuel tanks and fill pipes representative of California vehicles and/or a field compliance test unit as specified in subsection S.2.

N.2. Test procedure - primary and secondary shut-off devices.

N.2.1. Initial test - primary shut-off device.

Dispense fuel into the fill pipe opening of a vehicle fuel tank or test unit in accordance with the instructions for the vapor recovery device, if any, and common public usage. The nozzle shall shut off automatically when the nozzle primary shut-off sensing mechanism is covered by the liquid. Automatic nozzle shut off shall occur with the dispenser operating at discharge rates both greater than and equal to the minimum rate allowed by the slowest hold-open clip setting, if any, or 3 gallons per minute, whichever is less.

N.2.2. Override test - primary shut-off device.

After the initial primary shut-off device activates, dispense enough additional fuel into the test unit to immerse the nozzle primary shut-off sensing mechanism in liquid. Record the dispenser indicator gallons. Make 6 additional, consecutive override attempts duplicating a range of customer usage and record the new indicated gallons. All 6 attempts shall result in automatic nozzle shut off before the dispenser volume indicator increases more than the 1/10 gallon limit as specified in subsection T.1.1.

NOTE: A test unit must be used for this procedure so the primary shut-off device sensing mechanism can be seen immersed in liquid.

N.2.3. Secondary shut-off device (if equipped).

Introduce sufficient fuel into the vapor return line (approximately 1/10 gallon or 375 milliliter) to block the return of vapors through the line. Hold in place a "U-shaped" configuration of the fuel discharge hose at a level lower than the nozzle to concentrate the liquid. Make one or more attempts to dispense fuel into an empty test unit or vehicle fuel tank that is within 3 gallons of being full, including the fill pipe. (Balance-type nozzles must make their intended tight seal at the fill pipe opening.) The nozzles shall shut off automatically before the dispenser volume indicator increases more than the 3/10 gallon limit for each attempt as specified in subsection T.1.2.

N.3. Assist systems.

To test assist systems for proper operation at the specified inches of H_2O column vacuum, refer to Section 4054.2, N.5.

NOTE: Authority cited: Sections 12107 and 12500.5, Business and Professions Code; and Sections 41956(a) and 41956(c), Health and Safety Code. Reference: Sections 12107 and 12500.5, Business and Professions Code; and Sections 41956(a) and 41956(c), Health and Safety Code.

FIELD COMPLIANCE TEST UNIT

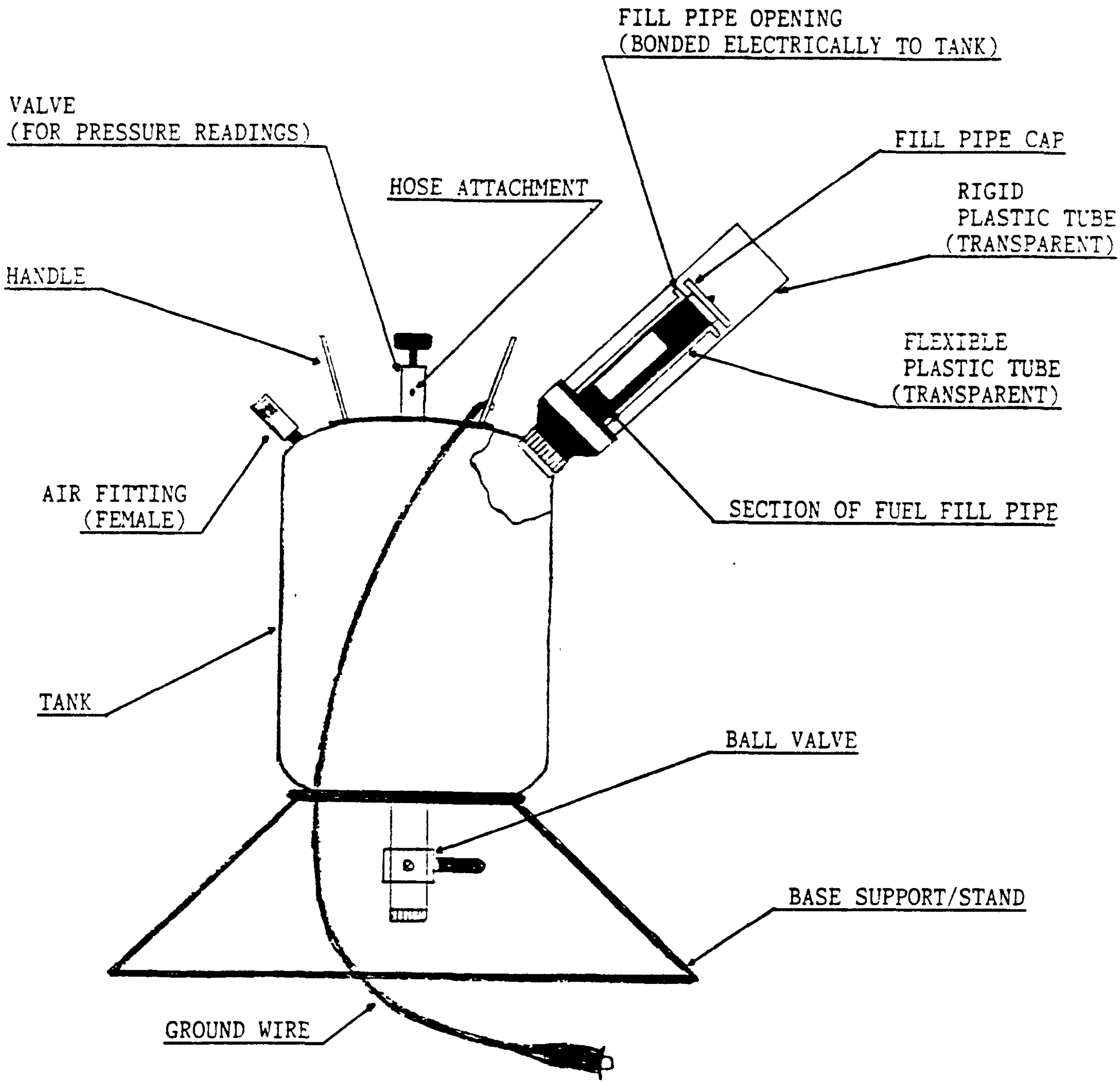


FIGURE 1

APPENDIX C.4

CALIFORNIA OCCUPATIONAL HEALTH AND SAFETY REQUIREMENTS

Where the special hazards of operation, sources of ignition, or exposures indicate a need, consideration shall be given to providing protection by one or more of the above means. Inserting for Fire and Explosion Prevention, NFPA No. 69–1973, provides information on inserting. (Title 24, T8–5557(a), (b))

HISTORY

1. Amendment filed 7–16–76; effective thirtieth day thereafter (Register 76, No. 29).

§ 5558. Tank Vehicle and Tank Car Loading and Unloading.

Tank vehicle and tank car loading or unloading facilities shall be separated from aboveground tanks, warehouses, other plant buildings or nearest line of adjoining property which may be built upon by a distance of 25 feet for Class I liquids and 15 feet for Class II and Class III liquids measured from the nearest position of any fill stem. Buildings for pumps or shelters for personnel may be a part of the facility. Operations of the facility shall comply with the appropriate portions of Article 147, Bulk Plants.

§ 5559. Fire Control.

(a) Approved portable fire extinguishers of appropriate size, type and number shall be provided. See Article 157.

(b) An approved automatic sprinkler system or an equivalent extinguishing system shall be installed when required by state or local regulations. Such systems shall comply with the applicable NFPA standard. (Title 24, T8–5559)

HISTORY

1. Amendment filed 7–16–76; effective thirtieth day thereafter (Register 76, No. 29).

§ 5560. Sources of Ignition.

(a) Precautions shall be taken to prevent the ignition of flammable vapors. Sources of ignition include but are not limited to open flames; lightning; smoking; cutting and welding; hot surfaces; frictional heat; static, electrical and mechanical sparks; spontaneous ignition, including heat-producing chemical reactions; and radiant heat.

(b) Class I liquids shall not be dispensed into metal containers unless the nozzle or fill pipe is in electrical contact with the container. This can be accomplished by maintaining metallic contact during filling, by a bond wire between them, or by other conductive path having an electrical resistance not greater than 106 ohms. Bonding is not required where a container is filled through a closed system, or the container is made of glass or other nonconducting material.

(c) See Article 140 for electrical classifications.

§ 5561. Maintenance and Repair.

(a) When necessary to do maintenance work in a flammable or combustible liquid processing area, the work shall be authorized by a responsible member of supervision.

(b) Hot work, such as welding or cutting operations, use of spark-producing power tools, and chipping operations shall be permitted only under supervision of a qualified person. The individual in charge shall make an inspection of the area to be sure that it is safe for the work to be done and that safe procedures will be followed for the work specified.

§ 5562. Housekeeping.

(a) Maintenance and operating practices shall be in accordance with established procedures which will tend to control leakage and prevent the accidental escape of flammable or combustible liquids. Spills shall be cleaned up promptly.

(b) Adequate aisles shall be maintained for unobstructed movement of personnel and so that fire protection equipment can be brought to bear on any part of the processing equipment.

(c) Combustible waste material and residues in a building or operating area shall be kept to a minimum, stored in closed metal waste cans, and disposed of daily.

(d) Ground area around buildings and operating areas shall be kept free of tall grass, weeds, trash or other combustible materials.

Article 144. Service Stations

§ 5565. Scope.

This Article applies to both automotive and marine service stations. (Title 24, T8–5565)

HISTORY

1. Amendment filed 7–16–76; effective thirtieth day thereafter (Register 76, No. 29).

§ 5566. Storage.

(a) Liquids shall be stored in closed containers not exceeding 60 gallons capacity, in tanks in special enclosures as described in 5567, in aboveground tanks as provided for in (e), or in tanks located underground as in Sections 5597, 5598 and 5599. Vent pipes on tanks storing gasoline shall discharge only upward in order to disperse vapors. Also see Section 5578.

(b) Aboveground tanks, located at an adjoining bulk plant, may be connected by piping to service station underground tanks if, in addition to valves at aboveground tanks, a valve is also installed within control of service station personnel. Apparatus dispensing Class I liquids into the fuel tanks of motor vehicles of the public shall not be located at a bulk plant unless separated by a fence or similar barrier from the area in which bulk operations are conducted.

(c) Class I liquids shall not be stored or handled within a building having a basement or pit into which flammable vapors may travel, unless such area is provided with ventilation which will prevent the accumulation of flammable vapors therein.

(d) Tanks supplying marine service stations and pumps not integral with the dispensing unit shall be on shore or on a pier of the solid-fill type, except as provided in (1) and (2).

(1) Where a shore location would require excessively long supply lines to dispensers, tanks may be installed on piers provided that applicable portions of Article 145 relative to spacing, diking and piping are complied with and the quantity so stored does not exceed 1,100 gallons aggregate capacity

(2) Shore tanks supplying marine service stations may be located aboveground where rock ledges or high water tables make underground tanks impractical.

(e) Where tanks are at an elevation which produces a gravity head on the dispensing unit, the tank outlet shall be equipped with a device, such as a solenoid valve, positioned adjacent to and downstream from the valve specified in Section 5596(b), so installed and adjusted that liquid cannot flow by gravity from the tank in case of piping or hose failure when the dispenser is not in use.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY

1. Amendment of subsections (a) and (f) filed 12–19–78; effective thirtieth day thereafter (Register 79, No. 1).
2. Amendment of subsection (a) filed 12–12–84; effective thirtieth day thereafter (Register 84, No. 50).
3. Repealer of subsection (d), and relettering of subsections (e) and (f) to subsections (d) and (e) filed 5–6–87; operative 6–5–87 (Register 87, No. 19).

§ 5567. Special Enclosures.

(a) When installation of tanks in accordance with Sections 5597, 5598 and 5599 is impractical because of property or building limitations, tanks for flammable or combustible liquids may be installed in buildings if enclosed as described in (b).

(b) Enclosure shall be liquid and vaportight without backfill. Sides, top and bottom of the enclosure shall be of reinforced concrete at least six inches thick, with openings for inspection through the top only. Tank connections shall be so piped or closed that neither vapors nor liquid can escape into the enclosed space. Means shall be provided to use portable equipment to discharge to the outside any liquid or vapors which might accumulate should leakage occur.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

C.4-2

HISTORY

1. Amendment filed 7-16-76, effective thirtieth day thereafter (Register 76, No 29)

2. Amendment of subsection (b) and repealer of subsection (c) filed 9-18-80, effective thirtieth day thereafter (Register 80, No. 38).

§ 5568. Inside Buildings.

(a) Except where stored in tanks as provided in Section 5567, no Class I liquids shall be stored within any service station building except in closed containers of aggregate capacity not exceeding 120 gallons. One container not exceeding 60 gallons capacity equipped with an approved pump is permitted

(b) Class I liquids may be transferred from one container to another in lubrication or service rooms of a service station building provided the electrical installation complies with Table FL-9 and provided that any heating equipment complies with Section 5575. See also Section 5580 for other possible sources of ignition

(c) Class II and Class III liquids may be stored and dispensed inside service station buildings from tanks of not more than 120 gallons each.

§ 5569. Piping, Valves and Fittings.

(a) The design, fabrication, assembly, test and inspection of the piping system shall be in accordance with Article 146 except that, where dispensing is from a floating structure, suitable lengths of oil-resistant flexible hose may be employed between the shore piping and the piping on the floating structure as made necessary by change in water level or shore line.

(1) Where excessive stray currents are encountered, piping handling Class I and Class II liquids at marine service stations shall be electrically insulated from the shore piping.

(2) Piping shall be located so as to be protected from physical damage.

(3) A readily accessible valve to shut off the supply from shore shall be provided in each pipeline at or near the approach to the pier and at the shore end of each marine pipeline adjacent to the point where a flexible hose is attached

(4) After completion of the installation, including any paving, that section of the pressure piping system between the pump discharge and the connection for the dispensing facility shall be tested for at least 30 minutes at the maximum operating pressure of the system. Such tests shall be repeated at 5-year intervals thereafter.

§ 5570. Remote Pumping Systems.

(a) This Section shall apply to systems for dispensing Class I liquids where such liquids are transferred from storage to individual or multiple dispensing units by pumps located elsewhere than at the dispensing units.

(b) Pumps shall be designed or equipped so that no part of the system will be subjected to pressures above its allowable working pressure. Each pump shall have installed on the discharge side an approved leak detection device which will provide an indication if the piping and dispensers are not essentially liquid-tight.

(c) Pumps installed above grade, outside of buildings, shall be located not less than 10 feet from lines of adjoining property which may be built upon, and not less than 5 feet from any building opening. When an outside pump location is impractical, pumps may be installed inside buildings as provided for dispensers in Section 5571(b), or in pits as provided in (d). Pumps shall be substantially anchored and protected against physical damage.

(d) Pits for subsurface pumps or piping manifolds of submersible pumps shall withstand the external forces to which they may be subjected without damage to the pump, tank or piping. The pit shall be no larger than necessary for inspection and maintenance and shall be provided with a fitted cover.

(e) An emergency shutoff valve, incorporating a fusible link or other thermally actuated device, designed to close automatically in event of severe impact or fire exposure shall be properly installed in the supply line at the base of each individual island-type dispenser or at the inlet of each overhead dispensing unit. If a coupling incorporating a slip-joint feature is used to join the emergency valve to the dispenser piping, the emergency valve shall automatically close before the slip-joint can disengage The automatic closing feature of this valve shall be checked at the time of initial installation and at least once a year thereafter by manually tripping the hold-open linkage

§ 5571. Fuel Dispensing System.

(a) Dispensing devices at an automotive service station shall be so located that all parts of the vehicle being served will be on the premises of the service station. Dispensing devices at marine service stations may be located on open piers, wharves, or floating docks or on shore or on piers of the solid-fill type and shall be located from other structures so as to provide room for safe ingress and egress of craft to be fueled. Dispensing units shall be in all cases at least 20 feet from any activity involving fixed sources of ignition.

(b) Dispensing units installed inside buildings after January 1, 1976, shall be separated from other areas by not less than a one-hour fire separation and shall be provided with adequate ventilation.

(c) When dispensing units are located below grade, only mechanical ventilation shall be used and the entire dispensing area shall be protected by an approved automatic sprinkler system. Ventilating systems shall be electrically interlocked with gasoline dispensing units so that the dispensing units cannot be operated unless the ventilating fan motors are energized.

§ 5572. Emergency Power Cutoff.

A clearly identified and easily accessible switch(es) or circuit breaker(s) shall be provided at a location remote from dispensing devices, including remote pumping systems, to shut off the power to all dispensing devices in the event of an emergency. (Title 24, T8-5572)

HISTORY

1. Amendment filed 7-16-76; effective thirtieth day thereafter (Register 76, No. 29).

§ 5573. Fuel Dispensing Units.

(a) Class I liquids shall be transferred from tanks by means of fixed pumps designed and equipped to allow control of the flow and prevent leakage or accidental discharge.

(b) Only listed nozzles may be used for dispensing Class I liquids. No such nozzle may be used if it shows evidence of having been dismantled.

EXCEPTION Nozzles which are an integral part of a gasoline vapor recovery system, certified by the State Air Resources Board and the State Fire Marshal pursuant to the provisions of Sections 41954 through 41961, inclusive, of the California Health and Safety Codes.

(c) Every dispensing nozzle for Class I liquids installed after December 31, 1978, shall contain evidence of listing so placed that any attempt to dismantle the nozzle will result in damage to such evidence, visible without disassembly or dismounting of the nozzle.

EXCEPTION: Nozzles which are an integral part of a gasoline vapor recovery system, certified by the State Air Resources Board and the State Fire Marshal pursuant to the provisions of Sections 41954 through 41961, inclusive, of the California Health and Safety Codes.

NOTE: A rebuilt nozzle valve shall be deemed in substantial compliance with (b) and (c) if:

(1) The nozzle valve has been approved, within the meaning of Section 3206, or

(2) The user of the nozzle valve shows a certificate prepared by the rebuilder which certifies that:

(A) The nozzle valve:

1. Has a spout that will break off at 150 pounds or less;

2. Will shut off automatically when dropped from a height of 22 inches to a concrete floor;

3. Has been pressure tested to 10 psi;

4. Has a poppet seat that has been pressure tested to 50 psi.

5. Will shut off automatically at a minimum flow rate of 5 gallons per minute; and

6. Can be reasonably expected to operate without malfunctioning due to mechanical failure in excess of 100,000 cycles under laboratory conditions; and

(B) The rebuilder of the nozzle valve has made application to a nationally recognized testing laboratory to obtain a listing in accordance with the Occupational Safety and Health Act of 1970.

(d) A control shall be provided that will permit the pump to operate only when a dispensing nozzle is removed from its bracket or normal position with respect to the dispensing unit, and the switch on this dispensing unit is manually actuated. This control shall also stop the pump when all nozzles have been returned, either to their brackets or to the normal non-dispensing position.

(e) Class I liquids shall not be dispensed by applying pressure to drums, barrels and similar containers. Approved pumps taking suction through the top of the container or approved self-closing faucets shall be used.

(f) The dispensing unit and its piping, except those attached to containers, shall be mounted on a concrete island or protected against collision damage by suitable means. If located indoors, the dispenser shall also be mounted either on a concrete island or protected against collision damage by suitable means and shall be located in a position where it cannot be struck by a vehicle that is out of control descending a ramp or other slope.

History

1. Amendment of subsections (b) and (c) filed 3-3-77; effective thirtieth day thereafter (Register 77, No. 10).

§ 5574. Electrical Equipment.

(a) This Section shall apply to areas where Class I liquids are stored, handled or dispensed. For areas where Class II or Class III liquids are stored, handled or dispensed, the electrical equipment may be installed in accordance with the provisions of the California Electrical Safety Orders for nonclassified locations.

(b) All electrical equipment and wiring shall be of a type specified by and shall be installed in accordance with the California Electrical Safety Orders. All electrical equipment integral with the dispensing hose or nozzle shall be suitable for use in Division 1 locations.

(c) Table FL-9 shall be used to delineate and classify areas for the purpose of installation of electrical equipment under normal circumstances. A classified area shall not extend beyond an unpierced wall, roof or other solid partition.

(d) The area classifications listed in (c) shall be based on the premise that the installation meets the applicable requirements of these orders in all respects (Title 24, T8-5574)

History

1. Amendment filed 7-16-76, effective thirtieth day thereafter (Register 76, No. 29).

Table FL-9

Electrical Equipment Classified Areas—Service Stations

Location	*Class I, Group D Division*	*Extent of Classified Area*
UNDERGROUND TANK Fill Opening	1	Any pit, box or space below grade level, any part of which is within the Division 1 or 2 classified area.
	2	Up to 18 inches above grade level within a horizontal radius of 10 feet from a loose fill connection and within a horizontal radius of 5 feet from a tight fill connection.
Vent Discharging Upward	1	Within 3 feet of open end of vent, extending in all directions
	2	Area between 3 feet and 5 feet of open end of vent, extending in all directions.
DISPENSING UNITS (except overhead-type) Pits	1	Any pit, box or space below grade level, any part of which is within the Division 1 or 2 classified area.
Dispenser	1	The area up to 4 feet vertically above the base within the enclosure, or up to a solid partition less than 4 feet above the base, located above the nozzle insertion level and above the level of any gasketed joint, hose or stuffing box.
	2	Within 18 inches horizontally in all directions from the Division 1 area within the enclosure.
Outdoor	2	Up to 18 inches above grade level within 20 feet horizontally of any edge of enclosure
INDOOR with Mechanical	2	Up to 18 inches above grade or Ventilation floor level within 20 feet horizontally of any edge of enclosure
with Gravity Ventilation	2	Up to 18 inches above grade or floor level within 25 feet horizontally of any edge of enclosure.
DISPENSING UNITS, OVERHEAD TYPE	1	Within the dispenser enclosure and 18 inches in all directions from the enclosure where not suitably cut off by ceiling or wall All electrical equipment integral with the dispensing hose or nozzle.
	2	An area extending 2 feet horizontally in all directionsbeyond the Division 1 area and extending to grade below this classified area.
	2	Up to 18 inches above grade level within 20 feet horizontally measured from a point vertically below the edge of any dispenser enclosure.
REMOTE PUMP—OUTDOOR	1	Any pit, box or space below grade level if any part is within a horizontal distance of 10 feet from any edge of pump.
	2	Within 3 feet of any edge of pump, extending in all directions. Also up to 18 inches above grade level within 10 feet horizontally from any edge of pump.
REMOTE PUMP—INDOOR	1	Entire area within any pit.
	2	Within 5 feet of any edge of pump, extending in all directions. Also up to 3 feet above floor or grade level within 25 feet horizontally from any edge of pump.
LUBRICATION OR SERVICE ROOM WITH DISPENSING	1	Any pit within any unventilated area.
	2	Any pit with ventilation.
	2	Area up to 18 inches above floor or grade level and 3 feet horizontally from a lubrication pit.
DISPENSER FOR CLASS I LIQUIDS	2	Within 3 feet of any fill or dispensing point, extending in all directions.
LUBRICATION OR SERVICE ROOM—WITHOUT DISPENSING	2	Entire area within any pit used for lubrication or similar services where Class I liquids may be released.
	2	Area up to 18 inches above any such pit, and extending a distance of 3 feet horizontally from any edge of the pit.
SPECIAL ENCLOSURE INSIDE BUILDING PER SECTION 5567	1	Entire enclosure.
SALES, STORAGE AND REST ROOMS	non classified	If there is any opening to these class-rooms within the extent of a Division 1 area, the entire room shall be classified as Division 1.

§ 5575. Heating Equipment.

(a) Heating equipment may be installed in the conventional manner except as provided in (b), (c), (d), or (e).

(b) Heating equipment may be installed in a special room separated from an area classified as Division 1 or Division 2 in Table FL–9 by walls having a fire–resistance rating of at least one hour and without any openings in the walls within 8 feet of the floor into an area classified as Division 1 or Division 2 in Table FL–9. This room shall not be used for combustible storage, and all air for combustion purposes shall come from outside the building

(c) Heating equipment using gas or oil fuel may be installed in the lubrication or service room where there is no dispensing or transferring of Class I liquids provided the bottom of the combustion chamber is at least 18 inches above the floor and the heating equipment is protected from physical damage.

(d) Heating equipment using gas or oil fuel listed for use in garages may be installed in the lubrication or service room where Class I liquids are dispensed provided the equipment is installed at least 8 feet above the floor.

(e) Electrical heating equipment shall conform to Section 5574. (Title 24, T8–5575)

HISTORY

1. Amendment filed 7–16–76; effective thirtieth day thereafter (Register 76, No. 29)

§ 5576. Fuel Delivery Nozzles.

(a) A listed manual or automatic–closing type hose nozzle shall be provided on dispensers used for the dispensing of Class I liquids.

(b) Overhead–type dispensing units shall be provided with a listed automatic–closing type hose nozzle valve without a latch–open device.

(1) A listed automatic–closing type hose nozzle valve with latch–open device may be used if the design of the system is such that the hose nozzle valve will close automatically in the event the valve is released from a fill opening or upon impact with a driveway

(c) Dispensing nozzles used at marine service stations shall be of the automatic–closing type without a latch–open device.

(d) Manual–closing type valves shall be held open manually during dispensing. Automatic–closing type valves may be used in conjunction with an approved latch–open device.

EXCEPTION: Nozzles which are an integral part of a gasoline vapor recovery system, certified by the State Air Resources Board and the State Fire Marshal pursuant to the provisions of Sections 41954 through 41961, inclusive, of the California Health and Safety Codes.

NOTE: Authority and reference cited: Section 142.3, Labor Code.

HISTORY

1. Amendment filed 3–3–77; effective thirtieth day thereafter (Register 77, No. 10).
2. Amendment filed 5–12–83; effective thirtieth day thereafter (Register 83, No. 20).

§ 5577. Dispensing Into Portable Containers.

(a) No delivery of any Class I or Class II liquid shall be made into portable containers unless the container is constructed of metal or is approved for such use, has a tight closure and is fitted with spout or so designed that the contents can be poured without spilling.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY

1. Repealer of subsection (b) filed 9–18–80; effective thirtieth day thereafter (Register 80, No. 38).

§ 5578. Attendance or Supervision of Dispensing.

(a) The provisions of Section 5566(a) shall not prohibit the temporary use of movable tanks in conjunction with the dispensing of flammable or combustible liquids into the fuel tanks of motor vehicles or other motorized equipment on premises not normally accessible to the public.

(b) The provisions of Section 5566(a) shall not prohibit the dispensing of Class I and Class II liquids in the open from a tank vehicle to a motor vehicle. Such dispensing shall be permitted provided:

(1) The dispensing is done on premises not open to the public.

(2) The dispensing hose does not exceed 50 feet in length.

(3) The dispensing nozzle is a listed automatic–closing type.

NOTE: Authority and reference cited: Section 142.3, Labor Code.

HISTORY

1. Amendment filed 5–12–83; effective thirtieth day thereafter (Register 83, No. 20).
2. Amendment filed 12–12–84; effective thirtieth day thereafter (Register 84, No. 50).

§ 5579. Drainage and Waste Disposal.

(a) Provision shall be made in the area where Class I liquids are dispensed to prevent spilled liquids from flowing into the interior of service station buildings. Such provision may be by grading driveways, raising door sills, or other equally effective means.

(b) Crankcase drainings and flammable or combustible liquids shall not be dumped into sewers, streams or adjoining property, but shall be stored in tanks or drums outside any building until removed from the premises.

§ 5580. Sources of Ignition.

In addition to the previous restrictions of this Article the following shall apply: There shall be no smoking or open flames in the areas used for fueling, servicing fuel systems for internal combustion engines, receiving or dispensing of Class I and Class II liquids. Conspicuous and legible signs prohibiting smoking shall be posted within sight of the customer being served. The motors of all equipment being fueled shall be shut off during the fueling operation except for emergency generators, pumps, etc., where continuing operation is essential.

§ 5581. Fire Control.

Each service station shall be provided with at least one fire extinguisher having a minimum classification of 5B, C located so that an extinguisher will be within 100 feet of each pump, dispenser, underground fill pipe opening, and lubrication or service room.

Article 145. Tank Storage

§ 5583. Materials.

(a) Tanks shall be built of steel except as provided in (b) through (d).

(b) Tanks may be built of materials other than steel.

(1) If required by the properties of the liquid stored. In case of doubt, the supplier, producer of the flammable or combustible liquid, or other competent authority should be consulted as to the suitability of the material of construction to be used;

(2) For installation underground;

(3) If used for the storage of Class IIIB liquids aboveground in areas not exposed to a spill or leak of a Class I or Class II liquid. If tanks storing Class IIIB liquids are located where they are exposed to a spill or leak of a Class I or Class II liquid, they shall be constructed in accordance with Section 5585; or

(4) If used for the storage of Class IIIB liquids inside a building protected by an approved automatic fire extinguishing system.

(c) Tanks built of materials other than steel shall be designed to specifications embodying principles recognized as good engineering design for the material used.

(d) Unlined concrete tanks may be used for storing flammable or combustible liquids having a gravity of 40 degrees API or heavier. Concrete tanks with special lining may be used for other services provided the design is in accordance with sound engineering practice.

(e) Special engineering consideration shall be required if the specific gravity of the liquid to be stored exceeds that of water or if the tanks are designed to contain flammable or combustible liquids at a liquid temperature below zero degrees F.

§ 5584. Fabrication.

(a) Tanks may be of any shape or type consistent with sound engineering design.

(b) Metal tanks shall be welded, riveted and caulked, or bolted, or constructed by use of a combination of these methods.

§ 5585. Atmospheric Tanks.

(a) Atmospheric tanks shall be built in accordance with approved standards of design. Atmospheric tanks may be built in accordance with:

(1) Underwriters' Laboratories, Inc., Standard For Steel Aboveground Tanks for Flammable and Combustible Liquids UL142-1972; Standard for Steel Underground Tanks for Flammable and Combustible Liquids, UL58-1972, or Standard for Steel Inside Tanks for Oil Burner Fuel, UL80-1968.

(2) American Petroleum Institute Standards No. 12A, Specification for Oil Storage Tanks with Riveted Shells, Seventh Edition, September 1951 or No. 650, Welded Steel Tanks for Oil Storage, Fifth Edition 1973.

(3) American Petroleum Institute Standards No. 12B, Specification for Bolted Production Tanks, Eleventh Edition, May, 1958 and Supplement I, April, 1962, No. 12D, Specification For Large Welded Production Tanks, Seventh Edition, August, 1957 and Supplement I, March, 1965; or No. 12F, Specification for Small Welded Production Tanks, Sixth Edition, March, 1968. Tanks built in accordance with these standards shall be used only as production tanks for storage of crude petroleum in oil-producing areas.

(b) Low pressure tanks and pressure vessels may be used as atmospheric tanks.

(c) Atmospheric tanks shall not be used for the storage of a flammable or combustible liquid at a temperature at or above its boiling point.

§ 5586. Low Pressure Tanks.

(a) The normal operating pressure of the tank shall not exceed the design pressure of the tank.

(b) Low pressure tanks shall be built in accordance with approved standards of design. Low pressure tanks may be built in accordance with:

(1) American Petroleum Institute Standard No. 620, Recommended Rules for the Design and Construction of Large, Welded, Low-Pressure Storage Tanks, Fifth Edition 1973.

(2) The principles of the Code for Unfired Pressure Vessels, Section VIII, Division I of the ASME Boiler and Pressure Vessels Code, 1971 Edition

(c) Atmospheric tanks built according to Underwriters' Laboratories, Inc. requirements in Section 5585(a) may be used for operating pressures not exceeding 1 psig and shall be limited to 2.5 psig under emergency venting conditions.

(d) Pressure vessels may be used as low pressure tanks.

§ 5587. Pressure Vessels.

(a) The normal operating pressure of the vessel shall not exceed the design pressure of the vessel.

(b) Storage tanks designed to withstand pressures above 15 psig shall meet the requirements of the Unfired Pressure Vessel Safety Orders.

§ 5588. Provisions for Internal Corrosion.

When tanks are not designed in accordance with the American Petroleum Institute, American Society of Mechanical Engineers or the Underwriters' Laboratories, Inc. Standards, or if corrosion is anticipated beyond that provided for in the design formulas used, additional metal thickness or suitable protective coatings or linings shall be provided to compensate for the corrosion loss expected during the design life of the tank.

§ 5589. Installation of Outside Aboveground Tanks.

(a) Every aboveground tank for the storage of Class I, Class II or Class IIIA liquids, except those liquids with boil-over characteristics and unstable liquids, operating at pressures not in excess of 2.5 psig and designed with a weak roof-to-shell seam or equipped with emergency venting devices which will not permit pressures to exceed 2.5 psig, shall be located in accordance with Table FL-10.

(1) For the purpose of this Section, a floating roof tank is one which incorporates a pontoon or double deck roof in an open top tank in accordance with API Standard 650, or one which incorporates an internal all-metal (except for seals) floating cover with a fixed metal roof with adequate ventilation at the eaves of the roof. Tanks with internal floating covers incorporating nonmetallic construction, such as plastics, shall be treated as cone roof tanks.

(b) Every aboveground tank for the storage of Class I, Class II or Class IIIA liquids, except those liquids with boil-over characteristics and unstable flammable or combustible liquids, operating at pressures exceeding 2.5 psig or equipped with emergency venting which will permit pressures to exceed 2.5 psig shall be located in accordance with Table FL-11.

(c) Every aboveground tank for the storage of Class I, Class II or Class IIIA liquids with boil-over characteristics shall be located in accordance with Table FL-12.

(d) Every aboveground tank for the storage of unstable liquids shall be located in accordance with Table FL-13.

(e) Every aboveground tank for the storage of Class IIIB liquids, excluding unstable liquids, shall be located in accordance with Table FL-14 except when located within a diked area or drainage path for a tank or tanks storing a Class I or Class II liquid. When a Class IIIB liquid storage tank is within the diked area or drainage path for a Class I or Class II liquid, (a) or (b) shall apply.

(f) Reference minimum distances for use in Tables FL-10 to FL-13, inclusive.

(g) Where end failure of horizontal pressure tanks and vessels may expose property, the tank shall be placed with the longitudinal axis parallel to the nearest important building.

Table FL-10

Type of Tank	*Protection*	*Minimum Distance in Feet From Property Line Which May Be Built Upon, Including the Opposite Side of a Public Way and Shall Be Not Less Than Five (5) Feet*	*Minimum Distance in Feet From Nearest Side of Any Public Way or From Nearest Important Building and Shall Be Not Less Than Five (5) Feet*
Floating Roof	Protection for Exposures	½ times diameter of tank but need not exceed 90 feet	⅙ times diameter of tank but need not exceed 30 feet
	None	Diameter of tank but need not exceed 175 feet	⅙ times diameter of tank but need not exceed 30 feet
Vertical with Weak Roof to Shell Seam	Approved foam or inerting system on the tank	½ times diameter of tank but need not exceed 90 feet	⅙ times diameter of tank but need not exceed 30 feet
	Protection for Exposures	Diameter of tank but need not exceed 175 feet	⅓ times diameter of tank but need not exceed 60 feet
	None	2 times diameter of tank but need not exceed 350 feet	⅓ times diameter of tank but need not exceed 60 feet
Horizontal and Vertical, with Emergency Relief Venting to Limit Pressures to 2.5 psig	Approved inerting system on the tank or approved foam system on vertical tanks	½ times Table FL-13	½ times Table FL-13
	Protection for Exposures	Table FL-13	Table FL-13
	None	2 times Table FL-13	Table FL-13

Table FL-11

Type of Tank	*Protection*	*Minimum Distance in Feet From Property Line Which May Be Built Upon, Including the Opposite Side of a Public Way*	*Minimum Distance in Feet From Nearest Side of Any Public Way or From Nearest Important Building*
Any Type	Protection for Exposures	1½ times Table FL-15 but shall not be less than 25 feet	1½ times Table FL-15 but shall not be less than 25 feet
	None	3 times Table FL-15 but shall not be less than 50 feet	1½ times Table FL-15 but shall not be less than 25 feet

Table FL-12

Type of Tank	*Protection*	*Minimum Distance in Feet From Property Line Which May Be Built Upon, Including the Opposite Side of a Public Way*	*Minimum Distance in Feet From Nearest Side of Any Public Way or From Nearest Important Building*
Floating Roof	Protection for Exposures	½ times diameter of tank but need not exceed 90 feet	⅙ times diameter of tank but need not exceed 30 feet
	None	Diameter of tank but need not exceed 175 feet	⅙ times diameter of tank but need not exceed 30 feet
Fixed Roof	Approved foam or inerting system	Diameter of tank but need not exceed 175 feet	⅓ times diameter of tank but need not exceed 60 feet
	Protection for Exposures	2 times diameter of tank but need not exceed 350 feet	⅔ times diameter of tank but need not exceed 120 feet
	None	4 times diameter of tank but need not exceed 350 feet	⅔ times diameter of tank but need not exceed 120 feet

Table FL-13

Type of Tank	*Protection*	*Minimum Distance in Feet from Property Line Which May Be Built Upon, Including the Opposite Side of a Public Way*	*Minimum Distance in Feet from Nearest Side of Any Public Way or From Nearest Important Building*
Horizontal and Vertical Tanks With Emergency Relief Venting to Permit Pressure Not in Excess of 2.5 psig	Tank protected with any one of the following: Approved water spray, Approved inerting, Approved insulation and refrigeration, Approved barricade	Table FL-15 but not less than 25 feet	Not less than 25 feet
	Protection for Exposures	2½ times Table FL-15 but not less than 50 feet	Not less than 50 feet
	None	5 times Table FL-15 but not less than 100 feet	Not less than 100 feet
Horizontal and Vertical Tanks With Emergency Relief Venting to Permit Pressure Over 2.5 psig	Tank Protected With Any One of the Following: Approved water spray, Approved inerting, Approved insulation and refrigeration, Approved barricade	2 times Table FL-15 but not less than 50 feet	Not less than 50 feet
	Protection for Exposures	4 times Table FL-15 but not less than 100 feet	Not less than 100 feet
	None	8 times Table FL-15 but not less than 150 feet	Not less than 150 feet

Table FL-14

Capacity Gallons	Minimum Distance in Feet from Property Line Which May Be Built Upon, Including the Opposite Side of a Public Way	Minimum Distance in Feet from Nearest Side of Any Public Way or from Nearest Important Building
12,000 or less	5	5
12,001 to 30,000	10	5
30,001 to 50,000	10	10
50,001 to 100,000	15	10
100,001 or more	15	15

Table FL-15

Capacity Tank Gallons	Minimum Distance in Feet from Property Line Which May Be Built Upon, Including the Opposite Side of a Public Way	Minimum Distance in Feet from Nearest Side of Any Public Way or from Nearest Important Building
275 or less	5	5
276 to 750	10	5
751 to 12,000	15	5
12,001 to 30,000	20	5
30,001 to 50,000	30	10
50,001 to 100,000	50	15
100,001 to 500,000	80	25
500,001 to 1,000,000	100	35
1,000,001 to 2,000,000	135	45
2,000,001 to 3,000,000	165	55
3,000,001 or more	175	60

NOTE: Authority cited: Section 142.3, Labor Code

HISTORY

1. Amendment of subsection (e) and Table FL-11 filed 12-19-78; effective thirtieth day thereafter (Register 79, No. 1).

§ 5590. Spacing (Shell-to-Shell) Between Aboveground Tanks.

(a) The distance between any two flammable or combustible liquid storage tanks shall not be less than three feet.

(b) Except as provided in (c), the distance between any two adjacent tanks any one of which stores Class I, Class II or Class IIIA liquids shall not be less than one-sixth the sum of their diameters, except when the diameter of one tank is less than one-half the diameter of the adjacent tank, the distance between the two tanks shall not be less than one-half the diameter of the smaller tank. Tanks used only for storing Class IIIB liquids may be spaced as provided in (a) unless within a diked area or drainage path for a tank storing a Class I or Class II liquid.

(c) Crude petroleum tanks at production facilities in isolated locations having capacities not exceeding 126,000 gallons (3,000 barrels), need not be separated by more than three feet.

(d) For unstable flammable or combustible liquids, the distance between such tanks shall not be less than one-half the sum of their diameters.

(e) When tanks are in a diked area containing Class I or Class II liquids, or in the drainage path of Class I or Class II liquids, and are compacted in three or more rows or in an irregular pattern, greater spacing or other means shall be provided to make inside tanks accessible for fire fighting purposes.

(f) The minimum separation between a liquefied petroleum gas container and a flammable or combustible liquid storage tank shall be 20 feet, except in the case of flammable or combustible liquid tanks operating at pressures exceeding 2.5 psig or equipped with emergency venting which will permit pressures to exceed 2.5 psig in which case the provisions of (a) and (b) shall apply. Suitable means shall be taken to prevent the accumulation of flammable or combustible liquids under adjacent liquefied petroleum gas containers such as by diversion curbs or grading. When flammable or combustible liquid storage tanks are within a diked area, the liquefied petroleum gas containers shall be outside the diked area and at least 10 feet away from the center line of the wall of the diked area. The foregoing provisions shall not apply when liquefied petroleum gas containers of 125 gallons or less capacity are installed adjacent to fuel oil supply tanks of 660 gallons or less capacity.

§ 5591. Location of Outside Aboveground Tanks with Respect to Important Buildings on Same Property.

Every outside aboveground tank shall be separated from important buildings on the same property by distances not less than those specified in Section 5589(a) through (e), whichever is applicable. The appropriate distance column in Tables FL-10 through 15 that shall be used shall be the one reading: "Minimum Distance in Feet from Nearest Side of a Public Way or from Nearest Important Building."

NOTE: Important buildings are those buildings containing employees, flammables or explosives.

§ 5592. Normal Venting for Aboveground Tanks.

(a) Atmospheric storage tanks shall be adequately vented to prevent the development of vacuum or pressure sufficient to distort the roof of a cone roof tank or exceeding the design pressure in the case of other atmospheric tanks, as a result of filling or emptying, and atmospheric temperature changes.

(b) Normal vents shall be sized either in accordance with the American Petroleum Institute Standard No. 2000, Venting Atmospheric and Low-Pressure Storage Tanks, 1968, or other accepted standard, or shall be at least as large as the filling or withdrawal connection, whichever is larger but in no case less than 1 1/4-inch nominal inside diameter.

(c) Low-pressure tanks and pressure vessels shall be adequately vented to prevent development of pressure or vacuum, as a result of filling or emptying and atmospheric temperature changes, from exceeding the design pressure of the tank or vessel. Protection shall also be provided to prevent overpressure from any pump discharging into the tank or vessel when the pump discharge pressure can exceed the design pressure of the tank or vessel

(d) If any tank or pressure vessel has more than one fill or withdrawal connection and simultaneous filling or withdrawal can be made, the vent size shall be based on the maximum anticipated simultaneous flow

(e) The outlet of all vents and vent drains on tanks equipped with venting to permit pressures exceeding 2.5 psig shall be arranged to discharge in such a way as to prevent localized overheating of or flame impingement on any part of the tank, in the event vapors from such vents are ignited

(f) Tanks and pressure vessels storing Class IA liquids shall be equipped with venting devices which shall be normally closed except when venting to pressure or vacuum conditions Tanks and pressure vessels storing Class IB and IC liquids shall be equipped with venting devices which shall be normally closed except when venting under pressure or vacuum conditions, or with approved flame arresters Tanks of 3,000 bbls capacity or less containing crude petroleum in crude-producing areas, and, outside aboveground atmospheric tanks under 1,000 gallons capacity containing other than Class IA flammable liquids may have open vents. (See Section 5594(b))

(g) Flame arresters or venting devices required in (f) may be omitted for IB and IC liquids where conditions are such that their use may, in case of obstruction, result in tank damage Liquid properties justifying the omission of such devices include, but are not limited to, condensation, corrosiveness, crystallization, polymerization, freezing or plugging When any of these conditions exist, consideration may be given to heating, use of devices employing special materials of construction, the use of liquid seals, or inserting.

§ 5593. Emergency Relief Venting for Fire Exposure for Aboveground Tanks.

(a) Except as provided in (b), every aboveground storage tank shall have some form of construction or device that will relieve excessive internal pressure caused by exposure fires.

(b) Tanks larger than 12,000 gallons capacity storing Class IIIB liquids and not within the diked area or the drainage path of Class I or Class II liquids do not require emergency relief venting

(c) In a vertical tank the construction referred to in (a) may take the form of a floating roof, lifter roof, a weak roof-to-shell seam, or other approved pressure relieving construction. The weak roof-to-shell seam shall be constructed to fail preferential to any other seam

(d) Where entire dependence for emergency relief is placed upon pressure relieving devices, the total venting capacity of both normal and emergency vents shall be enough to prevent rupture of the shell or bottom of the tank if vertical, or of the shell or heads if horizontal If unstable liquids are stored, the effects of heat or gas resulting from polymerization, decomposition, condensation, or self-reactivity shall be taken into account The total capacity of both normal and emergency venting devices shall be not less than that derived from Table FL-16 except as provided in (f) or (g). Such device may be a self-closing manhole cover, or one using long bolts that permit the cover to lift under internal pressure, or an additional or larger relief valve or valves The wetted area of the tank shall be calculated on the basis of 55 percent of the total exposed area of a sphere or spheroid, 75 percent of the total exposed area of a horizontal tank and the first 30 feet above grade of the exposed shell area of a vertical tank.

(e) For tanks and storage vessels designed for pressures over 1 psig, the total rate of venting shall be determined in accordance with Table FL-16, except that when the exposed wetted area of the surface is greater than 2,800 sq ft., the total rate of venting shall be in accordance with Table FL-17 or calculated by the following formula

$$CFH = 1,107\ A^{0.82}$$

Where

CFH = venting requirement, in cubic feet of free air per hour

A = exposed wetted surface, in square feet

The foregoing formula is based on $Q = 21,000\ A^{0.82}$

(f) The total emergency relief venting capacity for any specific stable liquid may be determined by the following formula.

$$\text{Cubic feet of free air per hour} = V \quad \frac{1337}{L\sqrt{M}}$$

V = cubic feet of free air per hour from Table FL-16

L = latent heat of vaporization of specific liquid in BTU per pound.

M = molecular weight of specific liquids

Table FL-16

Wetted Area Versus Cubic Feet Free Air Per Hour *
(14.7 psia and 60°F.)

Sq. Ft.	CFH	Sq. Ft.	CFH	Sq. Ft.	CFH
20	21,100	200	211,000	1,000	524,000
30	31,600	250	239,000	1,200	557,000
40	42,100	300	265,000	1,400	587,000
50	52,700	350	288,000	1,600	614,000
60	63,200	400	312,000	1,800	639,000
70	73,700	500	354,000	2,000	662,000
80	84,200	600	392,000	2,400	704,000
90	94,800	700	428,000	2,800	742,000
100	105,000	800	462,000	see (e)	
120	126,000	900	493,000		
140	147,000	1,000	524,000		
160	168,000				
180	190,000				
200	211,000				

* Interpolate for intermediate values.

Table FL-17

Sq. Ft.	CFH	Sq. Ft.	CFH
2,800	742,000	9,000	1,930,000
3,000	786,000	10,000	2,110,000
3,500	892,000	15,000	2,940,000
4,000	998,000	20,000	3,720,000
4,500	1,100,000	25,000	4,470,000
5,000	1,250,000	30,000	5,190,000
6,000	1,390,000	35,000	5,900,000
7,000	1,570,000	40,000	6,570,000
8,000	1,760,000		

(g) For tanks containing stable liquids, the required air-flow rate of (d) or (f) may be multiplied by the appropriate factor listed in the following schedule when protection is provided as indicated. Only one factor may be used for any one tank

.5 For drainage in accordance with Section 5595(b) for tanks over 200 square feet of wetted area

.3 For approved water spray in accordance with Standard for Water Spray Fixed Systems for Fire Protection, NFPA No 15, and drainage in accordance with Section 5595(b)

3 For approved insulation in accordance with (g)(1).

.15 For approved water spray with approved insulation in accordance with (g)(1) and drainage in accordance with Section 5595(b)

(1) Insulation systems for which credit is taken shall meet the following performance criteria and shall be subject to approval of the authority having jurisdiction

(A) Remain in place under fire exposure conditions.

(B) Withstand dislodgment when subjected to hose stream impingement during fire exposure. This requirement may be waived where use of solid hose streams is not contemplated or would not be practical.

(C) Maintain a maximum conductance value of 4.0 Btu's per hour per square foot per degree °F (Btu/hr./sq ft./ °F) when the outer insulation jacket or cover is at a temperature of 1,660° F and when the mean temperature of the insulation is 1,000° F.

(h) The outlet of all vents and vent drains on tanks equipped with emergency venting to permit pressures exceeding 2.5 psig shall be arranged to discharge in such a way as to prevent localized overheating of or flame impingement on any part of the tank, in the event vapors from such vents are ignited.

(i) Each commercial tank venting device shall have stamped on it the opening pressure, the pressure at which the valve reaches the full open position and the flow capacity at the latter pressure. If the start to open pressure is less than 2.5 psig and the pressure at full open position is greater than 2.5 psig, the flow capacity at 2.5 psig shall also be stamped on the venting device The flow capacity shall be expressed in cubic feet per hour of air at 60 F and 14.7 psia.

(1) The flow capacity of tank venting devices under 8 inches in nominal pipe size shall be determined by actual test of each type and size of vent. These flow tests may be conducted by the manufacturer if certified by a qualified impartial observer, or may be conducted by a qualified impartial outside agency. The flow capacity of tank venting devices 8 inches nominal pipe size and larger, including manhole covers with long bolts or equivalent, may be calculated provided that the opening pressure is actually measured, the rating pressure and corresponding free orifice area are stated, the word "calculated" appears on the nameplate, and the computation is based on a flow coefficient of 0.5 applied to the rated orifice area.

(2) A suitable formula for this calculation is.

$$CFH = 1.667\ C_f A \sqrt{(P_1 - P_a)}$$

where CFH = venting requirement in cubic feet of free air per hour

C_f = 0.5 (the flow coefficient)

A = the orifice are in sq. in.

P_1 = the absolute pressure inside the tank in inches of water

P_a = the absolute atmospheric pressure outside the tank in inches of water

§ 5594. Vent Piping for Aboveground Tanks.

(a) Vent piping shall be constructed in accordance with Article 146.

(b) Where vent pipe outlets for tanks storing Class I liquids are adjacent to buildings or public ways, they shall be located so that the vapors are released at a safe point outside of buildings and not less than 12 feet above the adjacent ground level. In order to aid their dispersion, vapors shall be discharged upward or horizontally away from closely adjacent walls. Vent outlets shall be located so that flammable vapors will not be trapped by eaves or other obstructions and shall be at least five feet from building openings.

(c) The manifolding of tank vent piping shall be avoided except where required for special purposes such as vapor recovery, vapor conservation or air pollution control. When tank vent piping is manifolded, pipe sizes shall be such as to discharge, within the pressure limitations of the system, the vapors they may be required to handle when manifolded tanks are subject to the same fire exposure.

(d) Vent piping for tanks storing Class I liquids shall not be manifolded with vent piping for tanks storing Class II or Class III liquids unless positive means are provided to prevent the vapors from Class I liquids from entering tanks storing Class II or Class III liquids, to prevent contamination and possible change in classification of the less volatile liquid.

§ 5595. Drainage, Dikes and Walls for Aboveground Tanks.

(a) The area surrounding a tank or group of tanks storing Class I, Class II or Class IIIA liquids shall be provided with drainage as in (b), or shall be diked as provided in (c), to prevent accidental discharge of liquid from endangering employees or facilities. Tanks storing Class IIIB liquids do not require drainage or dikes.

(b) Where protection is by means of a natural or man–made drainage system, such systems shall comply with the following:

(1) A slope of not less than 1 percent away from the tank toward the drainage system shall be provided.

(2) The drainage system shall terminate in vacant land or other area or in an impounding basin having a capacity not smaller than that of the largest tank served. This termination area and the route of the drainage system shall be so located that, if the flammable or combustible liquids in the drainage system are ignited, the fire will not seriously expose tanks or adjoining property.

(3) The drainage system, including automatic drainage pumps, shall not discharge to adjoining property, natural water courses, public sewers, or public drains unless the discharge of flammable or combustible liquids would not constitute a hazard, or the system is so designed that it will not permit flammable or combustible liquids to be released.

(c) Where protection is accomplished by retaining the liquid around the tank by means of a dike, the volume of the diked area shall comply with the following requirements:

(1) The volumetric capacity of the diked area shall not be less than the greatest amount of liquid that can be released from the largest tank within the diked area, assuming a full tank. To allow for volume occupied by tanks, the capacity of the diked area enclosing more than one tank shall be calculated after deducting the volume of the tanks, other than the largest tank, below the height of the dike.

(2) Walls of the diked area shall be of earth, steel, concrete or solid masonry designed to be liquid–tight and to withstand a full hydrostatic head. Earthen walls 3 feet or more in height shall have a flat section at the top not less than 2 feet wide. The slope of an earthen wall shall be consistent with the angle or repose of the material of which the wall is constructed. Diked areas for tanks containing Class I liquids located in extremely porous soils may require special treatment to prevent seepage of hazardous quantities of liquids to low lying areas or waterways in case of spills.

(3) Except as provided in (4) below, the walls of earthen dikes shall be restricted to an average interior height of six feet above interior grade.

(4) Dikes may be higher than an average of six feet above interior grade where provisions are made for normal and necessary emergency access to tanks, valves and other equipment, and safe egress from the diked enclosure.

(A) Where the average height of the dike containing Class I liquids is over 12 feet high, measured from interior grade, or where the distance between any tank and the top inside edge of the dike wall is less than the height of the dike wall, provisions shall be made for normal operation of valves and for access to tank roof(s) without entering below the top of the dike. These provisions may be met through the use of remote operated valves, elevated walkways or similar arrangements.

(B) Piping passing through dike walls shall be designed to prevent excessive stresses as a result of settlement or fire exposure.

(C) The minimum distance between tanks and toe of the interior dike walls shall be five feet.

(5) Where provision is made for draining water from diked areas, drainage shall be provided at a uniform slope of not less than one percent away from tanks toward a sump, drainbox or other safe means of disposal located at the greatest practical distance from the tank. Such drains shall normally be controlled in a manner so as to prevent flammable or combustible liquids from entering natural water courses, public sewers, or public drains, if their presence would constitute a hazard. Control of drainage shall be accessible under fire conditions and outside the dike.

(6) No loose combustible material, empty or full drum or barrel, shall be permitted within the diked area.

(7) Each diked area containing two or more tanks shall be subdivided preferably by drainage channels or at least by intermediate curbs in order to prevent spills from endangering adjacent tanks within the diked area as follows:

(A) When storing normally stable liquids in vertical cone roof tanks constructed with weak roof–to–shell seam or approved floating roof tanks or when storing crude petroleum in producing areas in any type of tank, one subdivision for each tank in excess of 10,000 bbls. and one subdivision for each group of tanks (no tank exceeding 10,000 bbls. capacity) having an aggregate capacity not exceeding 15,000 bbls.

(B) When storing normally stable flammable or combustible liquids in tanks not covered in subparagraph (1), one subdivision for each tank in excess of 100,000 gallons (2,500 bbls.) and one subdivision for each group of tanks (no tank exceeding 100,000 gallons capacity) having an aggregate capacity not exceeding 150,000 gallons (3,570 bbls.).

(C) When storing unstable liquids in any type of tank, one subdivision for each tank except that tanks installed in accordance with the drainage requirements of the Standard for Water Spray Fixed Systems for Fire Protection, NFPA No. 15–1973, shall require no additional subdivision. Since unstable liquids will react more rapidly when heated than when at ambient temperatures, subdivision by drainage channels is the preferred method.

(D) The drainage channels or intermediate curbs shall be located between tanks so as to take full advantage of the available space with due regard for the individual tank capacities. Intermediate curbs, where used, shall be not less than 18 inches in height.

§ 5596. Tank Openings Other Than Vents for Aboveground Tanks.

(a) Connections for all tank openings shall be vapor–tight and liquid–tight.

(b) Openings for gaging on tanks storing Class I liquids shall be provided with a vaportight cap or cover. Such covers shall be closed when not gaging.

(c) For Class IB and Class IC liquids other than crude oils, gasolines and asphalts, the fill pipe shall be so designed and installed as to minimize the possibility of generating static electricity. A fill pipe entering the top of a tank shall terminate within six inches of the bottom of the tank and shall be installed to avoid excessive vibration.

(d) Filling and emptying connections for Class I, Class II and Class IIIA liquids which are made and broken shall be located outside of buildings at a location free from any source of ignition and not less than five feet away from any building opening. Such connections for any liquid shall be closed and liquid–tight when not in use and shall be properly identified.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY

1. Repealer of subsections (b) and (c) and consecutive relettering of subsections (d)–(f) filed 9–18–80; effective thirtieth day thereafter (Register 80, No. 38).

§ 5597. Installation of Underground Tanks.

(a) Excavation for underground storage tanks shall be made with due care to avoid undermining of foundations of existing structures. Underground tanks or tanks under buildings shall be so located with respect to existing building foundations and supports that the loads carried by the latter cannot be transmitted to the tank. The distance from any part of a tank storing Class I liquids to the nearest wall of any basement or pit shall be not less than one foot, and to any property line that may be built upon, not less than three feet. The distance from any part of a tank storing Class II or Class III liquids to the nearest wall of any basement, pit or property line shall be not less than one foot

(b) Underground tanks shall be set on firm foundations and surrounded with at least six inches of noncorrosive, inert materials such as clean sand, earth or gravel well tamped in place. The tank shall be placed in the hole with care since dropping or rolling the tank into the hole can break a weld, puncture or damage the tank or scrape off the protective coating of coated tanks. Tanks shall be covered with a minimum of two feet of earth, or shall be covered with not less than one foot of earth, on top of which shall be placed a slab of reinforced concrete not less than four inches thick. When underground tanks are, or are likely to be, subjected to traffic, they shall be protected against damage from vehicles passing over them by at least three feet of earth cover, or 18 inches of well–tamped earth, plus six inches of reinforced concrete or eight inches of asphaltic concrete. When asphaltic or reinforced concrete paving is used as part of the protection, it shall extend at least one foot horizontally beyond the outline of the tank in all directions.

(c) Corrosion protection for the tank and its piping shall be provided by one or more of the following methods:

(1) Use of protective coatings or wrappings,

(2) Cathodic protection, or

(3) Corrosion resistant materials of construction

Selection of the type of protection to be employed shall be based upon the corrosion history of the area and the judgment of a qualified engineer.

§ 5598. Vents for Underground Tanks.

(a) Vent pipes from underground storage tanks storing Class I liquids shall be so located that the discharge point is outside of buildings, higher than the fill pipe opening, and not less than 12 feet above the adjacent ground level Vent pipes shall not be obstructed by devices that will cause excessive back pressure Vent outlets shall be so located and directed that flammable vapors will not accumulate or travel to an unsafe location, enter building openings or be trapped under eaves. Tanks containing Class IA liquids shall be equipped with pressure and vacuum venting devices which shall be normally closed except when venting to pressure or vacuum conditions Tanks storing Class IB or Class IC liquids shall be equipped with pressure–vacuum vents or with approved flame arresters. Tanks storing gasoline are exempt from the requirements for pressure and vacuum venting devices or flame arresters provided the vent does not exceed 3 inches in nominal inside diameter.

(b) Each tank shall be vented through piping adequate in size to prevent blow–back of vapor or liquid at the fill opening while tank is being filled. Vent pipes shall be not less than 1 1/4–inch nominal inside diameter. The vent size depends upon the filling or withdrawal rate whichever is larger, the vent line length and the tank design pressure. Vent piping sized in accordance with Table FL–18 will prevent the pressure in the tank from exceeding 2.5 psig.

Table FL–18
Vent Line Diameters

Maximum Flow GPM	*Pipe Length ** *50 Feet*	*100 Feet*	*200 Feet*
100	1 1/4–inch	1 1/4–inch	1 1/4–inch
200	1 1/4–inch	1 1/4–inch	1 1/4–inch
300	1 1/4–inch	1 1/4–inch	1 1/2–inch
400	1 1/4–inch	1 1/2–inch	2–inch
500	1 1/2–inch	1 1/2–inch	2–inch
600	1 1/2–inch	2–inch	2–inch
700	2–inch	2–inch	2–inch
800	2–inch	2–inch	3–inch
900	2–inch	2–inch	3–inch
1,000	2–inch	2–inch	3–inch

* Vent lines of 50 feet, 100 feet, and 200 feet of pipe plus 7 ells

(c) Vent pipes from tanks storing Class II or Class III liquids shall terminate outside of building and higher than the fill pipe opening. Vent outlets shall be above normal snow level. They may be fitted with return bends, course screens or other devices to minimize ingress of foreign material.

(d) Vent piping shall be constructed in accordance with Article 146 Vent pipes shall be so laid as to drain toward the tank without sags or traps in which liquid can collect. They shall be located so that they will not be subjected to physical damage. The tank end of the vent pipe shall enter the tank through the top

(e) When tank vent piping is manifolded, pipe sizes shall be such as to discharge, within the pressure limitations of the system, the vapors they may be required to handle when manifolded tanks are filled simultaneously.

(f) Vent piping for tanks storing Class I liquids shall not be manifolded with vent piping for tanks storing Class II or Class III liquids unless positive means are provided to prevent the vapors from Class I liquids from entering tanks storing Class II or Class III liquids, to prevent contamination and possible change in classification of the less volatile liquid

§ 5599. Tank Openings Other Than Vents for Underground Tanks.

(a) Connections for all tank openings shall be liquid–tight.

(b) Openings for manual gaging, if independent of the fill pipe, shall be provided with a liquid–tight cap or cover. Covers shall be kept closed when not gaging. If inside a building, each such opening shall be protected against liquid overflow and possible vapor release by means of a spring loaded check valve or other approved device.

(c) Fill and discharge lines shall enter tanks only through the top. Fill lines shall be sloped toward the tank.

(d) For Class IB and Class IC liquids other than crude oils, gasolines and asphalts, the fill pipe shall be so designed and installed as to minimize the possibility of generating static electricity by terminating within six inches of the bottom of the tank.

(e) Filling and emptying connections for Class I, Class II or Class IIIA liquids which are made and broken shall be located outside of buildings at a location free from any source of ignition and not less than five feet away from any building opening. Such connection for any liquid shall be closed and liquid–tight when not in use and shall be properly identified.

§ 5600. Installation of Tanks Inside of Buildings.

(a) Location. Tanks shall not be permitted inside of buildings except as provided in Articles 142, 143, 144 or 148.

(b) Vents. Vents for tanks inside of buildings shall be as required in Sections 5592, 5593, 5594(b) and 5598 except that emergency venting by the use of weak roof seams on tanks shall not be permitted. Automatic sprinkler systems designed in accordance with the requirements of the Standard for the Installation of Sprinkler Systems, NFPA No. 13–1974 may be accepted as equivalent to approved water spray systems for purposes of calculating the required air flow rates for emergency vents in Section 5593(g). Except for tanks containing Class IIIB liquids, vents shall terminate outside the buildings.

(c) Vent Piping. Vent piping shall be constructed in accordance with Article 146.

§ 5601. Tank Openings Other Than Vents for Tanks Inside Buildings.

(a) Connections for all tank openings shall be liquid-tight.

(b) Each connection to a tank inside of buildings through which liquid can normally flow shall be provided with an internal or an external valve located as close as practical to the shell of the tank.

(c) Flammable or combustible liquid storage tanks located inside of buildings, except in one-story buildings designed and protected for flammable or combustible liquid storage, shall be provided with an automatic-closing heat-actuated valve on each withdrawal connection below the liquid level, except for connections used for emergency disposal, to prevent continued flow in the event of fire in the vicinity of the tank. This function may be incorporated in the valve required in (b), and if a separate valve, shall be located adjacent to the valve required in (b).

(d) Openings for manual gaging of Class I or Class II liquids, if independent of the fill pipe, shall be provided with a vaportight cap or cover. Openings shall be kept closed when not gaging. Each such opening for any liquid shall be protected against liquid overflow and possible vapor release by means of a spring loaded check valve or other approved device. Substitutes for manual gaging include, but are not limited to, heavy-duty flat gage glasses, magnetic, hydraulic or hydrostatic remote reading devices and sealed float gages.

(e) For Class IB and Class IC liquids other than crude oils, gasolines and asphalts, the fill pipe shall be so designed and installed as to minimize the possibility of generating static electricity by terminating within six inches of the bottom of the tank.

(f) The fill pipe inside of the tank shall be installed to avoid excessive vibration of the pipe.

(g) The inlet of the fill pipe for Class I, Class II and Class IIIA liquids shall be located outside of buildings at a location free from any source of ignition and not less than five feet away from any building opening. The inlet of the fill pipe for any liquid shall be closed and liquid-tight when not in use, and the fill connection shall be properly identified.

(h) Tanks storing Class I, Class II and Class IIIA liquids inside buildings shall be equipped with a device, or other means shall be provided, to prevent overflow into the building. Suitable devices include, but are not limited to, a float valve, a preset meter on the fill line, a valve actuated by the weight of the tank contents, a low head pump which is incapable of producing overflow, or a liquid-tight overflow pipe at least one pipe size larger than the fill pipe discharging by gravity back to the outside source of liquid or to an approved location.

§ 5602. Supports, Foundations and Anchorage for All Tank Locations.

(a) Tanks shall rest on the ground or on foundations made of concrete, masonry, piling of steel. Tank foundations shall be designed to minimize the possibility of uneven settling of the tank and to minimize corrosion in any part of the tank resting on the foundation.

(b) When tanks are supported above from the foundations, tank supports shall be installed on firm foundations. Supports for tanks storing Class I, Class II or Class IIIA liquids shall be of concrete, masonry or protected steel. Single wood timber supports (not cribbing) laid horizontally may be used for outside aboveground tanks if not more than 12 inches high at their lowest point.

(c) Steel supports or exposed piling for tanks storing Class I, Class II or Class IIIA liquids shall be protected by materials having a fire resistant rating of not less than two hours, except that steel saddles need not be protected if less than 12 inches high at their lowest point. Water spray protection or its equivalent may be used in lieu of fire-resistive materials to protect supports.

(d) The design of the supporting structure for tanks such as spheres shall requires special engineering consideration.

(e) Every tank shall be so supported as to prevent the excessive concentration of loads on the supporting portion of the shell.

(f) In areas subject to earthquakes, the tank supports and connections shall be designed to resist damage as a result of such shocks.

§ 5603. Sources of Ignition.

In locations where flammable vapors may be present, precautions shall be taken to prevent ignition by eliminating or controlling sources of ignition. Sources of ignition may include open flames, lightning, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical and mechanical), spontaneous ignition, chemical and physical-chemical reactions and radiant heat.

§ 5604. Testing.

(a) All tanks, whether shop-built or field-erected, shall be tested before they are placed in service in accordance with the applicable paragraphs of the Code under which they were built. The ASME Code stamp, API monogram, or the Listing Mark of Underwriters' Laboratories, Inc., on a tank shall be evidence of compliance with this test. Tanks not marked in accordance with the above Codes shall be tested before they are placed in service in accordance with good engineering principles and reference shall be made to the sections on testing in the Codes listed in Sections 5585, 5586(b) or 5587(b).

(b) When the vertical length of the fill and vent pipes is such that when filled with liquid the static head imposed upon the bottom of the tank exceeds 10 pounds per square inch, the tank and related piping shall be tested hydrostatically to a pressure equal to the static head thus imposed.

(c) In addition to the test called for in (a) and (b), all tanks and connections shall be tested for tightness. Except for underground tanks, this tightness shall be made at operating pressure with air, inert gas or water prior to placing the tank in service. In the case of field-erected tanks the test called for in (a) or (b) may be considered to be the test for tank tightness. Underground tanks and piping, before being covered, enclosed, or placed in use, shall be tested for tightness hydrostatically, or with air pressure at not less than three pounds per square inch and not more than five pounds per square inch. (See Section 5612 for testing pressure piping.)

(d) Before the tank is initially placed in service, all leaks or deformations shall be corrected in an acceptable manner. Mechanical caulking is not permitted for correcting leaks in welded tanks except pin hole leaks in the roof.

(e) Tanks to be operated at pressures below their design pressure may be tested by the applicable provisions of (a) or (b) based upon the pressure developed under full emergency venting of the tank.

§ 5605. Protection of Tanks in Locations That May Be Flooded.

Where a tank is located in an area that may be subjected to flooding, installation shall be in accordance with the provisions of NFPA No. 30–1973.

Article 146. Piping, Valves and Fittings

§ 5606. General.

(a) The design, fabrication, assembly, test and inspection of piping systems containing flammable or combustible liquids shall be suitable for the expected working pressures and structural stresses. Conformity with the applicable sections of ANSI B31 American National Standard Code for Pressure Piping, and the provisions of this chapter, shall be con-

APPENDIX C.5

CALIFORNIA FIRE MARSHAL REQUIREMENTS

1

§ 1584.4. Packaging.

No provisions of these regulations nor the standards referenced herein shall allow any person to repackage any compound from the original manufacturer's packaging unit. The manufacturer of plosophoric compounds shall package and ship only in units which have been determined to meet the standards for shipping of hazardous

Chapter 11. Transportation of Flammable Liquids in Cargo Tanks on Highways

NOTE: Authority cited: Section 34020, Vehicle Code. Reference: Sections 34001 to 34102, Vehicle Code.

HISTORY

1. Repealer of Subchapter 11 (§§ 1600 through 1828) and new Subchapter 11 (§§ 1600–1605, 1605.1, 1605.2, 1608, 1609, 1609.1, 1610–1612, 1620–1626, 1630–1634, 1640–1655, 1670–1680, 1700–1719, 1750–1754, 1775–1779, 1790–1796, 1800–1803, 1825–1830, 1850–1857, 1870–1875, 1880–1882, 1890–1908, 1910–1917) filed 7-1-70; effective thirtieth day thereafter (Register 70, No. 27). For prior history see Register 62, No. 17. (Ed. note—original regulations filed 8-22-62, designated effective 8-23-62.)
2. Repealer of Subchapter 11 (Articles 1-18, Sections 1600–1917, not consecutive) filed 7-11-85; effective thirtieth day thereafter (Register 85, No. 28). For prior history, see Registers 80, No. 46; 79, No. 19, 79, No 11; 79, No. 9; 79, No. 4; 77, No. 45; 76, No. 26, 75, No. 47; 72, No. 52; 71, No. 41; and 71, No. 27.

Chapter 11.5. Gasoline Vapor Control Systems

Article 1. Administration

§ 1918. Title.

NOTE: Authority cited: Section 11349.1, Government Code. Reference: Sections 41954–41961, Health and Safety Code.

HISTORY

1. New Subchapter 11.5 (Sections 1918–1918.84, not consecutive) filed 4-18-77 as an emergency; effective upon filing (Register 77, No. 17).
2. Repealer of Subchapter 11.5 (Sections 1918–1918.84, not consecutive) and new Subchapter 11.5 (Sections 1918–1918.84, not consecutive) filed 8-12-77 as an emergency; designated effective 8-16-77. Certificate of Compliance included (Register 77, No. 33).
3. Editorial correction (Register 77, No. 51).
4. Repealer filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.1. Purpose.

These regulations establish minimum standards of fire safety for vapor recovery systems or components.

Any protective device or devices, including but not limited to impact valves, shear sections, flame arrestors or automatic fire checks may be required in addition to the components specified in these regulations, if in the judgement of the State Fire Marshal such additional means of protection from fire and explosion are necessary.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. Amendment filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.2. Scope.

These regulations shall apply to all gasoline dispensing equipment containing a gasoline vapor control system when such system is required by the California Air Resources Board or any air pollution control agency having jurisdiction. The design, construction and installation requirements of such systems shall be applied uniformly throughout the State.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41950 and 41960, Health and Safety Code.

HISTORY

1. Amendment filed 11-13-80; effective thirtieth day thereafter (Register 80, No. 46).
2. Amendment of NOTE filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.3. Authority.

NOTE: Authority cited: Section 11349.1, Government Code.

HISTORY

1. Repealer filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.4. Validity.

NOTE: Authority cited: Section 11349.1, Government Code.

HISTORY

1. Repealer filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.5. Local Ordinances.

NOTE: Authority cited: Section 11349.1, Government Code.

HISTORY

1. Repealer filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.6. Order of Precedence.

NOTE: Authority cited: Section 11349.1, Government Code.

HISTORY

1. Repealer filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.7. Violations.

NOTE: Authority cited: Section 11349.1, Government Code.

HISTORY

1. Repealer filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

Article 2. Definitions

§ 1918.10. "A" Definitions.

(a) ARB. "ARB" means Air Resources Board (of California).

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41954, 41950 and 41962, Health and Safety Code.

HISTORY

1. Renumbering and amendment of former Section 1918.10 to Section 1918.20, and renumbering and amendment of former Section 1918.20(a) to Section 1918.10 filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.11. "D" Definitions.

(a) Dispensing Device. A unit assembly approved for installation consisting of a power-operated pumping unit, strainers, metering devices, valves, dispensing outlet(s) for hoses and dispensing nozzles designed to stop the discharge of liquid automatically when the control level of the dispensing nozzle is released.

(b) Dispensing Nozzle. A regulating mechanism with spout approved for installation in conjunction with a "dispensing device" which controls the flow of gasoline into fuel tanks, and returns vapors to an underground tank.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41954, 41950 and 41962, Health and Safety Code.

HISTORY

1. Renumbering and amendment of former Section 1918.11 to Section 1918.21, and renumbering and amendment of former Section 1918.20(d) to Section 1918.11 filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.12. "F" Definitions.

(a) Flame Arrestor. A device approved for installation in piping carrying a flammable vapor/air mixture, to prevent flame travel beyond the point of installation of the device.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956, 41950 and 41962, Health and Safety Code.

HISTORY

1. Renumbering and amendment of former Section 1918.12 to Section 1918.22, and renumbering and amendment of former Section 1918.20(f) to Section 1918.12 filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.13. "G" Definitions.

(a) Gasoline. See Section 41950(c), Health and Safety Code.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956, 41950 and 41962, Health and Safety Code.

HISTORY

1. Renumbering and amendment of former Section 1918.13 to Section 1918.23, and renumbering and amendment of former Section 1918.20(g) to Section 1918.13 filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.14. "I" Definitions.

(a) Impact Valve. A device approved for installation in piping which automatically closes by the activation of a fusible link through exposure to fire or severe physical impact, or both.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956, 41950 and 41962, Health and Safety Code.

HISTORY

1. Renumbering and amendment of former Section 1918.14 to Section 1918.24, and renumbering and amendment of former Section 1918.20(i) to Section 1918.14 filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.15. "L" Definitions.

(a) Labeled. "Labeled" shall mean Systems or components bearing the label, symbol, or other identifying mark of a testing laboratory approved by the State Fire Marshal, or the label of the State Fire Marshal.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956, 41950 and 41962, Health and Safety Code.

HISTORY

1. Renumbering and amendment of former Section 1918.15 to Section 1918.25, and renumbering and amendment of former Section 1918.20(l) to Section 1918 15 filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.16. "N" Definitions.

(a) Nozzle. See dispensing nozzle.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41954, 41950 and 41962, Health and Safety Code.

HISTORY

1. Renumbering of former Section 1918.16 to Section 1918.26, and renumbering and amendment of former Section 1918.20(n) to new Section 1918.16 filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.17. "U" Definitions.

(a) Uniform Fire Code. The 1982 edition of the Uniform Fire Code. Copies available from I.C.B.O., 5360 South Workman Mill Road, Whittier, CA 90601.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Section 41956, Health and Safety Code.

HISTORY

1. New section filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.18. "V" Definitions.

(a) Vapor Recovery System. See Section 41952, Health and Safety Code.

(b) Vapor Balance System. A system designed to capture and retain, solely by means of displacement with or without processing, gasoline vapors emitted during dispensing operations.

(c) Vapor Assist System. A system whereby mechanical and/or chemical means are used to capture and retain, with or without processing, gasoline vapors emitted during dispensing operations.

(d) Vapor Processing Unit. Vapor Processing Equipment in one contiguous unit. Vapor processing unit shall not be construed interpreted to include inline flame arrestors, inline fire checks, pressure vacuum valves, inline check valves, and dispenser flow regulators.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41954, 41950 and 41962, Health and Safety Code.

HISTORY

1. Renumbering and amendment of former Section 1918.20(v) to Section 1918.18 filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

Article 3. Application for Certification

§ 1918.20. Application.

(a) Original. Any manufacturer desiring the certification and listing of any gasoline vapor recovery system or component part shall submit a completed application for evaluation and certification to the State Fire Marshal on forms provided by him. Such form shall be accompanied by the fee for evaluation and certification as prescribed in Section 1918.25.

(b) Revision. Any manufacturer desiring a revision to be made to the original certified system or component shall submit a completed application for revision to the State Fire Marshal on forms provided by him. Such form shall be accompanied by the fee for evaluation and certification as prescribed in Section 1918.25.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41955, 41958, Health and Safety Code.

HISTORY

1. Renumbering and amendment of former Section 1918.20(a) to Section 1918.10, Section 1918.20(d) to Section 1918.11, Section 1918.20(f) to Section 1918.12, Section 1918.20(g) to Section 1918.13, Section 1918.20(i) to Section 1918.14, Section 1918.20(l) to Section 1918.15, Section 1918.20(n) t Section 1918.16 and Section 1918.20(v) to Section 1918.18, and renumbering and amendment of former Section 1918.10 to Section 1918.20 filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.21. Required Submissions for Certification.

(a) In addition to the application and fee required by this subchapter the State Fire Marshal may require that sample specimens, taken from regular production, be submitted to him for evaluation. The State Fire Marshal may require the assembly or erection of a sample specimen for evaluation purposes.

The applicant shall assume all responsibility relating to the assembly or erection of such specimen, including but not limited to the cost, liability and removal thereof. The applicant shall arrange for the removal of any specimen submitted to the State Fire Marshal or which has been assembled or erected pursuant to this section, within 60 days of notification by the State Fire Marshal. The State Fire Marshal may, at his discretion, dispose of any specimen submitted to him following the 60 day notification.

(b) Every application for evaluation and certification of a gasoline vapor recovery system or component part which is required by these regulations to be tested, shall be accompanied by a test report issued by an approved testing organization. Technical data shall be submitted with any application when required by the State Fire Marshal. Each application for an evaluation and certification of a gasoline vapor recovery system or component shall be accompanied by black-line drawings suitable for reproduction.

(c) Specimens submitted to laboratories for testing shall be from regular production. Acceptance for certification will not be considered on the basis of any examination of hand made equipment or products.

(d) The State Fire Marshal reserves the right to publish all or any part of any test report or technical data submitted to him and relating to a gasoline vapor recovery system or component. Manufacturing processes, ingredients or compounds of materials or equipment shall not be matters of public record.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41955 and 41958, Health and Safety Code.

HISTORY

1. Renumbering and amendment of former Section 1918.11 to Section 1918.21 filed 9-27-85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.22. Labels.

(a) Every gasoline vapor recovery system or component which is certified by the State Fire Marshal, shall bear a label conforming to the provisions of this section. Labels shall be placed in a conspicuous location and shall be attached by the manufacturer during production or fabrication.

EXCEPTIONS:

(1) Systems or components which bear the label of an approved testing organization provided such organization conducts factory inspections of the material and workmanship during fabrication and assembly.

(2) Upon written request, the State Fire Marshal may exempt specified systems or components from the labeling requirement provided he finds such labeling impractical or impossible. In such cases however sufficient evidence shall be furnished indicating the means by which said systems or components may be reasonably identified.

(b) Labels shall be of sufficient size to render all data specified thereon, clear and legible.

(c) Labels shall be of a contrasting color to the material or equipment to which it is attached.

(d) Labels shall be produced or obtained by the manufacturer and such label shall be of the following configuration:

(1) Insert in the top scroll the name and address of the manufacturer.

(2) In the first bottom scroll insert the certification number issued by the State Fire Marshal and all other data as may be specified by the State Fire Marshal dependent upon its intended use.

(3) Insert in the bottom scroll the item certified. Examples: "Flame Arrestor"—"Impact Valve."

(e) Labels may be of any durable material and shall be attached to the certified systems or component in such a manner that any removal will cause destruction of the label.

(f) Prior to the use of any label, the manufacturer shall submit to the State Fire Marshal a sample of each label intended to be used with any certified system or component. Labels shall not be used until written approval has been received from the State Fire Marshal.

(g) No person shall attach any label conforming to the provisions of this section to any system or component which is not certified by the State Fire Marshal.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41958 and 41960, Health and Safety Code.

HISTORY

1. Renumbering and amendment of former Section 1918.12 to Section 1918.22 filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.23. Approved Testing Organization.

(a) For the purposes of this article, an approved testing organization shall mean any person, firm, corporation or association which conforms to all of the following:

(1) Equipped or has access to facilities which are equipped to perform tests in accordance with required test procedures.

(2) Employment of personnel who are qualified for testing. Evidence of such qualifications may include persons possessing registration as a Professional Engineer.

(3) Approved by the State Fire Marshal. Persons, firms, corporations, or associations desiring approval as a testing organization may initiate a request and present to the State Fire Marshal evidence of their qualifications which in the judgment of the State Fire Marshal is sufficient to grant approval.

Approval as a testing organization shall not be granted to any person, firm, corporation, or association for the purpose of conducting tests of materials or equipment manufactured, sold, or similarly processed or handled by such person, firm, corporation or association.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Section 41958, Health and Safety Code.

HISTORY

1. Renumbering and amendment of former Section 1918.13 to Section 1918.23 filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.24. Testing Equipment.

(a) Testing equipment used or intended to be used to determine a gasoline vapor recovery system or component's compliance with State Fire Marshal vapor recovery requirements shall be inspected and evaluated by the State Fire Marshal to determine conformance with required conditions for such testing equipment as set forth in the appropriate test standard.

(b) All testing equipment shall be maintained in good repair devoid of any defect which would affect the certification of any system or component to be tested.

(c) Any testing organization which desires State Fire Marshal approval shall be liable for the necessary advance arrangements for all costs incurred by one representative of the State Fire Marshal in conducting any service rendered under Section (a) above.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Section 41958, Health and Safety Code.

HISTORY

1. Renumbering and amendment of former Section 1918.14 to Section 1918.24 filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.25. Fees.

Each application for certification shall be accompanied by fees established by this section.

(a) The fee for evaluating any system and component shall be as follows:

(1) System (with or without processing including processing equipment, i.e., incinerator, refrigeration unit, carbon canisters, electrical controls)—$100.00.

(2) Components (flame arrestors, pressure/vacuum valves, impact valves, dispensing nozzles, automatic fire checks, and similar devices)—$50.00.

(b) Certification Fees. The fee for certification of systems or components—$35.00.

(c) Evaluation and certification fees shall be submitted with each application for evaluation and certification. If the system or component is not found to be in conformance with the provisions of these regulations, the certification fee will be returned to the applicant. The evaluation fee will be retained by the State Fire Marshal to offset the costs incurred for evaluation of the submitted system or component.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Section 41961, Health and Safety Code.

HISTORY

1. Renumbering and amendment of former Section 1918.15 to new Section 1918.25 filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.26. Violations.

No person, firm, corporation or association shall knowingly or intentionally represent any system or component as being certified by the State Fire Marshal when such system or component is not so certified.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Section 41958, Health and Safety Code.

HISTORY

1. Renumbering and amendment of former Section 1918.16 to new Section 1918.26 filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

Article 4. Installation—Vapor Recovery

§ 1918.30. Dispensing Nozzles.

Dispensing nozzles shall be tested in accordance with applicable provisions of this subchapter.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. Amendment filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.31. Vapor Check Valves.

Vapor check valves shall be provided in the vapor return line from each dispensing outlet to prevent the discharge of vapors when the hose nozzle valve is in its normal non–dispensing position. Such vapor check valves shall be tested in accordance with applicable provisions of this subchapter

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. Amendment filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41)

§ 1918.32. Fuel Shut Down.

Means shall be provided to shut down fuel dispensing in the event the vapor return line becomes blocked in any manner that can cause a forceful ejection of liquid.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. Amendment filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.33. Shear Sections.

Where vapor return piping is inside the dispenser enclosure or where it may impair the effective operation of an impact valve in the liquid pipe, a shear section shall be properly installed in the vapor return piping at the base of each dispenser. Properly installed means the shear section is mounted flush (plus/minus 3/4") with the top of the surface upon which the dispenser is mounted. Shear sections shall be tested in accordance with applicable provisions of this subchapter.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. Amendment filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41)

§ 1918.34. Impact Valves.

Impact valves shall be tested in accordance with the applicable provisions of this subchapter. Impact valves shall be properly installed in all gasoline carrying piping when supplied by a remote pump and rigidly mounted at the base of each dispenser. Properly installed means that the shear section of the impact valve is mounted flush (plus/minus 3/4") with the top of the surface upon which the dispenser is mounted.

NOTE: Authority cited. Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. Amendment filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.35. Piping.

Piping shall comply with the following:

(a) Non–metallic piping, if used, shall be installed in accordance with the manufacturer's installation instructions.

(b) All vapor return piping and tank vents shall be installed so as to drain toward the gasoline storage tanks. There shall be no sags or traps in the vapor return piping in which any liquid may become trapped. Condensate tanks, if utilized, shall be installed and maintained so as to preclude the blocking of the vapor return lines by liquid.

(c) All vapor return and vent piping shall be provided with swing joints or any other State Fire Marshal approved connector 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.

(d) Tank vent pipes two inches or less in nominal inside diameter shall not be obstructed by any device unless the tank and its associated piping and other equipment is protected to limit back pressure development to less than the maximum working pressure of the tank, its associated piping and other equipment. Protection shall be afforded by the installation of one of the following approved items: Pressure/vacuum vents, rupture disks or other tank venting devices installed in the tank vent pipes.

(e) Tank vent pipes shall terminate into the open atmosphere and shall be at least 12 feet above the adjacent ground level. The outlet shall vent upward or horizontally and be located so as to eliminate the possibility of vapors accumulating or traveling to a source of ignition or entering adjacent buildings.

(f) Vent pipes from tanks storing the same class of liquids may be connected into one outlet pipe. The vapor discharge capacity of manifolded vent piping shall be sufficient to limit back pressure development to less than the maximum working pressure of tanks, associated piping and other equipment when two tanks are filled simultaneously.

(g) Vent pipes shall be adequately supported throughout their length. When they are supporting weights in addition to their own, additional supports may be required.

(h) Piping systems servicing vapor balance recovery systems, installed after September 1, 1977 shall be pneumatically tested to 75 psig. Test pressure shall be maintained for at least 30 minutes, with the system sealed, and with a pressure loss not to exceed 3 psig.

(j) When there is any indication of a leak in an existing underground storage tank or piping system, the system shall be tested in accordance with and shall meet the criteria of Section 79.605 of the 1982 Uniform Fire Code.

(k) Vapor pipes shall enter tanks only through the top of the tank. The end of vapor pipes shall not extend into the tank more than one inch. Float check valves attached to such vapor pipes may extend into the tank without distance restrictions.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. Amendment of subsection (j) filed 11–13–80; effective thirtieth day thereafter (Register 80, No. 46).
2. Amendment filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.36. Tank Openings.

All tank openings, other than vent pipe openings, shall comply with the following:

(a) Vapor recovery openings shall be protected against vapor release by means of either a spring–loaded check valve, dry–break connection or other approved device. Combination fill and vapor recovery openings shall be protected against vapor release unless connection of the liquid delivery pipe to the fill pipe simultaneously connects the vapor recovery pipe. Tank vent pipes shall not be obstructed by any device which will allow back pressure development in the storage tanks.

(b) All connections, which are made and broken, shall be located outside of buildings at a location free from any source of ignition and at least ten feet from any building openings. Such connections shall be closed, liquid and vapor tight when not in use and each opening shall be properly identified as to its function.

(c) Separate fill pipe openings and vapor recovery openings shall be of different sizes, or the hose connection utilized shall be incompatible so as to eliminate the possibility of cross connections.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. Amendment filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.37. Gasoline Storage Tanks.

Gasoline storage tanks used in conjunction with vapor recovery systems shall comply with Sections 79.601 through 79.605 of the Uniform Fire Code, 1982 Edition.

EXCEPTIONS: Specific requirements set forth in this subchapter shall take precedence over requirements set forth in the Uniform Fire Code. See Section 1918.6.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. Amendment filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

Article 4.5. Installation—Vapor Balance Systems—With Processing

NOTE: Authority cited: Section 11349.1, Government Code.

HISTORY

1. Repealer of Article 4.5 (Section 1918.40) filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

Article 5. Installation—Vapor Recovery Systems—With Processing

§ 1918.60. General.

In addition to the requirements set forth in Article 4, Vapor Recovery Systems—With Processing shall install the following equipment and shall comply with the requirements set forth for equipment location, mounting and protection.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. Repealer of former Article 5 (Sections 1918.50–1918.58), including renumbering of Section 1918.55 to Section 1918.61, and renumbering of former Article 5.5 (Sections 1918.60–1918.64) to new Article 5 (Sections 1918.60–1918.65) filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.61. Flame Arrestors.

If the operation of the system will produce a flammable mixture in the piping which will carry it to the storage tanks, an approved flame arrestor, tested in accordance with the applicable provisions of Article 7, shall be properly installed in vapor return piping between the shear section and the storage tank.

EXCEPTION: An approved automatic fire check may be installed in lieu of an approved flame arrestor.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. Renumbering and amendment of former Section 1918.61 to Section 1918.62, and renumbering of former Section 1918.55 to Section 1918.61 filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.62. Automatic Fire Checks.

Positive means of automatic isolation of tanks may be required in vapor return piping to prevent flashback from reaching the tanks.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. Renumbering of former Section 1918.62 to Section 1918.63, and renumbering and amendment of former Section 1918.61 to Section 1918.62 filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.63. Equipment Mounting.

Vapor processing units shall be securely mounted on concrete, masonry or structural steel supports or other noncombustible foundations.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. Renumbering of former Section 1918.63 to Section 1918.64, and renumbering of former Section 1918.62 to Section 1918.63 filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.64. Processing Equipment Location.

(a) All ignition sources of vapor processing equipment shall be located not less than 18 inches above any tank fill opening, the top of the dispenser island, or grade, whichever is highest. The equipment shall also be located not less than 50 feet from any fuel transfer area and not less than 10 feet from the nearest building or property line which may be built upon.

EXCEPTIONS:

(1) Nothing in this section shall prohibit roof mounted equipment.

(2) When reduction of the required 50 feet clearance from the fuel transfer area is necessary, as determined by the enforcing authority, ignition sources of vapor processing units shall be installed in conformance with the following table:

Clear Distance Available (Ft)	*Required Height Above grade (Inches)*
50	18
40	30
30	42
20	48

When the minimum 20 feet required distance, as specified in the above table, cannot be obtained because of site configuration a minimum height of 12 feet from any ignition source shall be provided for the equipment, or construction enclosure requirements as set forth in (c) of this section shall apply.

In no instance shall any cargo tank be permitted within the minimum 20 foot clearance during delivery operations.

(b) When the processing unit location site is lower than the tan fill opening or the top of the dispenser island, the difference in elevation shall be added to the elevation requirements set forth in (a) of this section.

(c) When the required 10 foot distance to an adjacent property line which may be built upon cannot be obtained, an open–top enclosure of not less than 2–hour noncombustible fire–resistive construction which shall extend from the mounting base or slab to an elevation not less than 18 inches higher than the highest elevation of the processing equipment shall be provided on the property line side. Doors installed in the enclosure walls shall be of noncombustible construction including the door frames. Ventilation openings, except in the property line wall, shall be provided at slab level to eliminate the accumulation of flammable vapors within the enclosure as deemed necessary by the enforcing authority having jurisdiction.

(d) Where site configuration makes adherence to equipment location elevation requirements impossible or impracticable and the equipment is located below grade or within roofed enclosures, such below grade or roofed area shall be provided with mechanical ventilation providing not less than 6 complete air changes per hour at all times. All such equipment shall meet Class 1, Division 1 requirements as set forth in Part 3, Title 24, CAC.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. Renumbering and amendment of former Section 1918.64 to Section 1918.65, and renumbering of former Section 1918.63 to Section 1918.64 filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.65. Vapor Processing Unit Protection.

Fences, bumper posts and other control measures, as determined by the authority having jurisdiction, shall be provided to protect vapor processing unit installations against tampering, trespassing, and vehicular traffic. The area shall be kept clear of combustible materials of any nature within 10 feet of the vapor processing unit installation unless the unit is enclosed as specified in (c) of Section 1918.64.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. Renumbering and amendment of former Section 1918.64 to Section 1918.65 filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

Article 6. Electrical

§ 1918.70. Electrical Requirements.

(a) General. All electrical equipment and wiring shall comply with the requirements set forth in Part 3, Title 24, California Administrative Code.

(b) Emergency Pump Cut–Off. All electrically energized vapor collection equipment shall be directly connected to, and controlled by, an emergency pump cut–off switch.

(c) Cut–Off Switch Location. The emergency pump cut–off switch shall be located in a readily accessible and clearly visible location, outside of any enclosure, within 75 feet of but no closer than 15 feet to any gasoline dispenser.

(d) Labeling. The emergency pump cut–off switch shall be clearly and legibly labeled as to its function.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. Amendment filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

Article 7. Standards for the Certification of Gasoline Vapor Recovery Equipment

§ 1918.80. Scope.

This standard article represents the minimum basic requirements for the construction and operating performance standards of gasoline vapor recovery equipment for purposes of approval and certification by the State Fire Marshal. The minimum design, construction and operating performance standards set forth herein are those deemed as necessary to provide a reasonable degree of safety from fire and explosion in conformance to the regulations adopted by the State Fire Marshal pursuant to Section 41954 through 41961, inclusive, Health and Safety Code, and when applicable shall be reported on in their entirety by approved testing laboratories.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. Amendment filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.81. Test Reports.

The report shall include failure analysis engineering data, wiring diagrams, operating and maintenance manuals and photographs, together with the tests performed and the results thereof.

The reports shall include the catalog number or other readily identifiable marking, the laboratory test report number and date. Such individually tested components of a system when installed in combination with other components shall be subjected to the performance standard tests to determine their suitability for use in combination with other component parts or equipment.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. New NOTE filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.82. Equipment Standards.

(a) General. Equipment utilized in gasoline vapor recovery shall be tested according to the requirements set forth in the following applicable standards.

(1) Flame Arrestors. Flame Arrestors to be installed in either fuel, vapor, or vent lines shall be tested in accordance with the requirements of U.L. Standard 525, available from Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062, and as approved by the State Fire Marshal.

(2) Hose Nozzle Valves. Hose nozzle valves used in conjunction with gasoline vapor recovery systems shall be tested in accordance with the requirements of U.L. Standard 842, available from Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062, and as approved by the State Fire Marshal.

(3) Carbon/Charcoal Canisters. Carbon/charcoal canisters utilized in gasoline vapor recovery systems shall withstand, without failure, a test pressure of plus or minus 150% of the maximum operating pressure. The canister material shall also be able to withstand temperatures created by the materials contained therein.

(4) Pressure Regulators. Gasoline vapor pressure regulators utilized in a vapor recovery system shall be approved for the intended use.

(5) Ignition Controls. Ignition controls including, but not limited to, such devices as flame detectors, flame sensors, ignition transformers, electrical control units, alarms, flame indicators, utilized as a component of a gasoline vapor recovery system shall be approved by the State Fire Marshal for its intended use.

(6) Refrigeration Units. Refrigeration units utilized in processing vapors in gasoline vapor recovery systems shall be approved for their intended use.

(7) Pressure/Vacuum Valves. Pressure/vacuum valves utilized in gasoline vapor recovery systems shall be approved by the State Fire Marshal for their intended use.

(8) Internal Explosion/Ignition Test. The processing unit shall be subjected to a series of internal explosion/ignition tests, during performance/operation safety testing, such that ignition of an explosion air/gasoline vapor mixture occurs within the confines of the processing unit piping The explosion shall not propagate beyond the inlet Flame Arrestor(s). The processing unit and Flame Arrestors shall provide a degree of isolation between other installation components and the processing unit, and between the processing unit and the remainder of the installation, and between the processing unit and the storage tank. The operating function of the unit, shall not be impaired as a result of such tests. Adequate sensors shall be utilized to insure that: (1) an explosive gasoline/air vapor mixture was present; (2) that an ignition of the vapor mixture did occur, and (3) that the safeguards installed in the processing unit did function.

(9) Other Equipment. Such other equipment which may be utilized in gasoline vapor control systems shall also be tested to applicable standards as may be determined necessary by the State Fire Marshal.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. Amendment filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.83. Structural Integrity.

(a) Wind Loads. The completely assembled vapor processing unit shall be subjected to a wind loading velocity of not less than 60 MPH for a period of not less than 10 minutes. At the conclusion of this test there shall be no evidence of damage to the unit or its function.

(b) Dead Load Test. All portions of the assembled vapor processing unit, which may be stepped upon, shall be subjected to a dead load test of not less than 200 pounds. At the conclusion of such loading there shall be no evidence of damage to the unit, platform, structural frame or plumbing or their function.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. New NOTE filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

§ 1918.84. Drop Test.

The complete processing unit and its platform (base) shall be subjected to four drop tests. The drop tests shall consist of sequentially raising each side of the base not less than 6 inches and allowing the base to drop freely. The operating function of the unit shall not be impaired as the result of such tests.

NOTE: Authority cited: Section 41956, Health and Safety Code. Reference: Sections 41956 and 41958, Health and Safety Code.

HISTORY

1. New NOTE filed 9–27–85; effective thirtieth day thereafter (Register 85, No. 41).

Certification Number GVRC 005:007:031

COPY

COAXIAL EMERGENCY BREAKAWAY COUPLING

LISTEE-------- Emco Wheaton, Inc., 4001 Weston Parkway, Cary, NC 27513

DESIGN-------- Emco Wheaton Model A4019 Coaxial Safebreak Coupling is intended for use with gasoline dispensing devises having vapor recovery capabilities. It is used between two [2] hose assemblies to safeguard against excessive pull force on the hose assembly and dispenser.

The assembly consists of an internal male and female connectors with integral check valves in each component. These parts are assembled within a female and male outer body which are slipped together and held in place with a outer shell. When the coupling and connecting hose assemblies are subjected to a pull force not exceeding 250 pounds, the outer shell expands causing separation of the coupling halves relieving pull force on the hose assembly and dispenser. The check valves prevent the escape of liquid from the hose lines. Coupling can be reassembled in the field following separation.

The inlet and outlet connections consist of a 1 7/8 inch 12 female thread (vapor line) and a concentric 11/16 inch bore (liquid line) with two (2) integral O-rings.

Each assembly is tested by the manufacturer for electrical continuity with resistance less than 0.5 megohms.

APPLICATION--- Intended for installation between two (2) coaxial hose assemblies where the working pressure does not exceed 50 psi.

INSTALLATION--- To be installed in conformity with the manufacturer's instructions and all applicable codes.

MARKING------- Listee's name and coupling model number shall be molded on the outer shell, cast on body half, and silk-screened on scuff guard.

Maximum break force of the coupling shall be cast on body half and silk-screened on scuff guard.

A tag is to be wired to each coupling warning that prior to installation, it shall be determined that the pull force required to separate the emergency breakaway feature will not damage the hose assembly or dispensing devise.

CERTIFICATION- Certified for use with approved coaxial hose assemblies where breakaway protection is desired.

This coupling is approved for use with leaded or unleaded gasoline and 15 percent ASTM Fuel C/85 percent methanol.

THIS CERTIFICATION IS MADE PURSUANT TO THE AUTHORITY GRANTED TO THE CALIFORNIA STATE FIRE MARSHAL AS CONTAINED IN SECTION 41955 THROUGH 41960 INCLUSIVE, CALIFORNIA HEALTH AND SAFETY CODE.

A CSFM REPORT IS NOT TO BE CONSTRUED AS REPRESENTING AESTHETICS OR ANY OTHER ATTRIBUTES NOT SPECIFICALLY ADDRESSED NOR AN ENDORSEMENT OR RECOMMENDATION FOR USE OF THE SUBJECT REPORT.

THIS CERTIFICATION IS BASED UPON INDEPENDENT TEST OR OTHER TECHNICAL DATA SUBMITTED BY THE APPLICANT. THE CSFM TECHNICAL STAFF HAS REVIEWED THE TEST RESULTS AND/OR OTHER DATA, BUT DOES NOT POSSESS TEST FACILITIES TO MAKE AN INDEPENDENT VERIFICATION.

Date Issued: April 16, 1991 By: ______________
Deputy State Fire Marshal

COPY

STATE FIRE MARSHAL

Application for evaluation and certification or revision of vapor recovery

Do not write in this space	Do not write in this space
Subject No.	Ck.- M.O.
Company No.	Date
Item No.	$
	ROC No.

MANUFACTURER

ADDRESS

CITY

STATE

ZIP CODE

Application is hereby made for evaluation and certification of a gasoline vapor recovery system ☐ or component ☐ . A brief description of the item covered by this application including model number, shall be provided on the reverse side.

All applications shall be accompanied by an evaluation fee and a certification fee, except that applications for revisions which do not require evaluation of a test report or technical data may be accompanied by a revision fee only.

FEE SCHEDULE

SYSTEM EVALUATION-$100.00 (PLEASE MARK APPROPRIATE BOXES)

☐ BALANCE W/O PROCESSING ☐ BALANCE WITH PROCESSING ☐ ASSIST W/O PROCESSING

☐ ASSIST WITH PROCESSING ☐ OTHER (DESCRIBE)

COMPONENT EVALUATION-$50.00

☐ DISPENSING NOZZLE ☐ FLAME ARRESTOR ☐ FIRE CHECK (AUTOMATIC)

☐ IMPACT VALVE ☐ PRESSURE/VACUUM VALVE ☐ OTHER (DESCRIBE)

CERTIFICATION-$35.00

☐ SYSTEM ☐ COMPONENT

REVISION

☐ SYSTEM ($50.00) ☐ COMPONENT ($25.00)

We hereby waive any rights and immunities reserved for confidential information in-so-far as publication by the State Fire Marshal of qualifying test results are concerned.

SIGNATURE (REGISTERED OWNER, RESPONSIBLE COMPANY OFFICER OR AUTHORIZED AGENT)

Date

(Rev. 12/86)

APPENDIX D

CALIFORNIA AIR RESOURCES BOARD EXECUTIVE ORDERS

As discussed in Chapter 4, if a system is "certified" by CARB, an Executive Order is written. The Order specifies the conditions which must be met by any system installed under the certification. These specifications may include the plumbing system, an equipment list, the vapor hose configuration, and the maximum allowable pressure drop through the system. This appendix contains a summary of the requirements of Stage II (Phase II) CARB Executive Orders as well as examples of actual Executive Orders. The Sections of this appendix are as follows:

Section D.1	Executive Order Summary from the California Air Resources Board's "Gasoline Facilities Phase I & II" Technical Manual compiled under the Compliance Assistance Program.
Section D.2	List of all CARB Phase II Executive Orders.
Section D.3	Example CARB Executive Orders.

The CARB Technical Manual, "Gasoline Facilities Phase I & II" may be obtained from:

CARB Compliance Assistance Section
1101 R. Street
P.O. Box 2815
Sacramento, CA 95812

APPENDIX D.1

EXECUTIVE ORDER SUMMARY FROM THE CALIFORNIA AIR RESOURCES BOARD'S "GASOLINE FACILITIES PHASE I & II" TECHNICAL MANUAL COMPILED UNDER THE COMPLIANCE ASSISTANCE PROGRAM

603.2 PHASE II VAPOR RECOVERY

Phase I vapor recovery refers to the control of vapor from storage tank fueling operations. In Phase II, three types of vapor recovery systems have been certified by the California Air Resources Board (CARB) for use in the districts: Balance, Vacuum-Assist, and Aspirator-Assist.

603.2.1 Balance System

The balance system is a "no seal, no flow" system that uses a nozzle with a bellows to recover gasoline vapors displaced by incoming gasoline. Gasoline will not flow unless there is a tight seal between the faceplate and the motor vehicle fillpipe. There are many balance systems currently certified by ARB Executive Orders (see Appendix D). All approved balance systems are based on the same principle. Displaced vapors in a the vehicle fuel tank are forced, and to a slight degree pulled, into aboveground or underground storage tanks through vapor return plumbing.

The various approved balance systems do not differ in operating principle, but differ in plumbing configuration, size and equipment. All of the systems have been tested to achieve at least 95% vapor recovery efficiency with all types and models of balance product dispensers, hoses, and nozzles in various approved configurations.

D.1-2

To facilitate the approval and inspection process for balance vapor recovery systems, one Executive Order, G-70-52, has been developed. This order provides tables showing most of the dispenser, hose, and nozzle combinations approved for use with various approved balance systems. Executive Order G-70-52 has been amended and updated many times. The latest version, G-70-52 AK, is included in Appendix D of this manual. In addition, this manual provides Tables 603.2 and 603.3 which show, in simplified form, the various approved nozzles outlined in G-70-52 AK. Because new installations allow only coaxial vapor recovery hoses and nozzles, these tables are separated based on whether the balance system uses dual or coaxial hoses. It is important to note that these table are simplications of what is contained in the Executive Orders. If more detail is needed, consult the appropriate Executive Order.

Table 603.2
Nozzle Requirements For Dual Hose Balance System*

Nozzles	Latch Device	Spring in Bellows	Inter-Lock	High Pressure Shutoff	Vapor Check Valve
EW A3003	BAR	YES	YES	YES	INTERNAL
EW RA3003	BAR	YES	YES	YES	INTERNAL
EW A4000	RING	NO	YES	YES	REMOTE
EZ 4000**	RING	NO	YES	YES	REMOTE
EZ 3003	BAR	YES	YES	YES	INTERNAL
RPP RA3003	BAR	YES	YES	YES	INTERNAL
OPW 11VSC	RING	YES	YES	YES	INTERNAL
OPW 11VSF	RING	NO	YES	YES	INTERNAL
EZ 11VF**	RING	NO	YES	YES	INTERNAL

* Coaxial hose nozzles may be used with dual hoses if an appropriate coaxial-dual adaptor is used.
** Boot protectors prohibited.

Figure 603.7 Emco Wheaton Dual Balance Nozzle

603.2.1.1 Dual Hose Balance System

The requirements for the dual balance system are as follows:

Nozzles - Emco Wheaton and OPW manufacture nozzles certified by CARB Executive Orders for use with the dual balance system. In addition to Emco wheaton and OPW, E-Z Flo and Rainbow Products manufacture rebuilt nozzles that have been certified by CARB. The requirements for these nozzles are shown in Table 603.6. A dual balance nozzle is shown in figure 603.7.

Flow Limiter- A flow limiter is required on dispensers that allow a maximum flow rate in excess of 10 gpm. A flow limiter may be required on all dispensers at the option of the local air pollution control district.

Swivels - Nozzle end swivels on the dual Balance system must be multi-plane. Dispenser end swivels must be Fire Marshal approved with 90 degree stops. See specific Executive Order exhibit for swivel requirements.

Hoses - The Dual Balance system requires a long length double hose that is overhead retractor mounted. The vapor hose must be a minimum of 5/8 inches inside diameter.

Latching Device and Interlock - The Balance System requires that bellows fit snugly against the motor vehicle fillpipe. A latching device is required to help hold the nozzle spout inside the motor vehicle fillpipe during fueling. An interlock mechanism prevents dispensing and/or shuts off the nozzle unless the bellows is depressed.

Check Valve - A check valve is required to prevent vapor backflow. All dual hose EW 4000 series nozzles must have approved remote vapor check valves.

Vent Pipes - Each underground storage tank must have a vapor vent pipe. Above ground vent pipes for the Balance system can be open to the atmosphere or may ... pressure/vacuum valve if allowed for the specific installation

Table 603.3
Nozzle Requirements For Coaxial Hose Balance System

Nozzles	Latch Device	Spring in Bellows	Inter-lock	High Pressure Shutoff	Vapor Check Valve
EW A3005	BAR	YES	YES	YES	INTERNAL
EW RA3005	BAR	YES	YES	YES	INTERNAL
EZ 3005	BAR	YES	YES	YES	INTERNAL
RPP RA3005	BAR	YES	YES	YES	INTERNAL
EW A4001*	RING	NO	YES	YES	REMOTE
EZ 4001*	RING	NO	YES	YES	REMOTE
EW RA4001*	RING	NO	YES	YES	REMOTE
EW A4005*	RING	NO	YES	YES	INTERNAL
EZ 4005*	RING	NO	YES	YES	INTERNAL
OPW 11VC**	RING	YES	YES	YES	INTERNAL
OPW 11VF	RING	NO	YES	YES	INTERNAL
EZ 11VF*	RING	NO	YES	YES	INTERNAL
OPW 111VF	RING	NO	YES	YES	INTERNAL
Husky V	RING	YES	YES	YES	INTERNAL

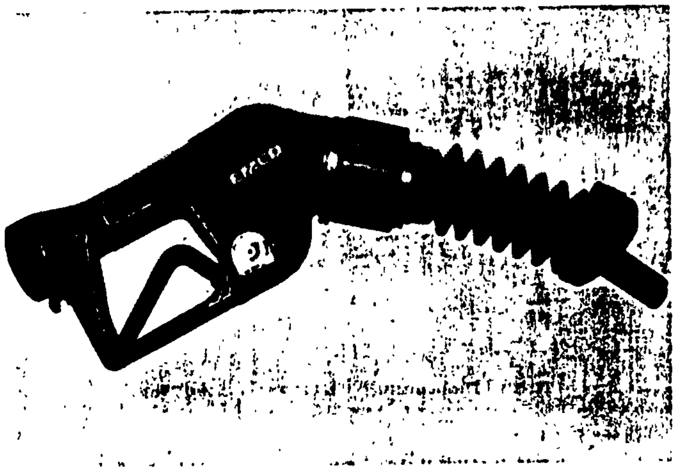


Figure 603.8 Emco Wheaton Coaxial Balance Nozzle

D.1-4

603.2.1.2 Coaxial Hose Balance System

The requirements for the coaxial hose balance system are as follows:

Nozzles - OPW, Emco Wheaton, and Husky manufacture nozzles certified by CARB Executive Orders for use with the coaxial balance system. In addition to the above, EZ Flow and Rainbow Petroleum Products manufacture rebuilt nozzles certified by CARB. The requirements for these nozzles are shown in Table 603.7. A Husky balance nozzle is shown in Figure 603.9; an OPW balance nozzle is shown in Figure 603.10.

Flow Limiter- A flow limiter is required on dispernsers that allow a maximum flow rate in excess of 10 gpm. A flow limiter may be required on all dispensers at the option of the local air pollution control district.

Swivels - Nozzle end swivels on the coaxial Balance system must be installed in accordance with the appropriate ARB Executive Order. Dispenser end swivels must also be installed in accordance with the Executive Orders.

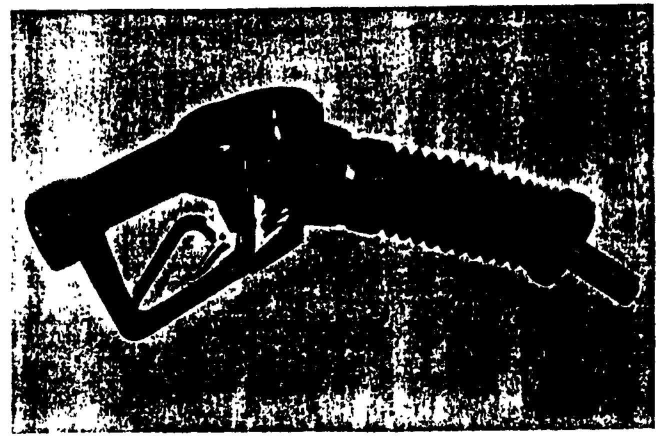


Figure 603.9 Husky Coaxial Balance Nozzle

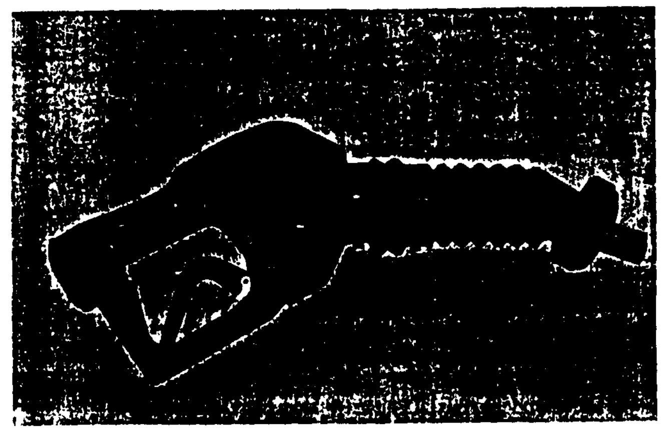


Figure 603.10 OPW Coaxial Balance Nozzle

Hoses - The coaxial Balance system requires a high hang coaxial hose with or without retractor. The hoses must be certified as indicated in the current version of Executive Order G-70-52.

Latching Device Interlock- The Balance System requires that the bellows fits snugly against the motor vehicle fillpipe. A latching device is required to help hold the nozzle spout inside the motor vehicle fillpipe during fueling. An interlock mechanism either prevents dispensing or shuts off the nozzle unless the bellows is depressed.

Check Valve - A check valve is required to prevent vapor backflow.

Vent Pipes - Each underground storage tank may be manifolded to a vapor vent pipe. Above ground, vent pipes for the coaxial hose balance system can be open to the atmosphere.

9.1-5

603.2.2 Vacuum-Assist

The vacuum-assist vapor recovery systems are manufactured by Hasstech and Hirt.

603.2.2.1 Hasstech System

The Hasstech system is a vacuum-assist system that uses a vacuum collecton unit to discharge gasoline vapors to the underground storage tank, and an incinerator to burn excess vapors. A summary of the ARB Executive Order requirements for this system are as follows:

Nozzles - The requirements of the three nozzles currently certified by CARB Executive Orders for the Hasstech system are shown below in Table 603.4. A vacuum-assist nozzle is shown in figure 603.11. No rebuilders are cerified for Hasstech nozzle systems.

Bellows - The Hasstech logo must be imprinted on the bellows of HP-1, HP2, and HP-11 nozzles.

Spring and Latching Device - Neither an internal bellows spring nor a latching device is required for the Hasstech system, but either one may be present. If a latch spring is present, it must not extend more than 1/4" past the faceplate.

Table 603.4
Nozzle Requirements For Hasstech Vacuum-Assist System

Nozzles	Swivel Hose-Disp	Latch Device	Spring in Bellows	Inter-lock	High Pressure Shutoff	Vapor Check Valve
OPW 7VH	None	OPT	NO	NO	YES	NO
OPW HP1	None	OPT	NO	NO	YES	NO
OPW HP11	None	OPT	NO	NO	YES	NO
HUSKY HP2	1*	OPT	NO	NO	YES	NO

* Not requred to be a multi-plane swivel.

Figure 603.11 Hasstech Vacuum-Assist Nozzle

Flow Control Valve - A vapor flow control valve, or "proportioning valve," *must be installed inside the dispenser to regulate the amount of hydrocarbon and* air vapor mixture collected, and to protect against venting of the underground tank. A vapor screen must also be present, to filter debris.

Hoses - The Hasstech system is certified to have any length hoses. Retractors and swivels are optional The vapor hose must have a minimum inside diameter of 1/2 inch.

Collection Unit - The collection unit must start up whenever a nozzle at a dispenser is switched on, and should stop when all dispensing nozzles shut off.

Processing Unit - The processing unit must operate properly.

Control Panel - The entire Hasstech system is operated and controlled from a single control panel that receives its power from a separate circuit breaker on the main electrical panel in the station. This panel must operate properly.

D.1-6

Tank Collection Guage - An optional tank correction gauge (or "magnahelic gauge," may be mounted near the vent pipes. This gauge normally indicates from -1 to -5 water column inches (although a reading between 0 and -1 inches of water column may occur during light traffic).

603.2.2.2 Hirt System

The Hirt System is a vacuum-assist system that uses a vapor pump unit or a vacuum turbine unit to draw gasoline vapors to the underground storage tanks, and an incinerator to burn excess vapors. Hirt manufactures a dual and coaxial vacuum-assist system.

<u>Dual</u>

The requirements for the Hirt dual vacuum-assist system are as follows:

Nozzles - The requirements of the six nozzles currently certified by CARB Executive Orders for the Hirt vacuum-assist system are shown below in Table 603.5. A Hirt dual vacuum-assist nozzle is shown in figure 603.12. Rainbow Petroleum Products (RPP) does not make bellows for its rebuilt EW A3006 nozzle

Table 603.5
Nozzle requirements for Dual Hirt Vacuum-Assist System

Nozzles	Latch Device	Spring in Bellows	Inter-lock	High Pressure Shutoff	Vapor Check Valve
EW 3003	BAR	YES	YES	YES	INTERNAL
EZ 3003	BAR	YES	YES	YES	INTERNAL
EW RA3003	BAR	YES	YES	YES	INTERNAL
RPP RA3003	BAR	YES	YES	YES	INTERNAL
EW A3006	BAR	YES	YES	YES	REMOTE
EW RA3006	BAR	YES	YES	YES	REMOTE
RPP RA3006	BAR	YES	YES	YES	REMOTE
EZ 3006	BAR	YES	YES	YES	REMOTE
EW A4000	RING	NO	YES	YES	REMOTE
EW A4002	RING	NO	NO	YES	REMOTE
EZ 4002**	RING	NO	NO	YES	REMOTE
OPW 7VE	SPRING	YES	NO	YES	REMOTE
OPW 7VH	SPRING	YES	NO	YES	REMOTE
OPW 11VSC*	RING	YES	YES	YES	INTERNAL
OPW 11VSF	RING	NO	YES	YES	INTERNAL
EZ 11VF**	RING	NO	YES	YES	INTERNAL
EZE 8	SPRING	YES	YES	YES	REMOTE

*OPW 11VE nozzle body may use EZFlo ESBL & ESBU bellows & spout.
** Boot protector prohibited.

Ball Check Valve - A ball check valve must be installed in all Hirt Systems between the vapor port of the nozzle and the vapor recovery hose. The check valve is designed to open the vapor path when a nozzle is tipped for use. (Optional: A solenoid valve may be installed to replace ball check valve, Hirt Certification G-70-33-AA.

Hoses - The Hirt dual vacuum-assist system requires a long length double hose that is overhead retractor mounted. The vapor hose must have a minimum inside diameter of 5/8 inches

Swivels - Nozzle end swivels on the Hirt system must be multi-plane. Dispenser end swivels must be Fire Marshal approved.

D.1-7

Vacuum Gauge - Hirt systems installed after August 13, 1980, are required to have a vacuum gauge installed inside the dispenser that is farthest away from the processing unit. The gauge range is from -1.0 inches to +1.0 inches of water column. If the sytem is operating properly, it should indicate approximately -.5 inches of water column.

Processing Unit - The processing unit must operate properly.

Control Panel - The control panel must operate properly.

Air Compressor - The air compressor must operate properly.

Vent Pipes - Each underground storage tank may be manifolded to a vapor vent pipe. Above gound, vent pipes for the Hirt system must be manifolded together to a single riser with a pressure/vacuum relief valve.

Pressure/Vacuum Relief Valve - The valve must operate properly, and be certified for the Hirt system.

Coaxial

The requirements for the Hirt coaxial vacuum-assist system are as follows:

Nozzles - The requirements of the five nozzles currently certified by CARB Executive Orders for the Hirt coaxial vacuum-assist system are shown below in Table 603.6. A Hirt coaxial nozzle is shown in figure 603.13. Rainbow

Table 603.6
Nozzle Requirements For Coaxial Hirt Vacuum-Assist System

Nozzles	Latch Device	Spring in Bellows	Inter-lock	High Pressure Shutoff	Vapor Check Valve
EW A3005	BAR	YES	YES	YES	INTERNAL
EW RA3005	BAR	YES	YES	YES	INTERNAL
EW A3007	BAR	YES	YES	YES	REMOTE
EW RA3007	BAR	YES	YES	YES	REMOTE
EZ 3007	BAR	YES	YES	YES	REMOTE
EW A4001**	RING	NO	YES	YES	REMOTE
EZ 4001**	RING	NO	YES	YES	REMOTE
EW A4003**	RING	NO	NO	YES	REMOTE
EZ 4003**	RING	NO	NO	YES	REMOTE
RPP RA3007	BAR	YES	NO	YES	REMOTE
OPW 11VE*	RING	YES	YES	YES	INTERNAL
OPW 11VF	RING	NO	YES	YES	INTERNAL
EZ 11VF**	RING	NO	YES	YES	INTERNAL
OPW 11VC	RING	YES	YES	YES	INTERNAL
OPW 111V	RING	YES	YES	YES	INTERNAL
HUSKY V	RING	YES	YES	YES	INTERNAL
EW A4005	RING	NO	YES	YES	INTERNAL
EZ 4005	RING	NO	YES	YES	INTERNAL

* OPW 11VE nozzle body may use EZFlo ESBL & ESBU bellows & spouts.
** Boot protectors prohibited.

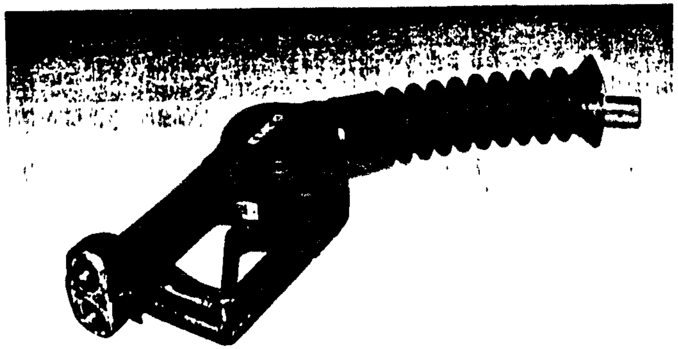


Figure 603.12 Hirt Dual Vacuum-Assist Nozzle.

D.1-8

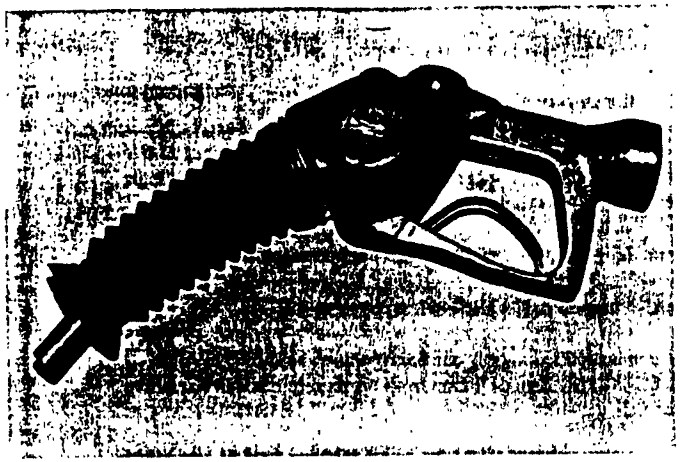


Figure 603.13 Hirt Coaxial Vacuum-Assist Nozzle

Petroleum Products (RPP) does not make bellows for its rebuilt EW A3006 nozzle.

Vapor Check Valve - A vapor check valve must be installed in all Hirt Systems. The vapor check valve is designed to open the vapor path when a nozzle is used.

Hoses - The Hirt coaxial vacuum-assist system requires a high hang coaxial hose. The hoses must be certified as indicated in the current version of Executive Order G-70-52.

Swivels - Nozzle end swivels on the Hirt system must be installed in accordance with the appropriate ARB Executive Order. Dispenser end swivels must be Fire Marshal approved.

Vacuum Gauge - Hirt systems installed after August 13, 1980, are required to have a vacuum gauge installed inside the dispenser that is farthest away from the processing unit. The gauge range is from -1.0 inches to +1.0 inches of water column. If the sytem is operating properly, it should indicate approximately -.5 inches of water column.

Processing Unit - The processing unit must operate properly.

Control Panel - The control panel must operate properly.

Air Compressor - The air compressor must operate properly.

Vent Pipes - Each underground storage tank must have a vapor vent pipe. Above ground, vent pipes for the Hirt system must be manifolded together to a single riser with a pressure/vacuum relief valve.

Pressure/Vacuum Relief Valve - The valve must operate properly and not leak.

603.2.2A Amoco Vacuum Assist (Bellowless) System

The Amoco system is certified in only one configuration as shown in ARB Executive Order G-70-118. Any deviation from the requirements in Executive Order is not certified.

The requirements for the Amoco vacuum system are as follows:

Table 603.7
Nozzle Requirements for Amoco
Vacuum Assist (Bellowless) System

Nozzles	Latch Device	Spring in Bellows	Inter-lock	High Pressure Shutoff	Vapor Check Valve
OPW 11-VJ-51	SPRING	NO BELLOWS	NO	NO	INTERNAL
OPW 11-VJ-61	SPRING	NO BELLOWS	NO	NO	INTERNAL

D.1-9

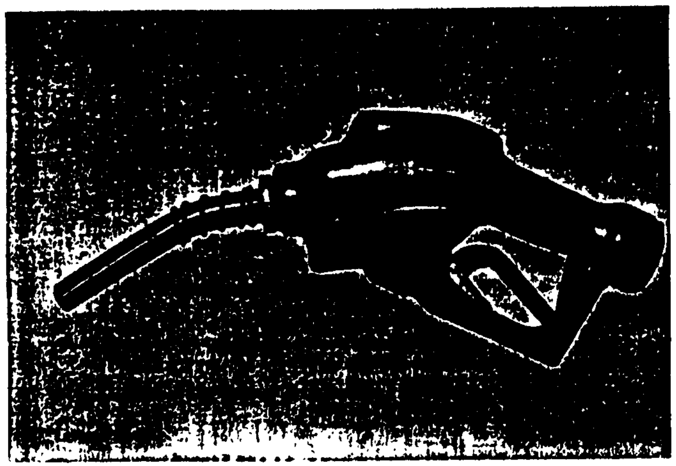


Figure 603.14 Amoco Vacuum Assist (Bellowless Nozzle)

Nozzle-OPW 11-V J-51

See Table 603.7 for nozzle requirements and Figure 603.14 for a picture of the nozzle.

Vapor Pump-Blackmer Model VR-34.

Coaxial Hoses- Dayco Petroflex Model 7574 with liquid pick-up.
Goodyear Maxxim with Gilbarco liquid removal system.

Dispenser- Dresser Wayne Model 390-IL installed as shown in ARB Executive Order G-70-52-AI, Exhibit 10.

Pressure Vacuum Vent- OPW 523 (2") or
OPW 523-S (2") set at 8 oz. pressure, 1/2 oz. vacuum.

603.2.3 Aspirator-Assist System

Aspirator-Assist systems use an aspirator to discharge gasoline vapors to the underground storage tanks. Aspirator-Assist systems are manufactured by Healy and Red Jacket.

603.2.3.1 Healy System

The Healy System is an aspirator-assist system that uses an aspirator jet pump to discharge gasoline vapors to the underground stroage tanks. The requirements for the Healy system are as follows:

Nozzles - The requirements for the one nozzle currently certified by CARB Executive Orders for the Healy system is shown below in Table 603.8. A Healy aspirator-assist nozzle is shown in figure 603.15. No rebuilders are certified for the Healy nozzle system.

Facecone - The facecone used with the Healy system should make contact with the motor vehicle fill pipe, but does not require a perfect seal, since it is vacuum assisted. Gasoline vapors are collected from the gap betwen the nozzle and the fuel tank.

Latching Device - Only a latch spring to help hold the nozzle spout inside the motor vehicle fillpipe during fueling is required for the Healy system.

Table 603.8
Nozzle Requirements For Healy Aspirator-Assist System

Nozzles	Latch Device	Spring in Bellows	Inter-lock	High Pressure Shutoff	Vapor Check Valve
HEALY 200	SPRING	NO	NO	YES	INTERNAL

D.1-10

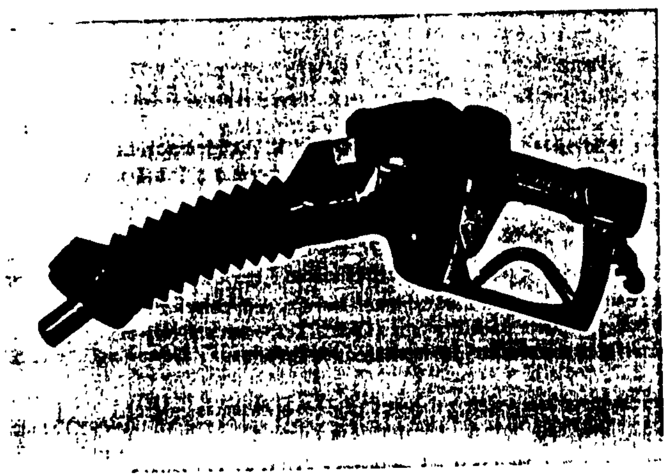


Figure 603.15 Healy Aspirator-Assist Nozzle

G-70-70 for specific configurations.

Hoses - Two hose configurations are certified by CARB Executive Orders for the Healy system, depending on the type of dispenser. See Executive Order

Vent Pipes - Each underground storage tank must be vented (Fire Marshal requirements). Above ground, vent pipes for the Healy system may be open to the atmosphere or manifolded together. And depending on whether the individual of central jet pumps are used, the system may or may not be required to have a pressure/vacuum valve; see Executive Order G-70-70 for specific requirements.

Jet Pump - For the Healy system to operate properly, an aspirater (jet pump) must be present and correctly installed inside each dispenser, or a centrally mounted multijet unit must be present..

603.2.3.2 Red Jacket System

Red Jacket manufactured, until 1982, a dual and coaxial aspirator-assist system.

Dual

The requirements for the Red Jacket aspirator-assist system are as follows:

Nozzles - The requirements for the eight nozzles certified by CARB Executive Orders for use with the Red Jacket aspirator-assist system are shown below in Table 603.9. A Red Jacket dual aspirator-assist nozzle is shown in figure 603.16. Rainbow Petroleum Products (RPP) does not make bellows for its rebuilt EW A3006 nozzle.

Swivels - nozzle end swivels on the dual aspirator-assist system must installed according with the appropriate ARB Executive Order. Dispenser end swivels must also be installed in accordance with the Executive Orders.

Hoses - The dual aspirator-assist system requires a double hose that is overhead retractor mounted. The vapor hose must be 5/8" inside diameter.

Vent Pipes - Each underground storage tank must have a vapor vent pipe. Above ground, vent pipes for the dual aspirator-assist system can be individual or manifolded together, see Executive Order G-70-70 for specific requirements.

9.1-11

Table 603.9
Nozzle Requirements For Red Jacket Dual Aspirator-Assist System

Nozzles	Latch Device	Spring in Bellows	Inter-lock	High Pressure Shutoff	Vapor Check Valve
EW A3006	BAR	YES	NO	YES	REMOTE
EW RA3006	BAR	YES	NO	YES	REMOTE
EZ 3006	BAR	YES	NO	YES	REMOTE
RPP RA3006	BAR	YES	NO	YES	REMOTE
OPW 7VE	SPRING	YES	NO	YES	REMOTE
EZ E-8	SPRING	YES	NO	YES	REMOTE
OPW 11VSE	RING	NO	NO	YES	REMOTE
EW A4002	RING	NO	NO	YES	REMOTE
EZ A4002*	RING	NO	NO	YES	REMOTE
EZ 11VE	RING	YES	NO	YES	REMOTE

* Boot protector prohibited.

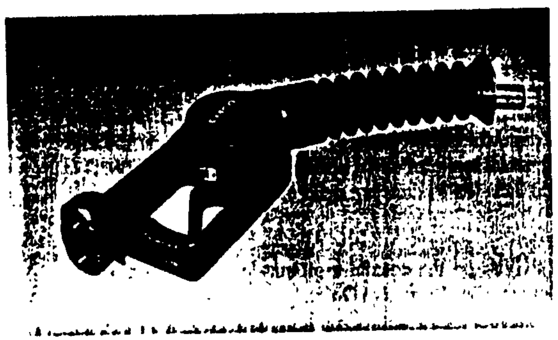


Figure 603.16 Red Jacket Dual Aspirator-Assist Nozzle

Aspirator - Must be present, correctly installed inside the dispenser, and operating properly.

Modulating Valve - Must be present, correctly installed inside the dispenser, and operating properly.

Vapor Check Valve - Must be present, correctly installed inside the dispenser, and operating properly.

Facecone - The facecone used with the Red Jacket system should make contact with the motor vehicle fill pipe, but does not require a perfect seal, since it is vacuum assisted.

Flow Limiter - A flow limiter may be required on Emco Wheaton installations.

Calibration - The dual aspirator-assist system must be calibrated annually if required. The owner/operator should have either a sticker (inside the dispenser) or a calibration sheet as proof of calibration.

Latching Device - A latch bar or latch spring to help hold the nozzle spout inside the motor vehicle fillpipe during fueling is required for the Red Jacket System.

Coaxial

The requirements for the Red Jacket coaxial system are as follows:

Nozzles - The requirements for the six nozzles certified by CARB Executive Orders for use with the coaxial aspirator-assist system are shown below in Table 603.10. A Red Jacket coaxial aspirator-assist nozzle is shown in figure 603.17. Rainbow Petroleum Products (RPP) does not make bellows for its rebuilt EW A3007 nozzle.

Swivels - nozzle end swivels on the coaxial aspirator-assist system must be installed according with the ARB Executive Order.

Hoses - The coaxial aspirator-assist system requires a high hang coaxial hose with or without a retractor.

D.1-12

Table 603.10
Nozzle Requirements For Red Jacket Coaxial Aspirator-Assist System

Nozzles	Latch Device	Spring in Bellows	Inter-lock	High Pressure Shutoff	Vapor Check Valve
EW A3007	BAR	YES	NO	YES	REMOTE
EW RA3007	BAR	YES	NO	YES	REMOTE
EZ 3007	BAR	YES	NO	YES	REMOTE
RPP RA3007	BAR	YES	NO	YES	REMOTE
OPW 11VF	RING	YES	NO	YES	REMOTE
OPW 7VE	RING	YES	NO	YES	REMOTE
EZ 11VF	RING	NO	NO	YES	REMOTE
EW A4003	RING	NO	NO	YES	REMOTE
EZ 4003*	RING	NO	NO	YES	REMOTE

* Boot protector prohibited.

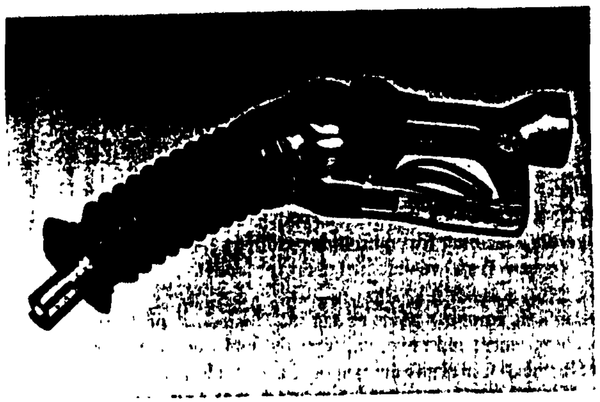


Figure 603.17 Red Jacket Coaxial Aspirator-Assist Nozzle

Vent Pipes - Each underground storage tank must be vented (Fire Marshal requirement). Above ground, vent pipes for the coaxial aspirator-assist system can be individual or manifolded together.

Aspirator - Must be present, correctly installed inside the dispenser, and operating properly.

Modulating Valve - Must be present, correctly installed inside the dispenser, and operating properly.

Vapor Check Valve - Must be present, correctly installed inside the dispenser, and operating properly.

Facecone - The facecone used with the Red Jacket system should make contact with the motor vehicle fill pipe, but does not require a perfect seal, since it is vacuum assisted.

Flow Limiter - A flow limiter may be required on Emco Wheaton installations only.

Calibration - The dual aspirator-assist system must be calibrated annually by a CARB-approved contractor to remain certified. The owner/operator should have either a sticker (inside the dispenser) or a calibration sheet as proof of calibration.

Latching Device - A latch bar to help hold the nozzle spout inside the motor vehicle fillpipe during fueling is required for the Red Jacket System.

604 EQUIPMENT CERTIFICATION

The following certification procedures are adopted pursuant to <u>Section 41954</u> of the Health and Safety Code. These requirements are applicable to vapor recovery systems installed at gasoline facilities for controlling gasoline vapors during the filling of storage tanks (phase I) and vehicle fuel tanks (phase II).

Vapor recovery systems are complete systems and shall include all necessary piping, nozzles, couplers, processing units, underground tanks and any other equipment necessary for the control of gasoline vapors during fueling operations.

605 LOCAL REQUIREMENTS

This place has been provided for you to place any additional requirements or policies your district may have concerning vapor recovery regulations. The ARB will not provide any amendments to this section for obvious reasons, so it is up to you to keep current.

D.1-13

APPENDIX D.2

LIST OF ALL CARB PHASE II EXECUTIVE ORDERS

Phase II

Certification of the Hasstech Model VCP-2 and VCP-2A Phase II Vapor Recovery Systems.	**G-70-7-AB**
Recertification of the Red Jacket Aspirator Assist Phase II Vapor Recovery System.	**G-70-14-AA**
Relating to Modification of Certification of the Emco Wheaton Balance Phase II Vapor Recovery System.	**G-70-17-AB**
Relating to the Modification of the Certification of the Shell Model 75B1 and 75B1-R3 Service Station Phase II Vapor Recovery Systems.	**G-70-18-C**
Recertification of the Exxon Balance Phase II Vapor Recovery System.	**G-70-23-AB**
Recertification of the Atlantic Richfield Balance Phase II Vapor Recovery System.	**G-70-25-AA**
Certification of the Modified Hirt VCS-200 Vacuum Assist Phase II Vapor Recovery System.	**G-70-33-AB**
Relating to Modification of Certification of the OPW Balance Phase II Vapor Recovery.	**G-70-36-AC**

Relating to the Modification of the Certification of the Chevron Balance Phase II Vapor Recovery System with OPW Nozzles for Service.	**G-70-37-B**
Recertification of the Texaco Balance Phase II Vapor Recovery System.	**G-70-38-AB**
Recertification of the Mobil Oil Balance Phase I Vapor Recovery System.	**G-70-48-AA**
Recertification of the Union Balance Phase II Vapor Recovery System.	**G-70-49-AA**
Certification of components for Red Jacket, Hirt, and Balance Phase II Vapor Recovery	**G-70-52-AL**
Recertification of the Chevron Balance Phase II Vapor Recovery System.	**G-70-53-AA**
Order Suspending Certification of OPW Balance Phase II Vapor Recovery System.	**G-70-67**
Relating to the Certification of the Healy Phase II vapor Recovery System for Service Stations.	**G-70-70-AB**
Relating to the Certification of the OPW Repair/Replacement Parts and Modification of the Certification of the OPW Balance Phase II Vapor Recovery System.	**G-70-77**
Certification of E-Z Flo Nozzle Company Rebuilt Vapor Recovery Nozzles and Vapor Recovery Nozzle Components.	**G-70-78**
Certification of E-Z Flo Nozzle Model 3006 and Model 3007 Vapor Recovery Nozzles and Use of E-Z Flo Components with OPW Models 11VC and 11VE Vapor Recovery Nozzles.	**G-70-101-B**
Certification of Rainbow Petroleum Products Model RA3003, RA3005, RA3006 and RA3007 Vapor Recovery Nozzles and Vapor Recovery Components.	**G-70-107**
Certification of Stage I and II Vapor Recovery Systems for Methanol Fueling Facilities.	**G-70-110**
Certification of ConVault Incorporated Aboveground Tank Filling/Dispensing Vapor Recovery System	**G-70-116-A**

Certification of the Amoco V-1 Vapor Recovery System	**G-70-118**
Certification of the Husky Model V Phase II Balance Vapor Recovery Nozzle	**G-70-125**
Certification of the OPW Model 111-V Phase II Balance Vapor Recovery Nozzle	**G-7-127**
Certification of the Bryant Fuel Systems Aboveground Tank Filling/Dispensing Vapor Recovery System	**G-70-128**
Certification of the BRE Products, Inc. Enviro-Vault Aboveground Tank Filling/Dispensing Vapor Recovery System	**G-70-129**
Certification of Sannipoli Corporation Petro Vault Aboveground Tank Filling/Dispensing Vapor Recovery System	**G-70-130**
Certification fo Hallmark Industries Tank Vault Aboveground Tank Filling/ Dispensing Vapor Recovery System	**G-70-131**
Certification of Trusco Tank, Inc. Supervault Aboveground Storage Tank Filling/Dispensing Vapor Recovery System	**G-70-132**
Certification of LRS., Inc. Fuelmaster Aboveground Storage Tank Filling/ Dispensing Vapor Recovery System	**G-70-133**
Certification of the EZ-Flo Rebuilt A4000-Series and 11V-Series Vapor Recovery Nozzles	**G-70-134**

APPENDIX D.3

EXAMPLE CARB EXECUTIVE ORDERS

This section contains the following Executive Orders

State of California
AIR RESOURCES BOARD

Executive Order G-70-52-AM
Certification of Components for Red Jacket, Hirt, and Balance
Phase II Vapor Recovery Systems

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 Code of Regulations;

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 Code of Regulations;

WHEREAS, the certification for use with Phase II vapor recovery systems has been applied for as specified in Attachment A of this Executive Order;

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 the equipment specified in Attachment A of this Executive Order, when used on Phase II balance and assist vapor recovery systems, conforms with all the requirements set forth in Sections I through VII of the Certification Procedures and will not compromise the efficiency of the Phase II vapor recovery systems on which they will be installed;

NOW THEREFORE, IT IS HEREBY ORDERED that the certification, Executive Order G-70-52-AL, is hereby modified to add vapor recovery equipment listed in Attachment A and to incorporate the requirements and conditions specified in the Exhibits of this Order for use on Phase II vapor recovery systems;

IT IS FURTHER ORDERED that the equipment listed in Attachment A of this Executive Order is certified as shown in Exhibits 4 through 11. A reference identifying the vapor recovery systems for which the hose configurations are approved is contained in Exhibit 1. Certified components for the systems are listed in Exhibit 2. A cross reference identifying which vapor recovery nozzle is approved for each vapor recovery system is shown in Exhibit 3. The systems shall otherwise comply with all the certification requirements in the latest applicable Phase II vapor recovery system certification.

IT IS FURTHER ORDERED that where a balance type vapor recovery system is to be installed at a new installation only the balance type coaxial vapor recovery nozzles and coaxial hose configurations may be used.

IT IS FURTHER ORDERED that nozzle bellows covers, hereinafter refered to as "boot protectors" may not be used on any nozzles after July 26, 1992, and that they are prohibited prior to that date on certain nozzles as specified in Exhibits 2 and 3 of this Order.

IT IS FURTHER ORDERED that the compliance with the applicable certification requirements and rules and regulations of the Division of Measurement Standards, the Office of the State Fire Marshal, and the Division of Occupational Safety and Health of the Department of Industrial Relations are made a condition of this certification.

IT IS FURTHER ORDERED that the components and alternative hose configurations certified hereby shall perform in actual use with the same effectiveness as the certification test system.

IT IS FURTHER ORDERED that any alteration of the equipment, parts, design, or operation of the configurations certified hereby, is prohibited, and deemed inconsistent with this certification, unless such alteration has been approved by the undersigned or the Executive Officer's designee.

IT IS FURTHER ORDERED that all nozzles approved for use with the Phase II vapor recovery systems specified in this Executive Order shall be 100 percent performance checked at the factory including checks of proper functioning of all automatic shutoff mechanisms.

Executed at Sacramento, California this 4 day of October, 1991.

Tom Cackette for

James D. Boyd
Executive Officer

Executive Order G-70-52-AM
Attachment A

Gasoline Vapor Recovery Equipment Added to Exhibit 2

Dresser Division/Wayne Industries
590 Blending Dispenser
390Dx-GQU Dispenser

Emco Wheaton A4019 coaxial hose breakaway coupling

Gates Kleanaire coaxial hose

Gilbarco Advantage motor fuel dispenser

Goodyear Maxxim coaxial hose with green outer hose

High retractor dispenser - coaxial hose configuration with liquid removal system (Exhibit 8c)

OPW Division/Dover Corporation
66-CL coaxial hose breakaway coupling
43-CRT elbow swivel

Exhibit 1

Executive Order G-70-52-AM

Phase II Vapor Recovery Systems

Certified for Hose Configurations Shown in Exhibits 4-11

Executive Order G-70-	Vapor Recovery System Name
14	Red Jacket
17	Emco Wheaton Balance
23	Exxon Balance
25	Atlantic Richfield Balance
33	Hirt
36	OPW Balance
38	Texaco Balance
48	Mobil Balance
49	Union Balance
53	Chevron Balance

Additional Executive Orders Pertaining to

Vapor Recovery Nozzles Not Listed in the Above Orders

Executive Order G-70-	Vapor Recovery System Name
78	EZ-flo rebuilts
102	EZ-flo rebuilts
107	Rainbow rebuilts
125	Husky Model V
127	OPW 111V
134	EZ-flo rebuilts

Exhibit 2

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,b,c	9a,b,c	10	11	11a	Exhibit 3 X-Reference
Nozzles (new or rebuilt by original manufacturer)[2]											
Emco Wheaton A3003, RA3003[7]	001:007:005	X		X	X						1
Emco Wheaton A3005, RA3005	005:007:006	X	X	X	X	X	X	X	X	X	2
Emco Wheaton A3006, RA3006	005:007:020	X		X	X						3
Emco Wheaton A3007, RA3007	005:007:025	X	X	X	X	X	X	X	X	X	4
Emco Wheaton A4000, RA4000[7/8]	005:007:022	X		X	X						5
Emco Wheaton A4001, RA4001[8]	005:007:023	X	X	X	X	X	X	X	X	X	6
Emco Wheaton A4002[8]	005:007:022	X		X	X						7
Emco Wheaton A4003[8]	005:007:023	X	X	X	X	X	X	X	X	X	8
Emco Wheaton A4005, RA4005[8]	005:007:025	X	X	X	X	X	X	X	X	X	9
OPW 7V-E (34,36,47,49)	002:008:014-17	X		X	X						10
OPW 11V-C (22,24,47,49)	005:008:030	X	X	X	X	X	X	X	X	X	11
OPW 11VS-C (22,24,47,49)[7]	005:008:039	X		X	X						12
OPW 11V-E (34,36,47,49)	005:008:033	X	X	X	X	X	X	X	X	X	13
OPW 11VS-E (34-36,47,49)	005:008:035	X		X	X						14
OPW 11V-F (22,24,47,49)	005:008:037	X	X	X	X	X	X	X	X	X	15
OPW 11VS-F (22,24,47,49)[7]	005:008:038	X		X	X						16
OPW 111-V (22,24,47,49)[8]	005:008:045	X	X	X	X	X	X	X	X	X	17
Husky Model V[8]	005:021:005	X	X	X	X	X	X	X	X	X	18

Exhibit 2, page 2

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,b,c	9a,b,c	10	11	11a	Exhibit 3 X-Reference
Rebuilt Nozzles (rebuilt by other than original manufacturer)[2/]											
EZ-flo 3003[7/][9/]	005:029:003	X		X	X						1
EZ-flo 3005[9/]	005:029:004	X	X	X	X	X	X	X	X	X	2
EZ-flo 3006[9/]	005:029:004	X		X	X						3
EZ-flo 3007[9/]	005:029:005	X	X	X	X	X	X	X	X	X	4
EZ-flo A4000[7/][8/]	005:029:006	X		X	X						5
EZ-flo A4001[8/]	005:029:006	X	X	X	X	X	X	X	X	X	6
EZ-flo A4002[8/][9/]	005:029:006	X		X	X						7
EZ-flo A4003[8/][9/]	005:029:006	X	X	X	X	X	X	X	X	X	8
EZ-flo A4005[8/][9/]	005:029:006	X	X	X	X	X	X	X	X	X	9
EZ-flo EZE 8 (22,24,47,49)[10/]	005:029:002	X		X	X						10a
EZ-flo 11VS (coaxial)[8/]	005:029:007	X	X	X	X	X	X	X	X	X	15
EZ-flo 11VS (dual)[7/][8/]	005:029:007	X		X	X						16
EZ-flo 11VE (coaxial)[8/]	005:029:007	X	X	X	X	X	X	X	X	X	13
EZ-flo 11VE (dual)[8/]	005:029:007	X		X	X						14
Rainbow RA3003[7/][11/][16/]	005:035:002	X		X	X						1
Rainbow RA3005[11/][16/]	005:035:003	X	X	X	X	X	X	X	X	X	2
Rainbow RA3006[11/]	005:035:004	X		X	X						3
Rainbow RA3007[11/]	005:035:005	X	X	X	X	X	X	X	X	X	4
Rainbow RPP (34,36,47,49)	005:035:006	X		X	X						10b
Nozzle Bellows											
Daystar [13/]		X	X	X		X	X	X	X		

Exhibit 2, page 3

Component[1/] Executive Order G-70-52-AM
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-Retractor Hose Configurations[3/]														
Overhead Hose Retractors														
CNI Series 9900, 9910 and 9930		X	X						X	X	X			X
Dresser Wayne 360-series		X	X											
Gasboy Model 90-750-2		X	X											
Gilbarco									X	X	X			
OPW 55 (coax)			X											
OPW 56 (dual)		X												
Petro-Vend PV-8		X	X											
Pomeco 100A, B, C and 102		X	X								X			X
Radikas		X	X								X			X
Red Jacket		X	X								X			X
Rusken		X	X								X			X
Topmaster		X	X								X			X
Universal Valve #880		X	X								X			X
High Retractor Dispensers[4/]														
Bennett Pump 6012, 6013, 6022, 6024, 6025, 6027			X											
Dresser Wayne Series 370/380				X										
Dresser Wayne DecadeMarketer Series 310/320					X									
Gasboy Series 50		X	X											
Tokheim Series 162		X	X											
Tokheim 262 [19/]		X	X											
Tokheim 242 and 244			X											
Tokheim 330A and 333A MMD					X									
Tokheim retrofit 222 and 333												X		
Low Retractor Dispensers[4/]														
Tokheim TCS														
311, 312, 322, 324, 413, 426, 614, 628													X	X

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

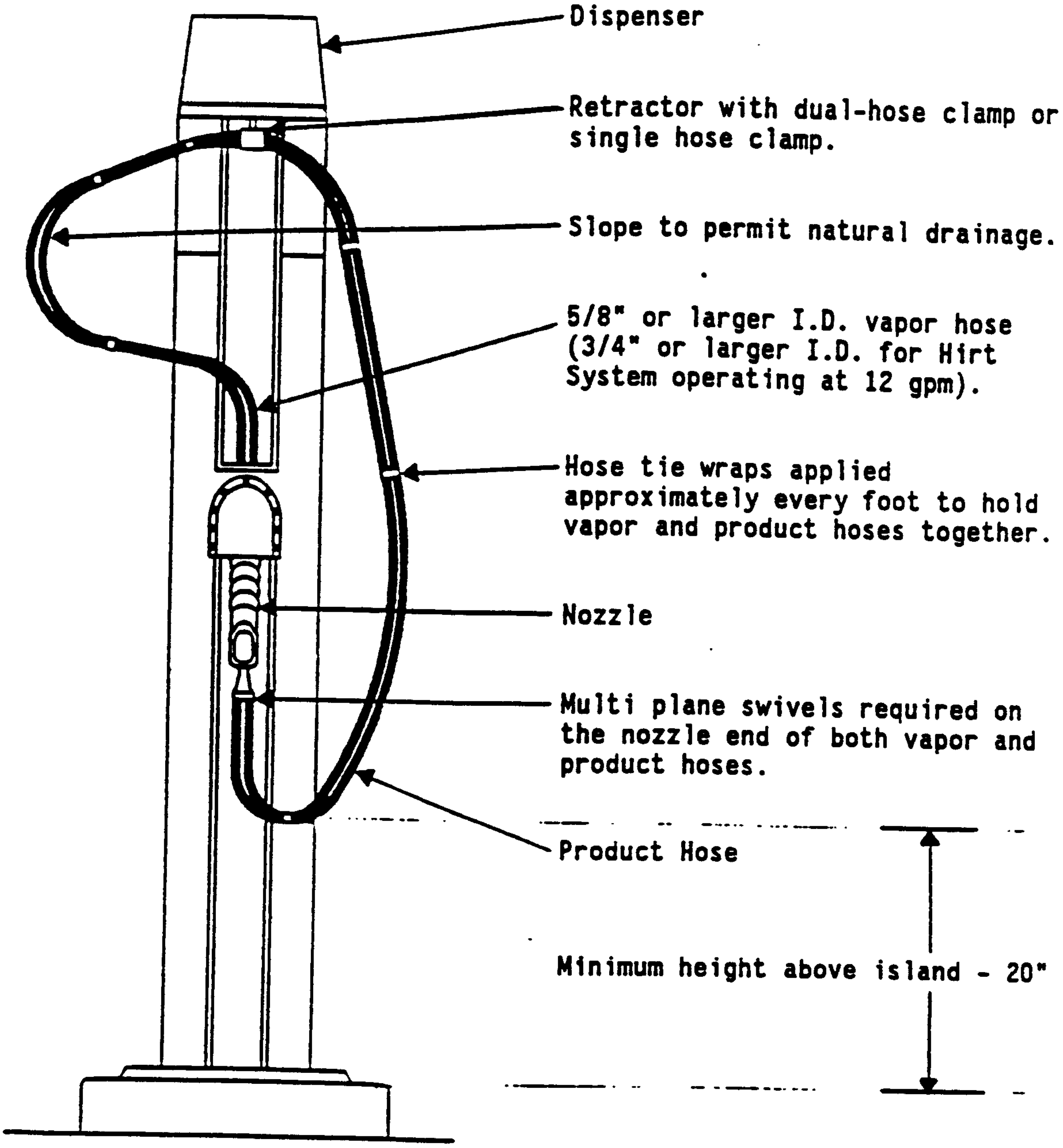
(continued next page)

Exhibit 2, page 5

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

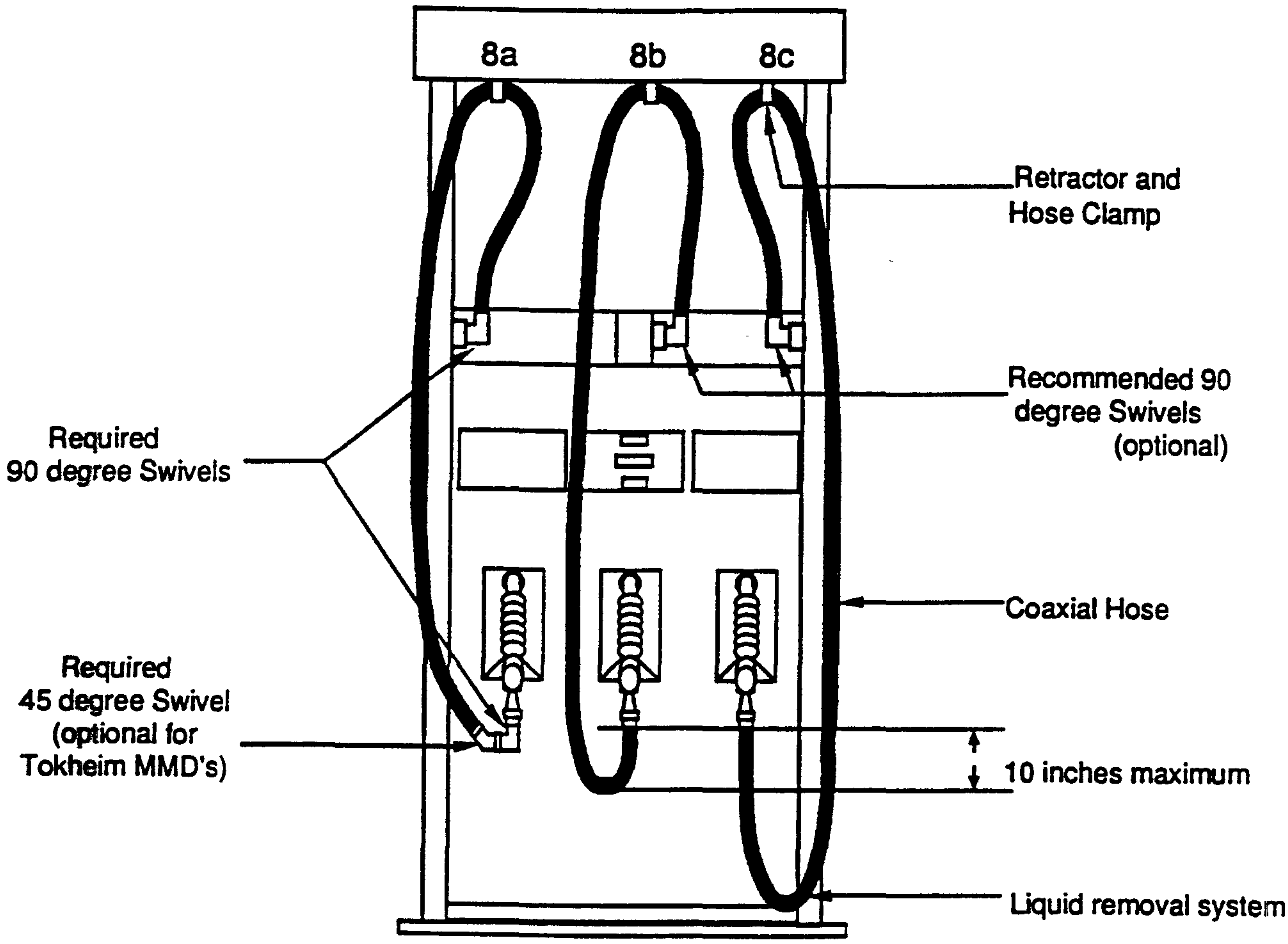
Manufacturer/Item and Model Number	SFM ID Number	Exhibits 4	5	6	7	8a	8b	8c	9a	9b	9c	10	11	11a
Coaxial Hose Assembly [16/] (continued from previous page)														
Goodyear Maxxim (black or green)														
(1/2" or 5/8" inner hose)	005:036:001		X	X		X	X	X	X	X	X	X	X	X
Thermoid Superlite (HPD Industries)														
(1/2" or 5/8" inner hose)	005:037:001		X	X		X	X	X	X	X	X	X	X	X
Vapor Systems Technologies	005:044:001		X	X		X	X	X	X	X	X	X	X	X
Liquid Removal Systems														
Gilbarco Venturi CoVent (1/2")	005:026:011							X			X	X		
Gilbarco CoVent-2 (5/8")	005:026:012							X			X	X		
Wayne Purge System												X		
Coaxial Hose Assemblies with Liquid Removal Systems [22/]														
Dayco Petroflex 7573 (1/2")	005:033:003							X			X	X	X	
Dayco Petroflex 7574 (5/8")	005:033:004							X			X	X	X	
Goodyear Maxxim Plus (5/8")	005:036:001							X			X	X	X	
Thermoid Superlite "V"	005:037:002							X			X	X	X	
Coaxial Hose Fittings														
OPW 38-C [14/]	005:008:041		X	X										
OPW 38-CS [14/]	005:008:041		X	X										
OPW 38-CX [14/]	005:008:041		X	X										
Emco Wheaton 4041 [14/]	005:007:029		X	X										
Emco Wheaton 4042 [21/]	005:007:030		X	X					X	X	X	X		
Hose Breakaway Fittings - Dual Hose Systems Only														
Enterprise Brass Works 697-V	005:034:001	X		X	X									
Husky Safe-T-Break	005:021:003	X		X	X									
Richards R85 Safe-T-Gard	005:031:003	X		X	X									

EXHIBIT 7
Executive Order G-70-52-AM
Dual Hose Dispenser-Mount High-Retractor Configuration
For Existing Installations Only



Notes:
1. See Exhibit 2 for the component list.
2. A flow limiter is required on dispensers that have a maximum flowrate in excess of 10 gpm (12 gpm for dispensers for the Hirt System).
3. Hose swivels not required at dispenser end of hoses.
4. Riser must be 3/4 inch or larger inside diameter galvanized pipe.
5. Dual hose dispenser-mount high-retractor configuration not permitted on new installations.
6. The Emco Wheaton and EZ-flo A4000 and A4005 nozzles are permitted only when used in conjunction with certified vapor check valves.

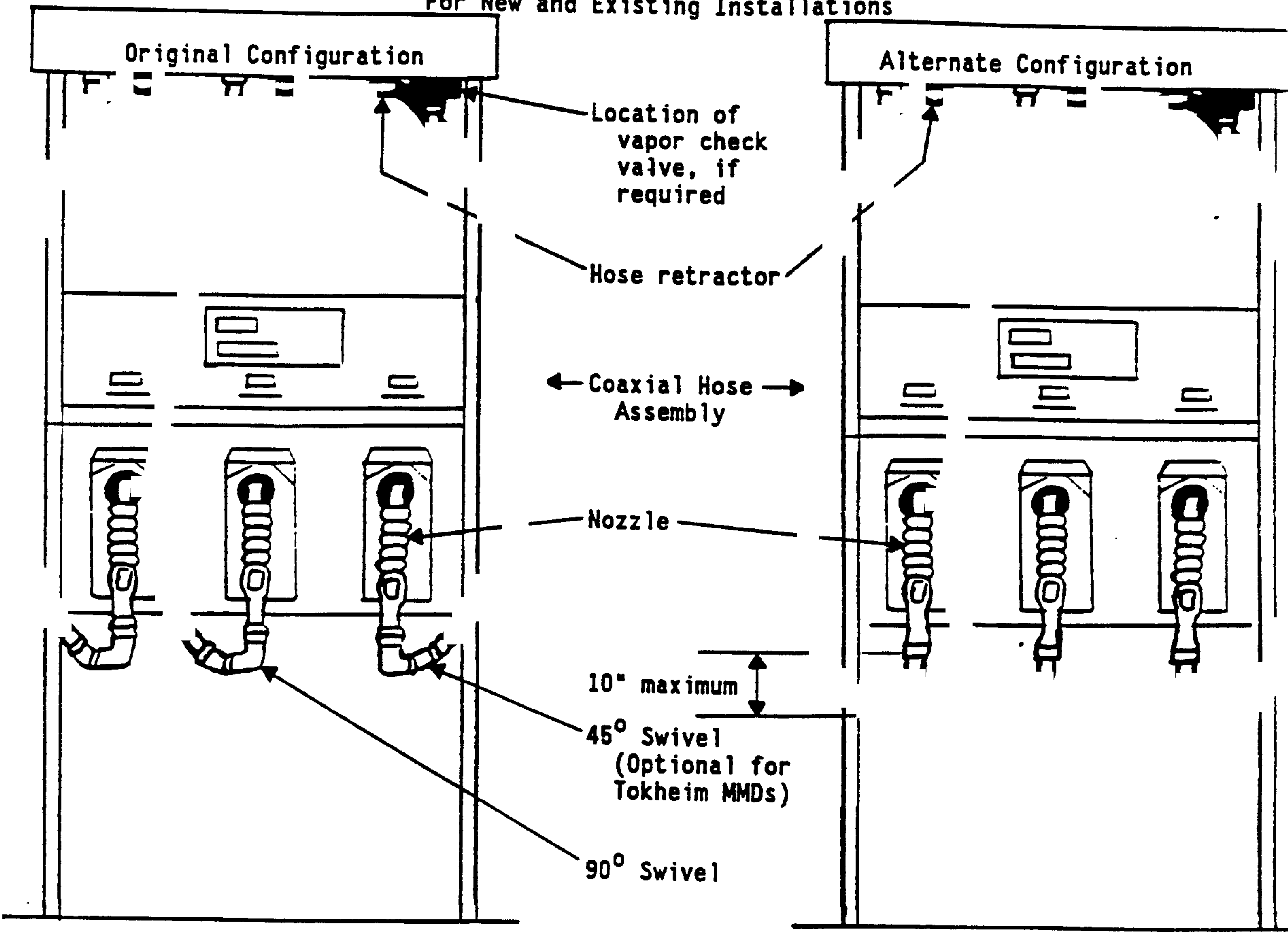
EXHIBIT 8
Executive Order G-70-52-AM
High-Retractor Dispenser - Coaxial Hose Configurations
For New and Existing Installations



Motor Fuel Dispenser

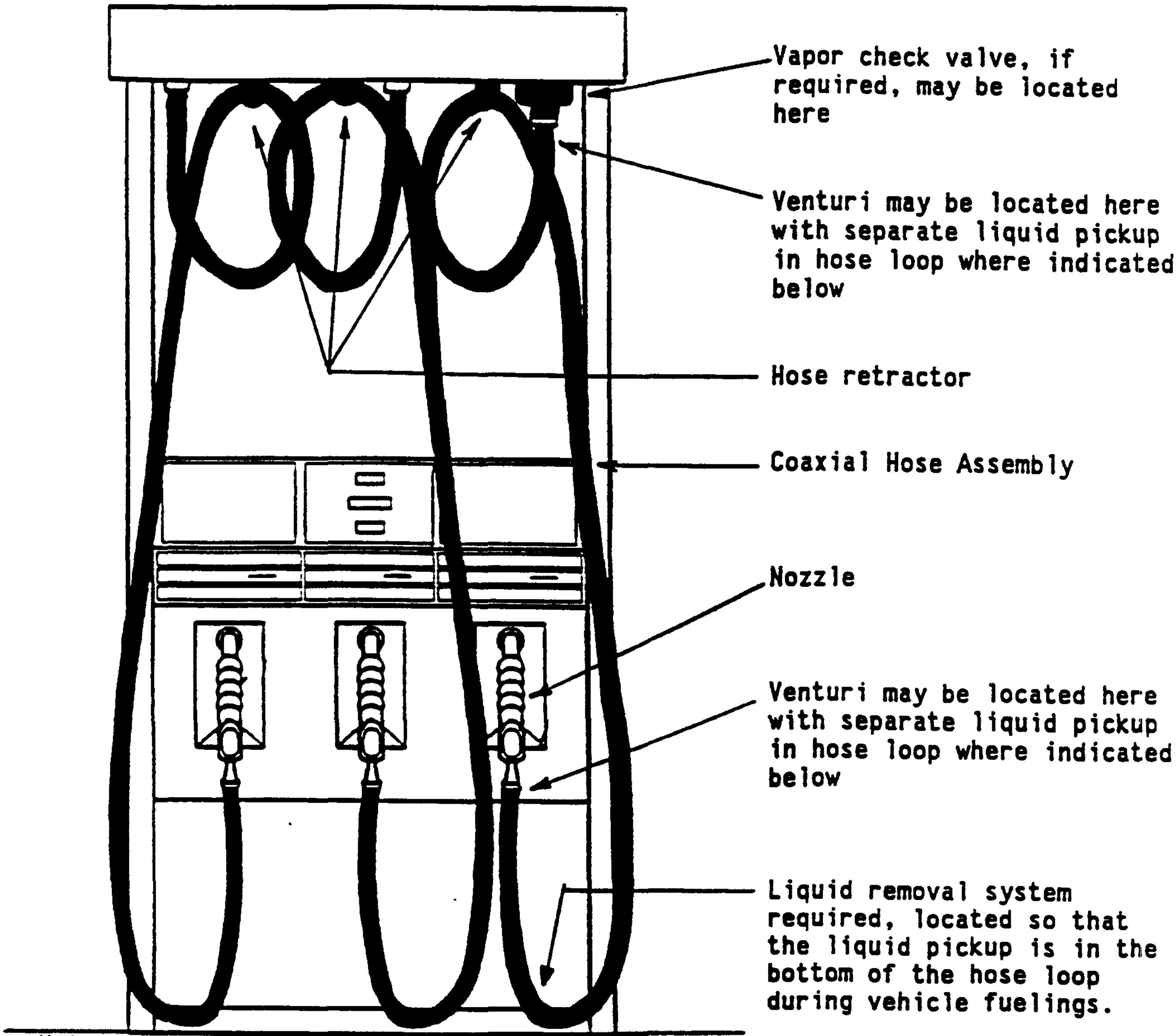
Notes:
1. Use a 1 inch or larger diameter galvanized pipe for riser.
2. A flow limiter is required on dispensers that have a maximum flowrate in excess of 10 gpm. A flow limiter may be required on any gasoline dispenser at the option of the local air pollution control district. Flow limiters are not recommended for configurations requiring liquid removal systems if flowrates are10 gpm or less for all nozzles.
3. For configuration 8a only, the maximum length of the hose assembly is 9 feet. For dispenser islands greater than 4 feet in width, the maximum length of the hose assembly shall not exceed the sum of one-half the dispenser width, in feet, plus 7 feet.
4. Retractor must retract coaxial hose to top of dispensers when not in use and hose must slope downward to dispenser to provide natural drainage from the retractor to the dispenser. Tension on retractor hose clamp must not be in excess of that required to return hose to top of dispenser.
5. For configuration 8c, the hose may not touch the island or the ground when not in use. In the case of a dogbone island where the wider 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.
6. The Emco Wheaton and EZ-flo A4001 and A4003 nozzles are permitted only when used in conjunction with approved vapor check valves.
7. Configuration 8a with swivels is required with hardwall coaxial hoses.
8. Liquid removal system is required with configuration 8c and shall be located so that the liquid pickup is in the bottom of the hose loop during vehicle fuelings.

Exhibit 9 (a and b)
Executive Order G-70-52-AM
High-Hang Coaxial Hose Configuration with Retractor
For New and Existing Installations



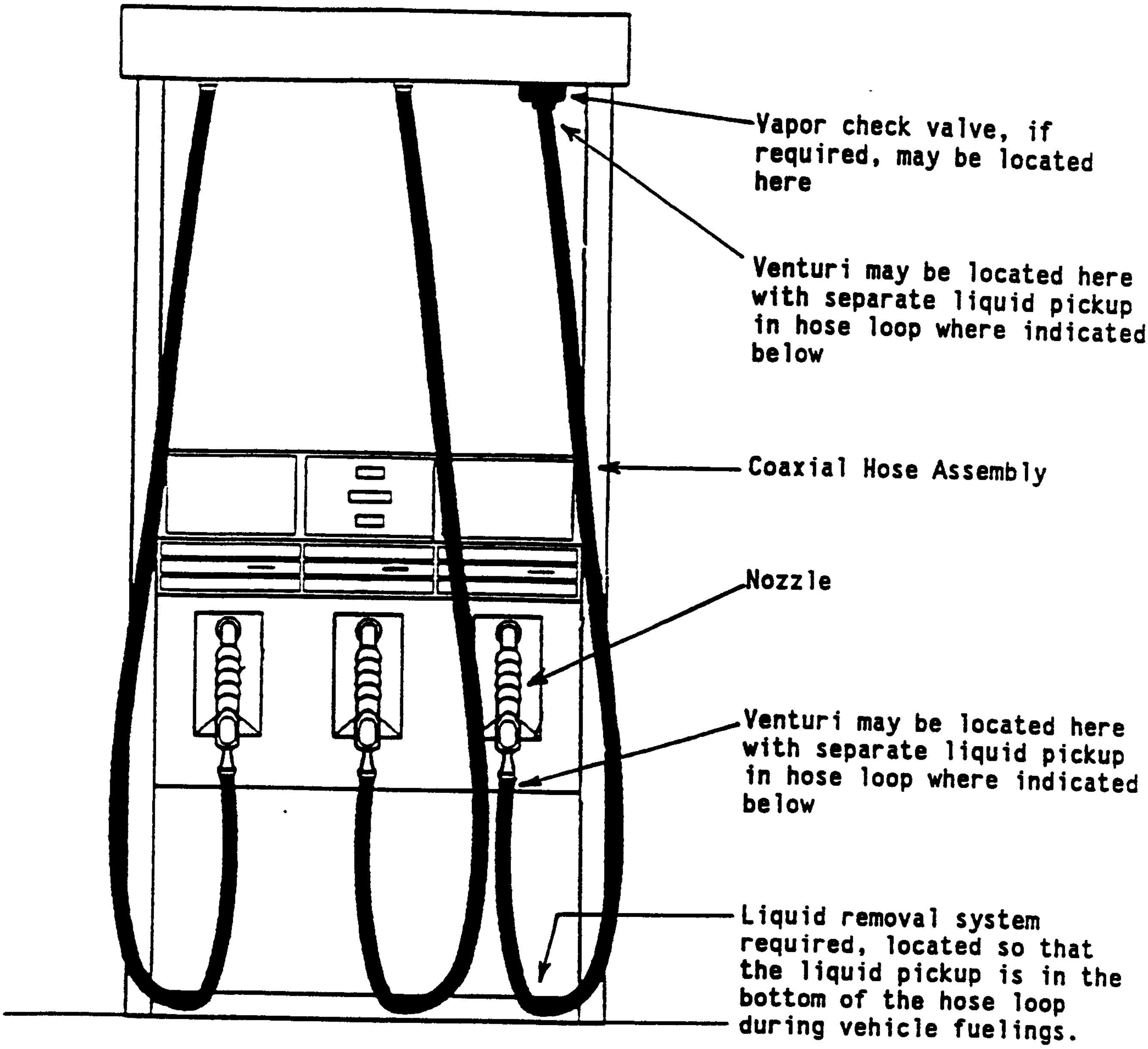
Notes:
1. Use a 1 inch or larger inside diameter galvanized pipe for riser.
2. A flow limiter is required on dispensers that have a maximum flowrate in excess of 10 gpm. A flow limiter may be required on all gasoline dispensers at the option of the local air pollution control district.
3. For dispenser islands less than 4 feet in width, the maximum length of the hose assembly is 9-1/2 feet. For dispenser islands greater than 4 feet in width, the maximum length of the hose assembly shall not exceed the sum of one-half the dispenser island width, in feet, plus 7-1/2 feet.
4. Retractor must retract coaxial hose to top of dispensers when not in use.
5. Tension on retractor hose clamp must not be in excess of that required to return hose to top of dispenser.
6. Original configuration required with hardwall hoses.
7. 90 degree swivel is not required if hose stiffener [illegible] zle is 24" in length (Hose stiffeners pertain only to B.F. Good[illegible] hoses).
8. The Emco Wheaton and EZ-flo A4001 and A4003 nozzles a[illegible] permitted only when used in conjunction with approved vapor check valves.

Exhibit 9c
Executive Order G-70-52-AM
High-Hang Coaxial Hose Configuration With Liquid Removal System
For New and Existing Installations



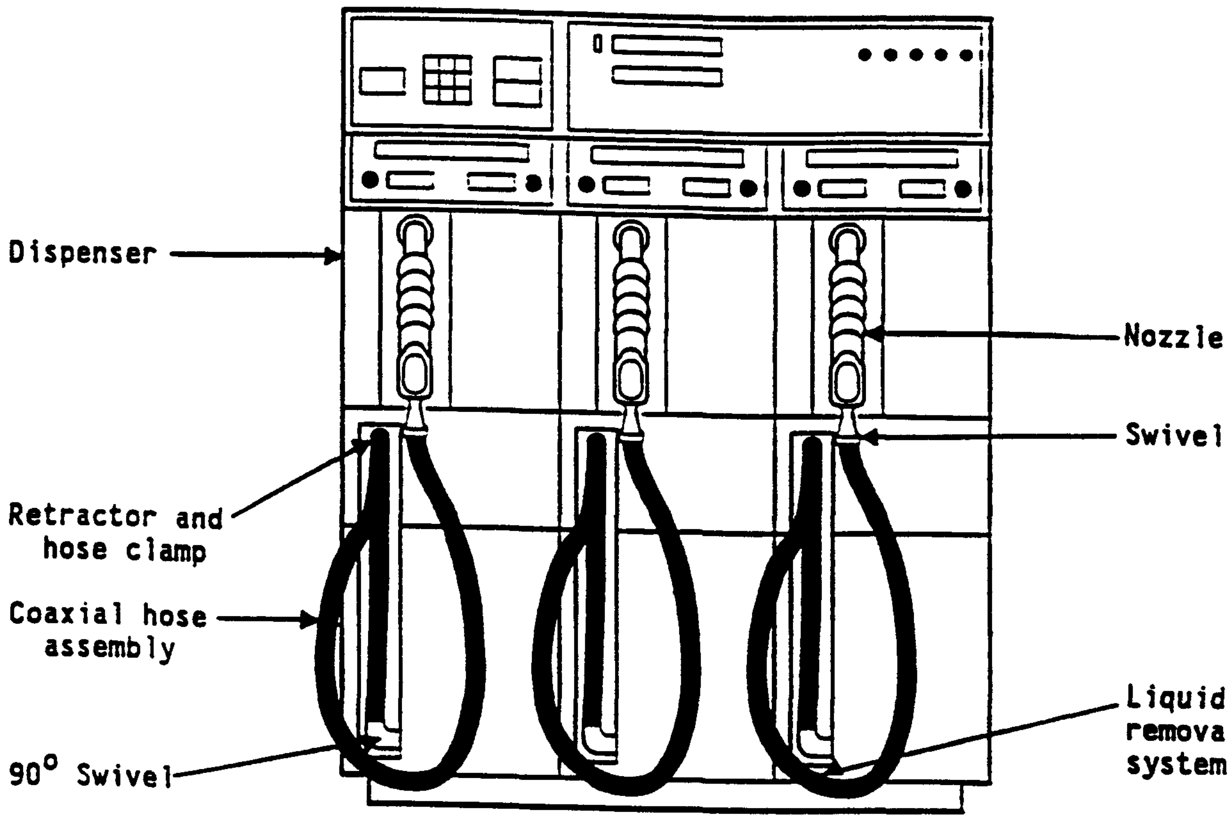
Notes:
1. Use 1 inch or larger inside diameter galvanized pipe for riser.
2. The maximum length of the hose assembly, including any breakaway valve, vapor check valve or pigtail hose, shall not exceed 13 feet.
3. An ARB certified liquid removal system must be installed and maintained according to the 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.
7. Retractor must retract coaxial hose to top of dispensers when not in use.
8. Tension on hose clamp must not be in excess of that required to return hose to top of dispenser.

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



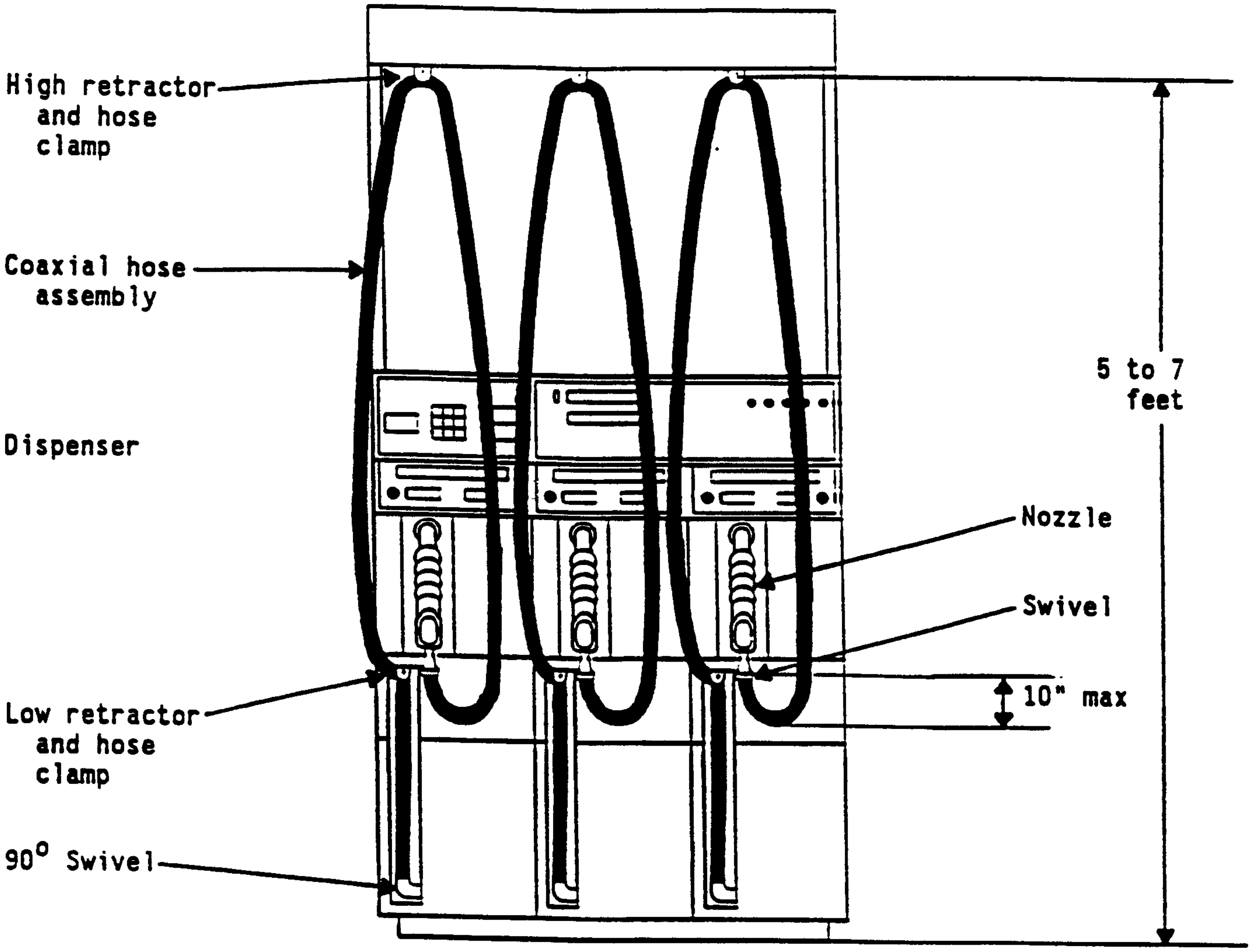
Notes:
1. Use 1 inch or larger inside diameter galvanized pipe for riser.
2. The maximum length of the hose assembly is 10-1/2 feet.
3. An ARB certified liquid removal system must be installed and maintained according to the manufacturer's current specifications.
4. A flow limiter is required on all 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 11
Executive Order G-70-52-AM
Low-Profile Dispenser with Retractor and Liquid Removal System
For New and Existing Installations



Notes:
1. Use 1 inch or larger inside diameter galvanized pipe for riser.
2. A flow limiter is required on 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.
3. An ARB certified liquid removal system must be installed and maintained according to manufacturer's specifications.
4. Retractor must retract coaxial hose to dispenser when not in use. The hose must fit snugly against the dispenser from the low retractor to the 90° swivel.
5. Tension on retractor hose clamp must not be in excess of that required to return hose to dispenser.
6. The Emco Wheaton and EZ-flo A4001 and A4003 nozzles are permitted only when used in conjunction with approved vapor check valves.
7. 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 11a
Executive Order G-70-52-AM
Low-Profile Dispenser with Retractors
For New and Existing Installations



Notes:
1. Use 1 inch or larger inside diameter galvanized pipe for riser.
2. A flow limiter is required on 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.
3. Low retractor must be present and must retract hose to dispenser when not in use. Hose must fit snugly against dispenser from low retractor to 90 degree swivel.
4. High retractor must retract hose fully when hose is not in use and must provide natural drainage from high retractor to the 90° swivel.
5. Tension on retractor hose clamp must not be in excess of that required to return hose to dispenser.
6. The Emco Wheaton and EZ-flo A4001 and A4003 nozzles are permitted only when used in conjunction with approved vapor check valves.

State of California
AIR RESOURCES BOARD

Executive Order G-70-70-AB

Relating to the Certification of the
Healy Phase II Vapor Recovery System
for Service Stations

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 September 1, 1982 (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, James W. Healy of Cambridge Engineering, Inc. has applied for certification of the Healy Phase II Vapor Recovery System modified to use a single, centrally located Cambridge Engineering Multi-Jet Pump for both multi-product and individual dispensers;

WHEREAS, the modified Healy Phase II Vapor Recovery System installed with Cambridge Engineering's centrally located Multi-Jet Pump has been evaluated pursuant to the Board's Certification Procedures and Test Procedures;

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; and

WHEREAS, I find that the Healy Phase II Vapor Recovery System modified to use a single, Cambridge Engineering Multi-Jet Pump, conforms with all of the requirements set forth in Sections I through VII of the Certification Procedures and is at least 95 percent effective for attendant and/or self-service use at gasoline service stations when used in conjunction with Phase I vapor recovery systems that have been certified by the Board.

NOW THEREFORE, IT IS HEREBY ORDERED that the Executive Order G-70-70-AA issued on December 16, 1983 is hereby modified to add the use of the Healy Phase II Vapor Recovery System which incorporates Cambridge Engineering's Multi-Jet Pump with both multi-product and individual dispensers.

IT IS FURTHER ORDERED that this system is certified to be at least 95 percent effective in self-serve and/or attendant use at gasoline service stations when used with a Board certified Phase I vapor recovery system. A typical piping arrangement for the Healy Phase II Vapor Recovery System without multi-product dispensers is shown in Exhibit 1. A schematic of a typical installation of dispenser components for Healy Phase II Vapor Recovery Systems not incorporating the Multi-Jet Pump is shown in Exhibit 2. A typical piping arrangement for the Healy Phase II Vapor Recovery System when used with multi-product dispensers is shown in Exhibit 3. A typical piping arrangement for the Healy Phase II Vapor Recovery System when used with the Multi-Jet Pump and multi-product dispensers is shown in Exhibit 4. A listing of certified Healy Phase II Vapor Recovery System components is presented in Exhibit 5. Notes applicable to underground vapor return lines for the Healy Phase II Vapor Recovery System are listed in Exhibit 6.

IT IS FURTHER ORDERED that compliance with the applicable certification requirements and rules and regulations of the Division of Measurement Standards, the State Fire Marshal's Office, and the Division of Occupational Safety and Health of the Department of Industrial Relations is made a condition of this certification.

IT IS FURTHER ORDERED that the system certified hereby shall perform in actual use with the same effectiveness as the certification test system. Compliance with this performance criterion shall be a condition of this certification, and failure to meet this criterion shall constitute grounds for revocation, suspension, or modification of this certification.

IT IS FURTHER ORDERED that any alteration to the equipment, parts, design, or operation of the system certified hereby, is prohibited, and deemed inconsistent with this certification, unless such alteration has been approved by the undersigned or the Executive Officer's designee.

IT IS FURTHER ORDERED that the certified Healy Phase II Vapor Recovery System shall, at a minimum, be operated in accordance with the manufacturer's recommended maintenance intervals and shall use the manufacturer's recommended operation, installation, and maintenance procedures.

IT IS FURTHER ORDERED that the Healy Phase II Vapor Recovery System nozzle, jet pump, control valve and Multi-Jet Pump shall be 100 percent performance checked at the factory including checks of proper operation in all aspects of performance.

IT IS FURTHER ORDERED that the certified Healy Phase II Vapor Recovery System shall be performance tested during installation for ability to dispense gasoline and collect vapors without difficulty in the presence of the station manager or other responsible individual. The station manager, owner or operator shall also be provided with instructions on the proper use of the Healy Phase II Vapor Recovery System, its repair and maintenance, and where system replacement and system components can be readily obtained. A copy of the Healy Phase II Vapor Recovery System warranty shall be made available to the station manager, owner or operator.

Executed at Sacramento, California this 2 day of October, 1986.

James D. Boyd
Executive Officer

Exhibit 1
Executive Order G-70-70-AB
Typical Phase II Vapor Recovery System with Individual Vapor Return Lines Adaptable to the Healy Phase II Vapor Recovery System

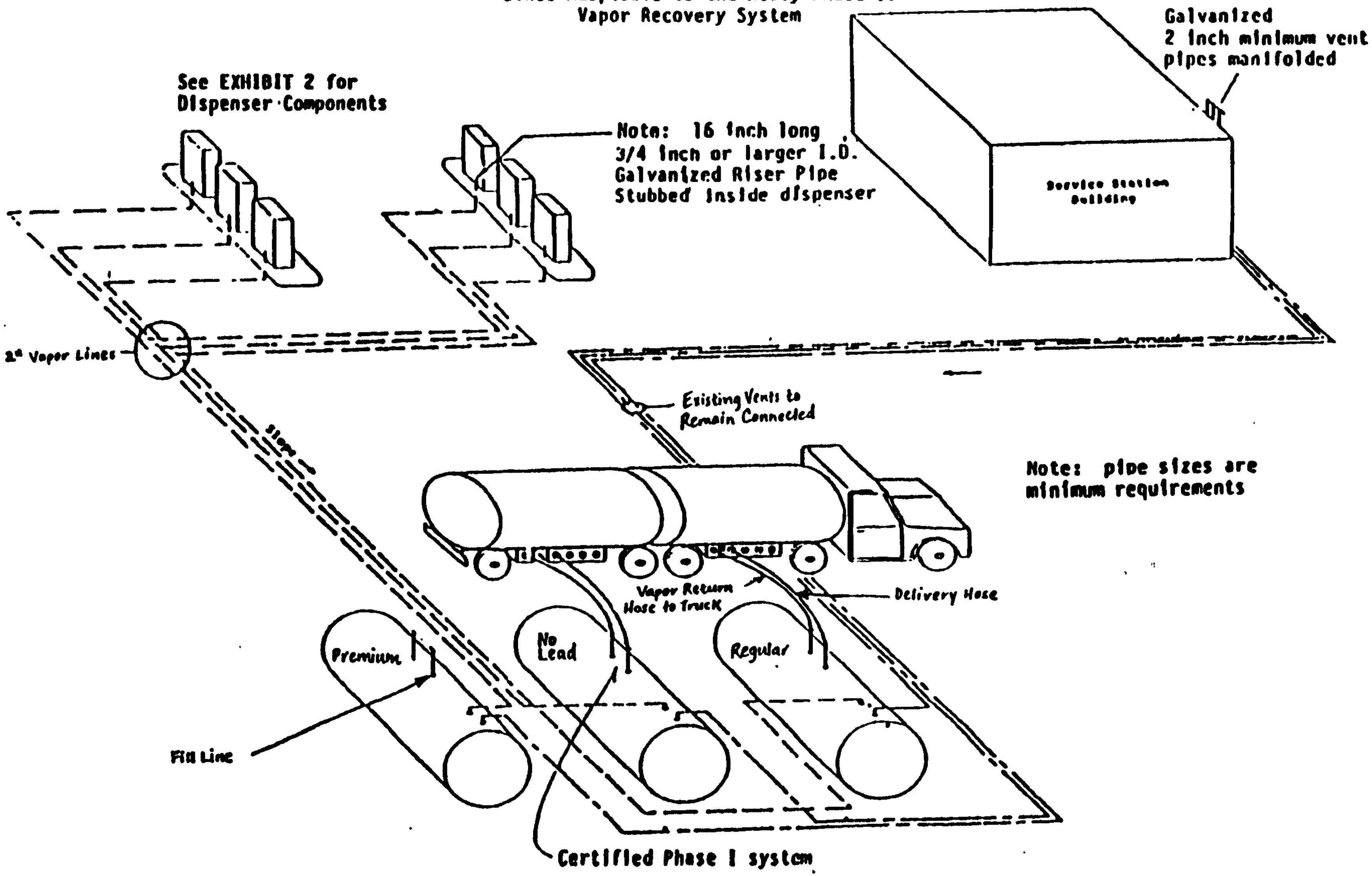
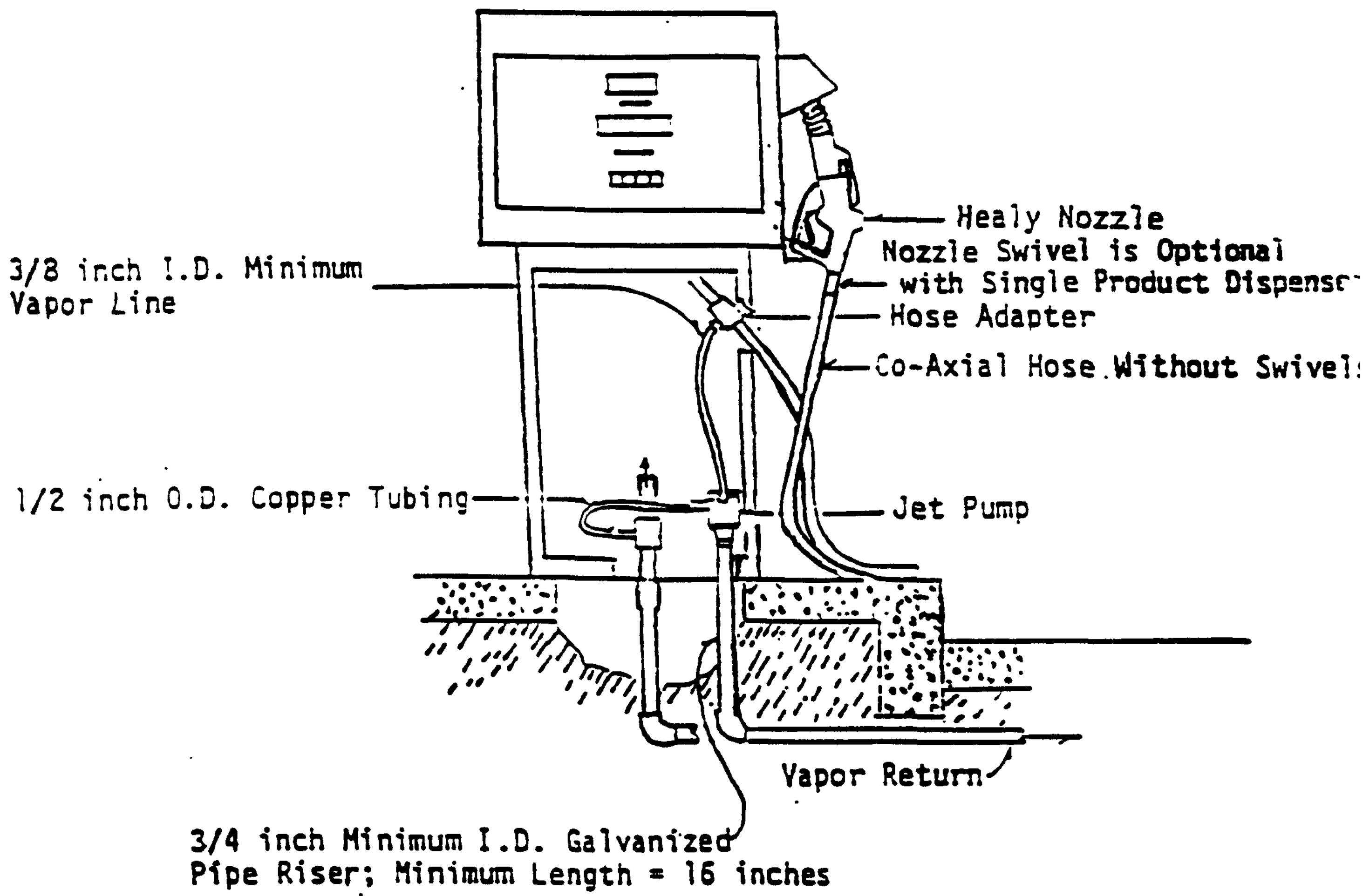


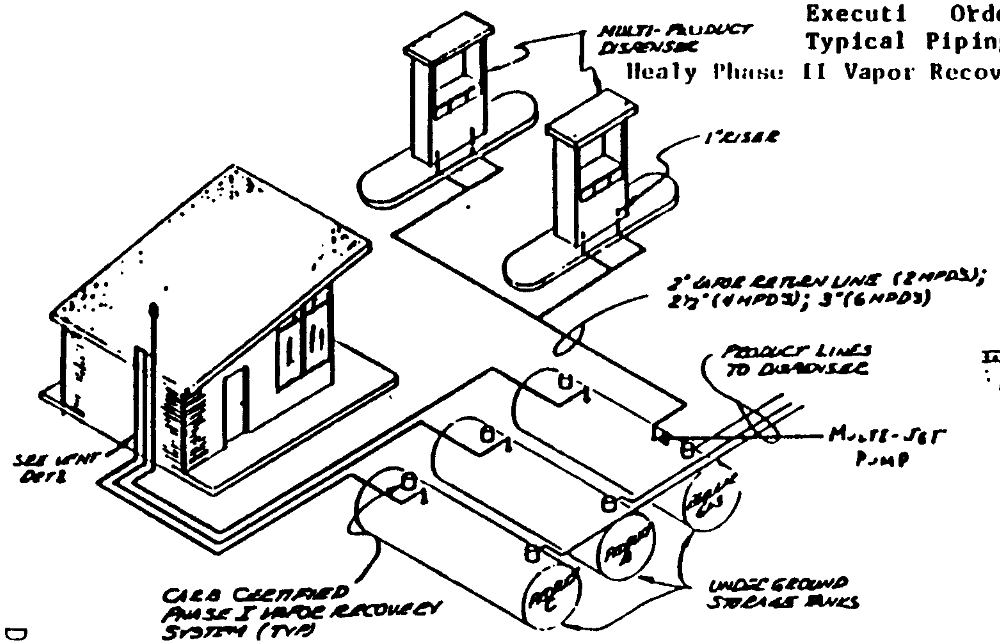
EXHIBIT 2

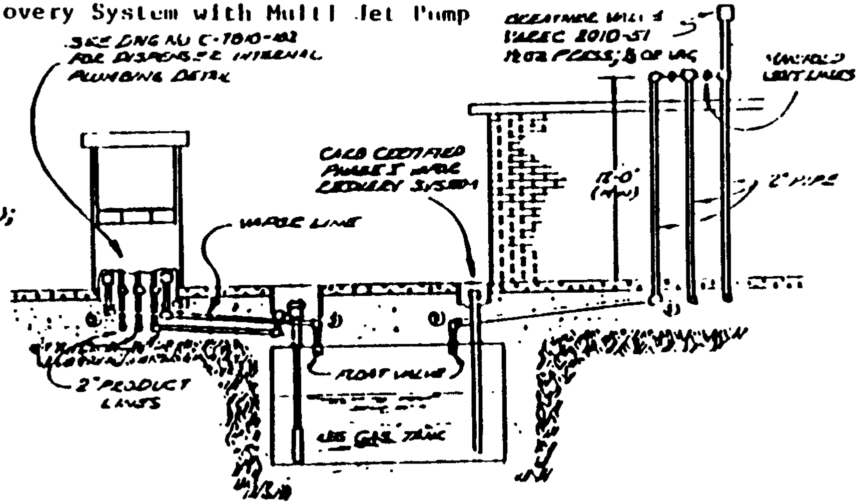
Executive Order G-70-70-A8

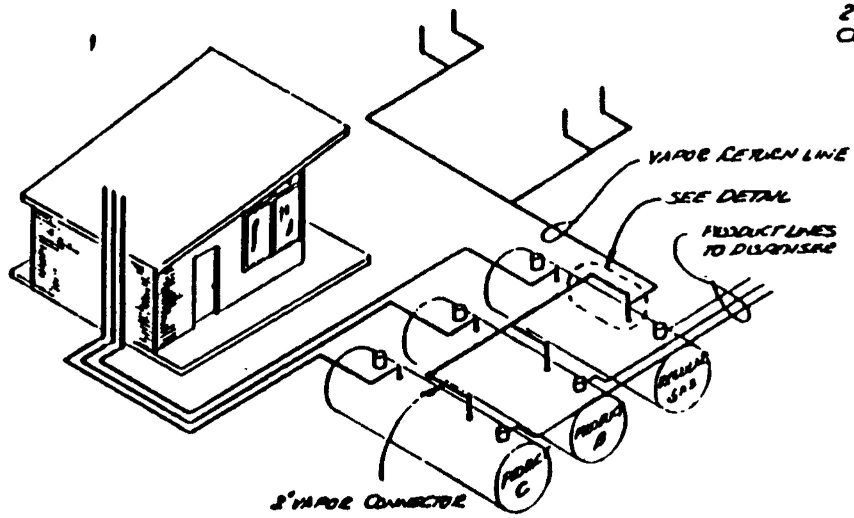
Healy Vapor Recovery System
Typical Installation
of Dispenser Components



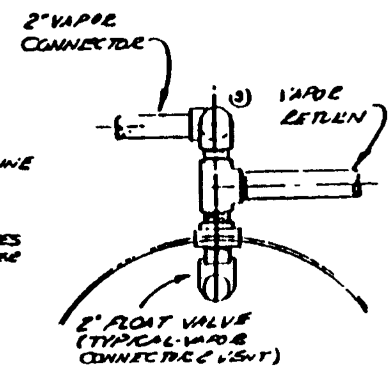
Executi Order G-70-70 AB
Typical Piping Arrangement
Healy Phase II Vapor Recovery System with Multi Jet Pump







ALTERNATE VAPOR PLUMBING



VAPOR CONNECTOR DETAIL

NOTES

1. THIS DRAWING IS FOR ILLUSTRATIVE PURPOSE ONLY. THIS PLAN SHOWS A GENERAL ARRANGEMENT AND IS INTENDED AS A GUIDELINE FOR A TYPICAL MULTI-PRODUCT VAPOR RECOVERY INSTALLATION. THE GENERAL ARRANGEMENT SHALL BE MODIFIED TO SUIT INDIVIDUAL INSTALLATION AND CONDITIONS AND IS NOT TO BE USED FOR ACTUAL DESIGN AND INSTALLATION.

2. INSTALLATION SHALL BE DONE IN COMPLIANCE WITH THE REQUIREMENTS SPECIFIED HEREIN: CALIFORNIA AIR RESOURCES BOARD REGULATIONS, CALIFORNIA STATE FIRE MARSHAL REGULATIONS, SUB-CHAPTER 11.3 AND LOCAL APCD RULES.

3. ALL PIPING AND FITTINGS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND SPECIFICATIONS. METAL PIPE SHALL BE MINIMUM SCHEDULE 40 WELDED OR SEAMLESS STEEL PIPE PER ASTM A-53, GALVANIZED, AND FITTINGS SHALL BE 150# SCREWED MALLEABLE IRON, GALVANIZED. ALL NON-METALLIC PIPE AND FITTINGS SHALL BE U/L APPROVED.

4. (S) DENOTES SWING JOINTED PIPE.

5. VAPOR RETURN LINES AND VENT LINES TO BE 2" DIAMETER PIPE UNLESS OTHERWISE NOTED. SLOPE MUST BE MINIMUM 1/8" PER FOOT, WITHOUT SAGS OR TRAPS, DRAINING UNIFORMLY TOWARD PRODUCT STORAGE TANK

6. VAPOR RETURN LINE MUST RETURN TO REGULAR GASOLINE TANK

7. VENT LINES MUST BE SEPARATED BY PRODUCT.

8. ALL VAPOR PIPING TRENCHING MUST BE COMPACTED TO THE UNDISTURBED SOIL BEFORE THE PIPES ARE INSTALLED AND BACKFILLED WITH SAND AT LEAST SIX INCHES BELOW AND ABOVE THE PIPING.

9. THE VAPOR RETURN PIPE SHOULD ENTER A SEPARATE UNDERGROUND TANK OPENING FROM THAT CONNECTED TO THE VENT PIPE OR STAGE I PIPING

10. FLOW RESTRICTING DEVICES SHALL NOT BE INSTALLED ON VENT PIPE.

11. GROOVE 1" RISER WITH PIPE CUTTER; LEAVE 1/32" TO 3/64" RADIAL WALL AS SHEAR SECTION. LOCATE @ 3/4" TO GROUND LINE

12. 1/2" COPPER TUBING OR FIRE MARSHAL APPROVED HOSE WITH BANDS AND HOSE CLAMPS MAY BE USED AS INDICATED ON DWG. NO. C-7810-182.

13. RISING TUBE AND REDUCING TUBE EXTENSION MAY BE UNSCREWED FROM JET PUMP BASE FOR INSERTION INTO 1" VAPOR RISER. REASSEMBLE EACH SECTION AS INSERTED

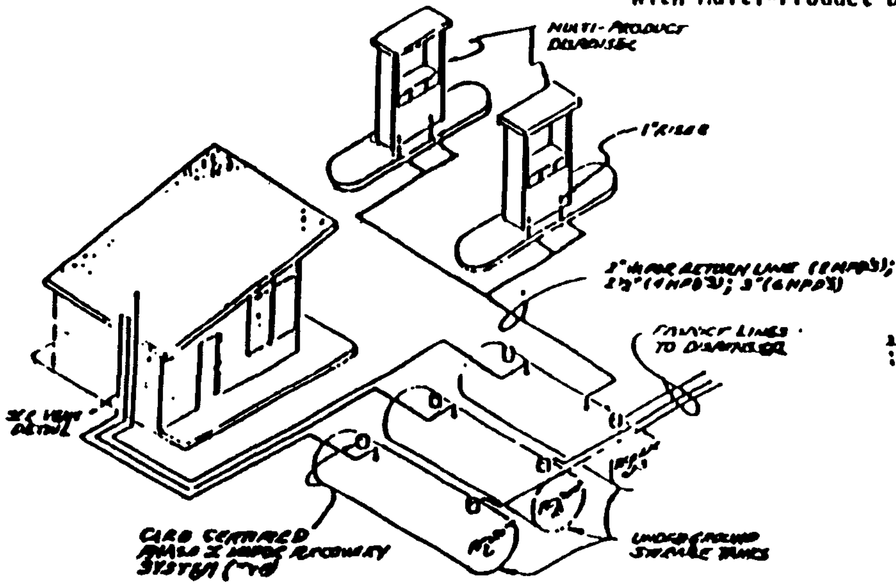
DO NOT SCALE THIS DRAWING

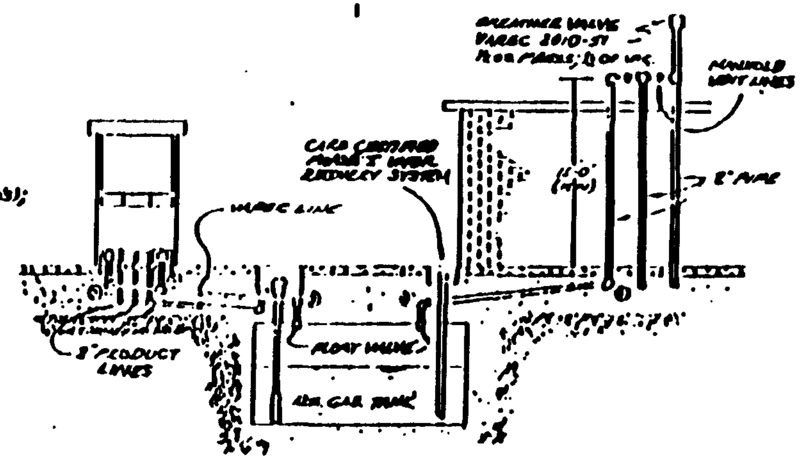
BREAK ALL SHARP CORNERS

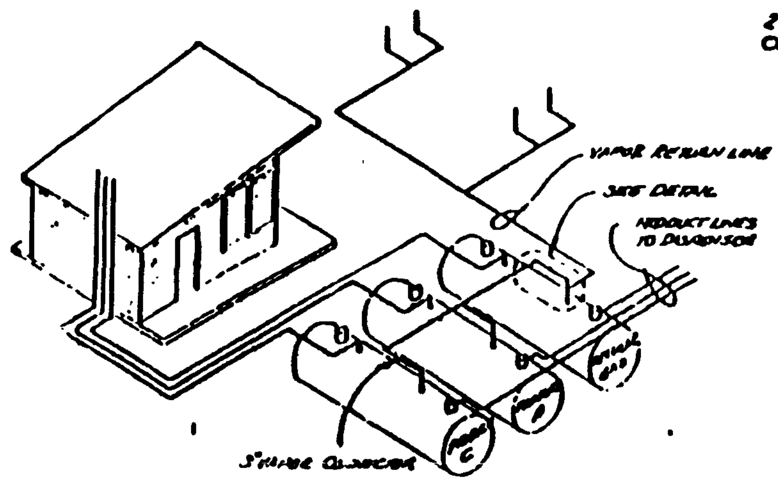
UNLESS OTHERWISE SPECIFIED			ORIGINAL ISSUE DATE		TYPICAL INSTALLATION HEALY PHASE II (MULTI-PROD. DISPENSER)	CAMARGOS ENGINEERING, INC.
TOLERANCES ON			DWN JAN	DATE 01/24		
FRACTIONS	DECIMALS	ANGLES	CHKD	DATE		
			APPD	DATE		
MATERIALS			SUBMITTED			
HEAT TREATMENT				CS INC		
			CLIENT			7810-188

EXHIBIT 3

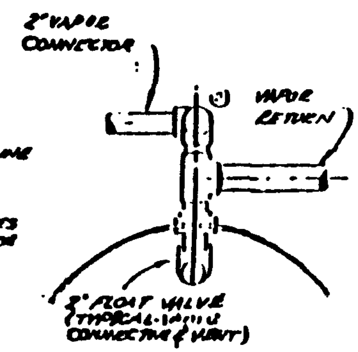
Executive Order G-70-70-AB
Typical Piping Arrangement
Healy Phase II Vapor Recovery System
with Multi-Product Dispensers.







ALTERNATE VAPOR PLUMBING



VAPOR CONNECTOR DETAIL

Exhibit 5

Executive Order G-70-70-AB

List of Components for Healy Phase II
Vapor Recovery System

Item		Model	State Fire Marshal Identification No.
1.	Nozzle	Healy Model 200	005:024:002
	Notes:	Leaded and unleaded spouts are interchangeable. Nozzle must shut off at -10 inches H_2O or less and +10 inches H_2O or greater. Flow rate is limited to 10 gallons or less per minute.	
2.	Riser		
	Notes:	Riser must be 16 inches or longer and have an inside diameter of no less than 3/4 inches. One inch inside diameter riser required with multi-product dispenser.	
3.	Jet pump	Healy Model 100	005:024:004
	Notes:	A single jet pump may not be connected to more than one vapor/liquid hose where more than one hose can be dispensing gasoline simultaneously. Gasoline that flows through the jet pump and components of the jet pump must first be strained by the dispenser filter or by a filter approved by the manufacturer.	
4.	Hose Adapter	Healy Model CX-6	005:024:005
5.	Vapor Line		
	Notes:	The vapor line connecting the jet pump with the coaxial hose adapter shall consist of durable material listed for use with gasoline. It shall be no less than 3/8 inch inside diameter and shall be installed unobstructed. The vapor tube at the top of each side of a multi-product dispenser must be manifolded such that liquid that is taken from either vapor hose cannot enter the vapor path of another hose. The vapor tube extending from top to bottom of a dispenser must be 5/8 inch or greater inside diameter. The vapor tube from the bottom of the 5/8 inch or greater line to the jet pump shall be 3/8 inch inside diameter.	

Exhibit 5 (Continued)

Executive Order G-70-70-AB

List of Components for Healy Phase II
Vapor Recovery System

Item	Model	State Fire Marshal Identification No.
6. Vapor/Liquid Coaxial Hose	Healy Model CX	005:024:003

Notes: The coaxial hose shall not exceed a hose length of 13 ft. The hose must clear the island when the nozzle is in place on a multi-product dispenser.

7. Nozzle Swivel	Healy Model S	

Notes: Swivel required on nozzle end of coaxial hose when used with multi-product dispensers. Swivel optional on nozzle end of coaxial hose when used with other dispensers.

8. Control Valve	Healy Model 143	

Notes: Healy Model 143 control valve required on systems installed with multi-product dispenser.

9. Multi-Jet Pump		

Notes: Gasoline that flows through Multi-Jet Pump and Components of the Multi-Jet Pump must first be strained by a filter approved by the manufacturer.

10. Pressure Vacuum Valve	VAREC 2010-811-2 Hazlett H-PVB-1	

Notes: Pressure vacuum valve must have a release pressure setting equal to 1.0 inch of water column.

Exhibit 6

1. Vent pipes shall be adequately supported throughout their length and when they are supporting weights in addition to their own, additional supports may be required; anchor to building or other structure.

2. Tank vent pipes shall not be obstructed.

3. On Healy systems not incorporating the Multi-Jet Pump, tank vent pipes shall terminate into the open atmosphere and the vent outlet shall be not less than 12 feet above the adjacent ground level. The outlet shall vent upward or horizontally and be located to eliminate the possibility of vapors accumulating or traveling to a source of ignition or entering adjacent buildings.

4 On Healy systems incorporating the Multi-Jet Pump, tank vent pipes shall be manifolded into a single vent pipe to which a pressure vacuum valve is attached. The pressure vacuum valve shall be approved by the State Fire Marshal and have a release pressure equal to 1.0 inch of water column. The vent outlet shall be not less than 12 feet above the adjacent ground level. The pressure vacuum valve outlet shall vent upward and be located to eliminate the possibility of vapors accumulating or traveling to a source of ignition or entering adjacent buildings.

5. All vapor return and vent piping shall be provided with swing joints at each tank connection, and at the base of the vent riser where it fastens to a building or other structure.

6. Locate 1" riser with double swing connection to 2" run for best mounting position inside multi-product dispenser. Allow for 1/2" O.D. copper gasoline tie-in to regular (leaded) riser. When a swing joint is used in a riser containing a shear section, the riser must be rigidly supported.

7. On Healy Phase II Vapor Recovery Systems not incorporating Cambridge Engineering's Multi-Jet Pump, all horizontal lines to be sloped 1/8" per foot minimum.

8. On Healy Phase II Vapor Recovery Systems not incorporating Cambridge Engineering's Multi-Jet Pump, all horizontal lines must be sized to freely drain up to 2 gpm from each jet pump.

State of California
AIR RESOURCES BOARD

Executive Order G-70-7-AB

Certification of the Hasstech Model VCP-2 and VCP-2A
Phase II Vapor Recovery Systems

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 refueling 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 Services Stations" as last amended December 4, 1981 (the "Test Procedures"), incorporated by reference in Section 94000 of Title 17, California Administrative Code;

WHEREAS, Hasstech has applied for certification of the Hasstech Model HP-11 vapor recovery nozzle for use with the Hasstech Phase II vapor recovery systems;

WHEREAS, the Hasstech Model HP-11 vapor recovery nozzle has been evaluated when used with the Hasstech Phase II vapor recovery systems pursuant to the Board's Certification Procedures and Test Procedures;

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 paragraphs I through VII;

WHEREAS, I find that the Hasstech Phase II vapor recovery systems, modified to use the Hasstech Model HP-11 vapor recovery nozzle, conform with all the requirements set forth in paragraphs I through VII of the Certification Procedures and are at least 95 percent effective for attendant and/or self-serve use at gasoline service stations when used in conjunction with Phase I vapor recovery systems that have been certified by the Board.

NOW, THEREFORE, IT IS HEREBY ORDERED that the certification, Executive Order G-70-7-AA issued on December 3, 1982 for the Hasstech VCP-2 and VCP-2A Phase II vapor recovery systems is hereby modified to include the Hasstech Model HP-11 vapor recovery nozzle. The maximum dispensing rate for the Hasstech Model HP-11 vapor recovery nozzle shall be 12 gallons per minute.

IT IS FURTHER ORDERED that the systems are certified to be at least 95 percent effective in the self-serve and/or attendant use at gasoline service stations when used with Board-certified Phase I vapor recovery systems. These systems are described in Exhibit I. All certified components are listed in Exhibit 2.

IT IS FURTHER ORDERED that compliance with the applicable certification requirements and rules and regulations of the Division of Measurement Standards, and the State Fire Marshal's Office is made a condition of this certification.

IT IS FURTHER ORDERED that the systems certified hereby shall perform in actual use with the same effectiveness as the certification test systems. Compliance with this performance criterion shall be a condition of this certification, and failure to meet this criterion shall constitute grounds for revocation, suspension or modification of this certification.

IT IS FURTHER ORDERED that any alteration of the equipment, parts, design, or operation of the configurations certified hereby, is prohibited, and deemed inconsistent with this certification, unless such alteration has been approved by the undersigned or the Executive Officer's designee.

IT IS FURTHER ORDERED that all nozzles approved for use with these systems shall be 100 percent performance checked at the factory including checks of proper functioning of all automatic shut-off mechanisms.

IT IS FURTHER ORDERED that the certified Phase II vapor recovery systems shall, at a minimum, be operated in accordance with the manufacturer's recommended maintenance intervals and shall use the manufacturer's recommended operation, installation, and maintenance procedures, if available.

IT IS FURTHER ORDERED that the certified Phase II vapor recovery system selected for installation shall be performance tested during installation for ability to dispense gasoline and collect vapors without difficulty in the presence of the station manager or other responsible individual. The station manager, owner, or operator shall be provided with instructions on the proper use, maintenance, and repair of the system, and where system components can be readily obtained. A copy of the system warranty shall also be made available to the station manager, owner, or operator.

Executed at Sacramento, California this 22 day of July, 1985.

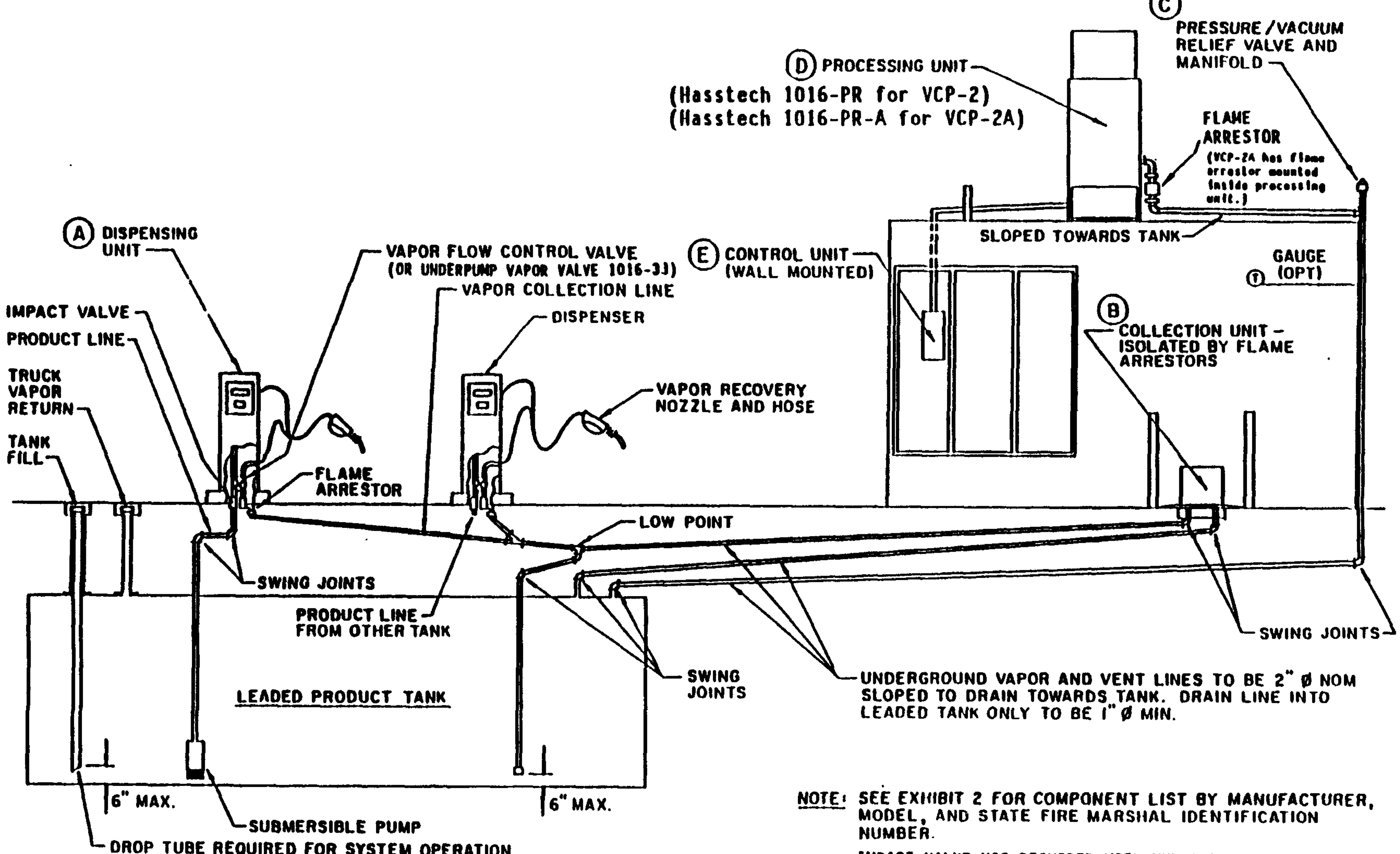
James D. Boyd
Executive Officer

EXHIBIT 1

EXECUTIVE ORDER G-70-7-AB

Hasstech Models VCP-2 and VCP-2A

PHASE II VAPOR RECOVERY SYSTEMS



NOTE: SEE EXHIBIT 2 FOR COMPONENT LIST BY MANUFACTURER, MODEL, AND STATE FIRE MARSHAL IDENTIFICATION NUMBER.

IMPACT VALVE NOT REQUIRED WITH UNDERPUMP VAPOR VALVE, HASSTECH COMPONENT 1016-33.

EXHIBIT 2

Executive Order G-70-7-AB

Hasstech Models VCP-2 and VCP-2A
Phase II Vapor Recovery Systems
Components List

Item	Manufacturer and Model	State Fire Marshal Identification Number	Substitute Equipment Manufacturer and Model	Substitute Equipment State Fire Marshal Identification Number
A. Dispenser Unit				
1. Nozzle	HP-1, HP-11	1016-1	Husky HP-2	1016-1
2. Vapor Hose 1/2 inch or Greater I.D.	Hasstech	1016-2		
3. Flow Control Valve	ITT-General Control SF1FE01A101H or SF1FE01A102	1016-3		
4. Impact Valve	A. Y. McDonald 9760176	1016-4	Hasstech	1016-33
5. Flame Arrestor	Hasstech 1025-3/4"	1016-5		
6. Hose Swivels	State Fire Marsnal Approved			
B. Collection Unit				
1. Pump Inlet Flame Arrestor	Protectoseal SP 4951 (1 1/4")	1016-6		
2. Collection Pump	Rotron D313 or D 312	1016-7		
3. Pump Outlet Flame Arrestor	Protectoseal SP 4951 (1 1/4")	1016-8		
C. Safety Relief				
1. P/V Valve	Varec 2010-811-2	1016-9		
1. Processing Unit	Hasstech	1016-PR (for VCP-2) or 1016-PR-A (for VCP-2A)		

EXHIBIT 2 (Continued)

Executive Order G-70-7-AB

Hasstech Models VCP-2 and VCP-2A
Phase II Vapor Recovery Systems
Components List

Item	Manufacturer and Model	State Fire Marshal Identification Number	Substitute Equipment Manufacturer and Model	Substitute Equipment State Fire Marshal Identification Number
E. Control Unit	Hasstech	1016-CP		
F. Optional Components				
1. In-Tank Drain Check	Hasstech 1044	1016-31		
2. Out-of-Tank Drain Check	Hasstech 1042	1016-32		

State of California
AIR RESOURCES BOARD

Executive Order G-70-118

Certification of the Amoco V-1
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," adopted March 30, 1976 and amended August 25, 1977 and December 4, 1981 (the "Certification Procedures"), incorporated by reference in Section 94001 of Title 17, California Administrative Code; Code of Regulations.

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," adopted on December 9, 1975 and amended on March 30, 1976, August 9, 1978, December 4, 1981 and September 1, 1982 (the "Test Procedures"), incorporated by reference in Section 94000 of Title 17, California Administrative Code; Code of Regulations.

WHEREAS, the Amoco Oil Company, has applied for certification of its Amoco V-1 Vapor Recovery System;

WHEREAS, the Amoco V-1 Vapor Recovery System has been evaluated pursuant to the Air Resources Board's Certification Procedures and Test Procedures;

WHEREAS, Section VII-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 of the Certification Procedures;

WHEREAS, I find that the Amoco V-1 Vapor Recovery System conforms with all of the requirements set forth in Sections I through VII of the Certification Procedures as amended on December 4, 1981, and would result in a vapor recovery system that is at least 95 percent effective for attendant and/or self-serve use at gasoline service stations when used in conjunction with Phase I vapor recovery systems that have been certified by the Board;

NOW, THEREFORE, IT IS HEREBY ORDERED that the Amoco V-1 Vapor Recovery System is hereby certified to be at least 95 percent effective in the self-serve and/or attendant use at gasoline service stations when used with a Board certified Phase I vapor recovery system. A typical piping arrangement for this system is described in Exhibit 1. A typical gasoline dispenser configuration showing the vapor pump and nozzle is shown in Exhibit 2. Certified components are listed in Exhibit 3.

IT IS FURTHER ORDERED that compliance with the applicable certification requirements and rules and regulations of the Division of Measurement Standards, the State Fire Marshal's Office and the Division of Occupational Safety and Health of the Department of Industrial Relations is made a condition of this certification.

IT IS FURTHER ORDERED that the Amoco V-1 Vapor Recovery System certified hereby shall perform in actual use with the same effectiveness as the certification test system. Compliance with this performance criterion shall be a condition of this certification, and failure to meet this criterion shall constitute grounds for revocation, suspension or modification of this certification.

IT IS FURTHER ORDERED that any alteration of the equipment, parts, design, or operation of the configurations certified hereby, is prohibited, and deemed inconsistent with this certification, unless such alteration has been approved by the undersigned or the Executive Officer's designee.

IT IS FURTHER ORDERED that the certified Phase II vapor recovery system shall, at a minimum, be operated in accordance with the manufacturer's recommended maintenance intervals and shall use the manufacturer's recommended operation, installation, and maintenance procedures, if available.

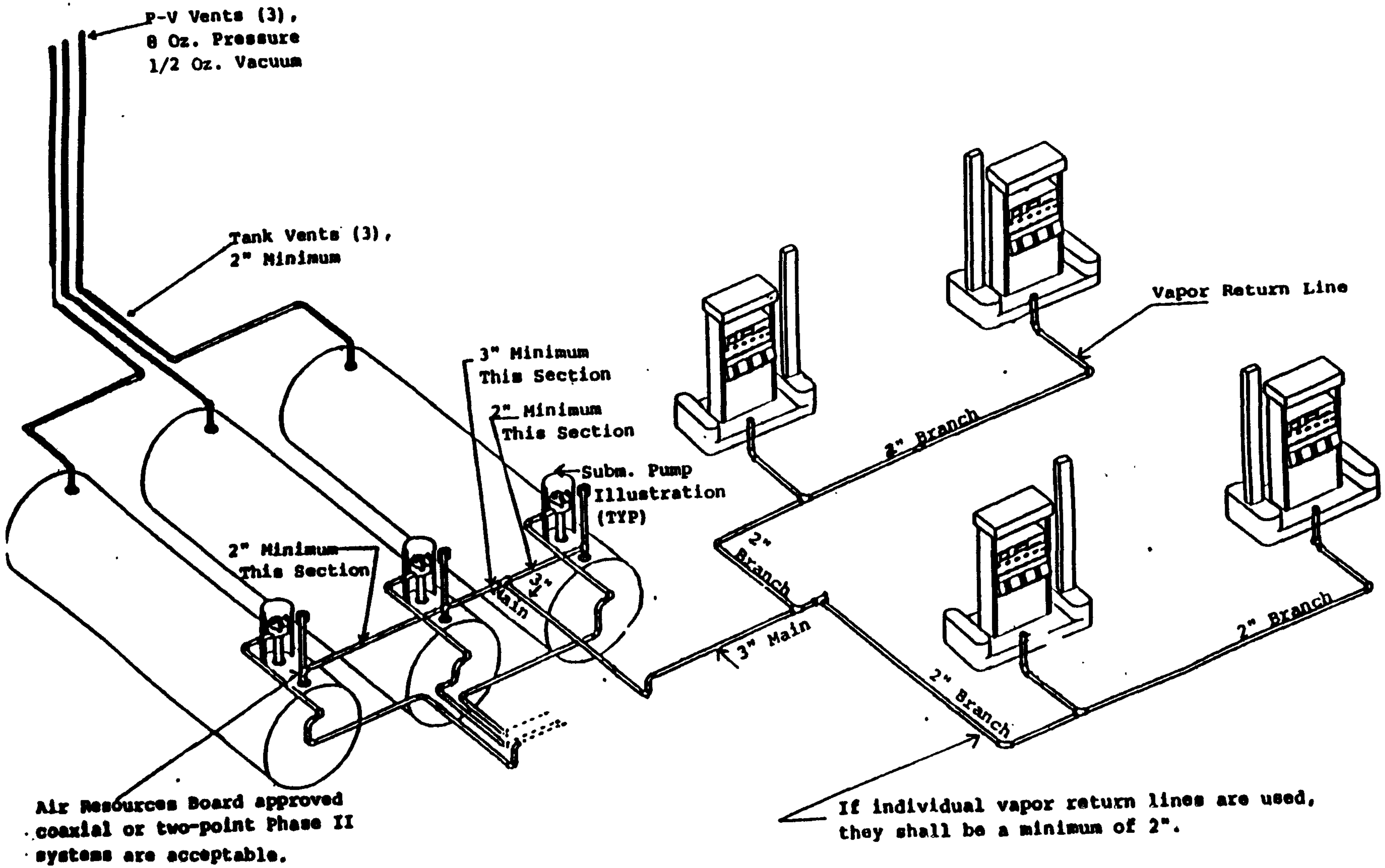
IT IS FURTHER ORDERED that the certified Phase II vapor recovery system shall be performance tested during installation for ability to dispense gasoline and collect vapors without difficulty in the presence of the station manager or other responsible individual. The station manager, owner, or operator shall be provided with instructions on the proper use, maintenance, and repair of the system, and where system components can be readily obtained. A copy of the system warranty shall also be made available to the station manager, owner, or operator.

Executed at Sacramento, California this 24th day of June 1988.

James D. Boyd
Executive Officer

Executive Orde. G-70-118
Amoco Oil Company Phase II
Vapor Recovery System

(See Exhibit 2 and latest revision of
Executive Order G-70-52 for Component
List by Manufacturer, Model, and State
Fire Marshal Identification Number.)



EXECUTIVE ORDER G-70-118
NOTES TO ACCOMPANY EXHIBIT 1

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 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.

3. 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.

4. On new installations, float check valves (or alternate equipment, design, or operating procedures acceptable to the Air Resources Board) are required for all underground manifolded piping to prevent contamination of unleaded gasoline with leaded gasoline, via vapor recovery piping, during underground storage tank loading or overfill.

Exhibit 2

xecutive Order G-70-118
moco V-1 Vapor Recovery System
ypical Dispenser Schematic

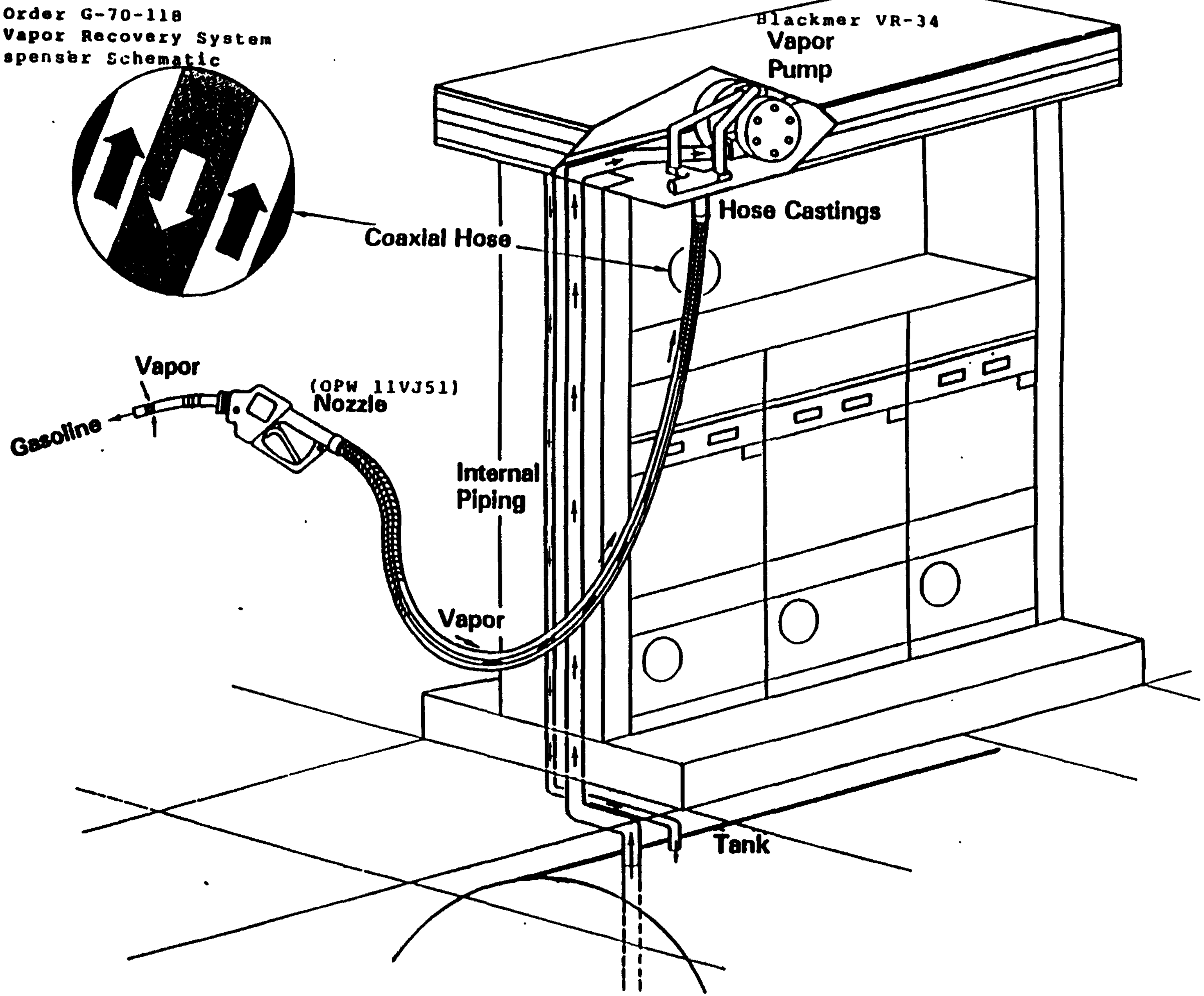


Exhibit 3

Executive Order G-70-118

Amoco V-1 Vapor Recovery System

Component List

Item	Manufacturer/Model	State Fire Marshal Identification No.
Vapor Recovery Coaxial Nozzle	OPW 11-V J-81	005:008:043
Vapor Pump	Blackmer Model VR-34	001:039:001
Coaxial Hose	Dayco Petroflex 2000 Model 7874 with venturi pickup	005:033:004
	Goodyear Maxxim with Gilbarco Venturi Liquid Removal System	005: 36:001 005:026: 11
Dispenser	Dresser Wayne 1/ Model 390-IL	
Pressure Vacuum Vents	OPW 523(2") or 523-S(2") set at 8 oz. pressure 1/2 oz. vacuum	

1/ The dispenser must be installed in with the hose configuration shown in Air Resources Board Executive Order G-70-82 AI, Exhibit 10.

State of California
AIR RESOURCES BOARD

Executive Order G-70-36-AC
Relating to Modification of Certification
of the OPW 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, on February 20, 1983 the Dover Corporation/OPW Division ("OPW") received certification in Executive Order G-70-36-AB for the OPW 11V Model F vapor recovery nozzle, used in conjunction with an external vapor check valve, for use with the Balance Phase II vapor recovery systems.

WHEREAS, on August 6, 1986, OPW requested certification of a vapor recovery nozzle for use with Balance Phase II vapor recovery systems which is to be designated as the OPW 11V Model F and which is identical to the previously certified OPW 11V Model F except that it incorporates an internal check valve rather than an external check valve;

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 of the Certification Procedures;

WHEREAS the OPW IIV Model F vapor recovery nozzle incorporating an internal check valve no longer necessitates use of the Model 119A vapor valve actuator and Model 119B vapor check valve external components;

WHEREAS, I find that the OPW 11V Model F coaxial vapor recovery nozzle incorporating an internal check valve, when used with the Balance Phase II vapor recovery system at all new and existing installations, conforms with all the requirements set forth in Sections I through VII of the Certification Procedures;

NOW THEREFORE, IT IS HEREBY ORDERED that Executive Order G-70-36-AB is hereby modified to replace the previously identified configuration with the OPW 11V Model F vapor recovery nozzle incorporating an internal check valve, for use with the OPW Balance Phase II vapor recovery system.

IT IS FURTHER ORDERED that where an OPW balance type vapor recovery system is to be installed at a new installation only the OPW balance type coaxial vapor recovery nozzles and coaxial hose configurations may be used.

IT IS FURTHER ORDERED that this system is certified to be at least 95 percent effective in the self-serve and/or attendant use at gasoline service stations when used with a Board certified Phase I vapor recovery system. Typical piping arrangements for this system are described in Exhibits 1 and 2. All certified components are listed in the latest revision of Executive Order G-70-52.

IT IS FURTHER ORDERED that the OPW 11V Model F vapor recovery nozzle shall be installed as shown in Exhibit 3.

IT IS FURTHER ORDERED that compliance with the applicable certification requirements and rules and regulations of the Division of Measurement Standards, the Office of the State Fire Marshal, and the Division of Occupational Safety and Health of the Department of Industrial Relations is made a condition of this certification.

IT IS FURTHER ORDERED that the components certified hereby shall perform in actual use with the same effectiveness as the certification test system.

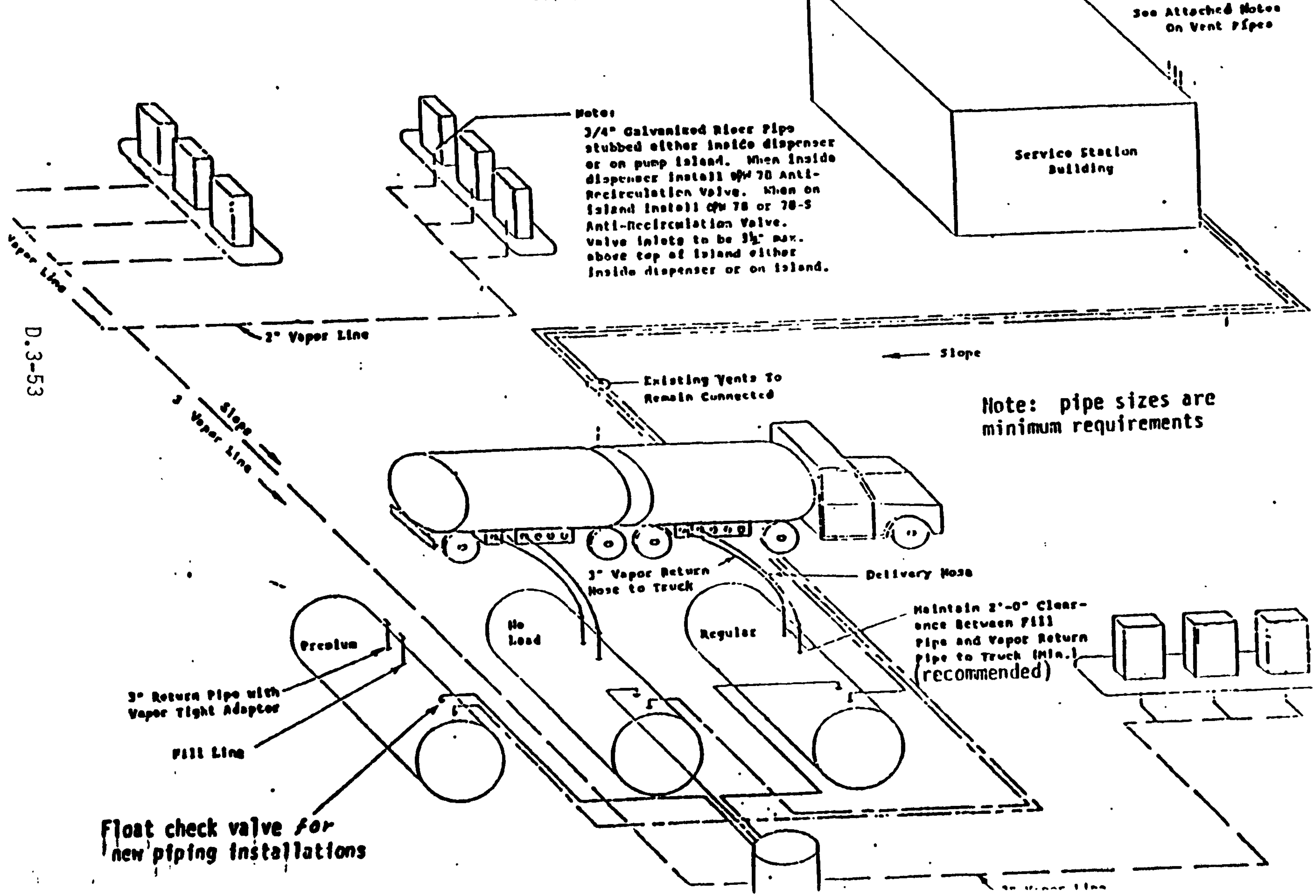
IT IS FURTHER ORDERED that any alteration of the equipment, parts, design, or operation of the configurations certified hereby, is prohibited, and deemed inconsistent with this certification, unless such alteration has been approved by the Executive Officer or his/her designee.

IT IS FURTHER ORDERED that all nozzles approved for use with the Phase II vapor recovery systems specified in this Executive Order shall be 100 percent performance checked at the factory including checks of proper functioning of all automatic shut-off mechanisms.

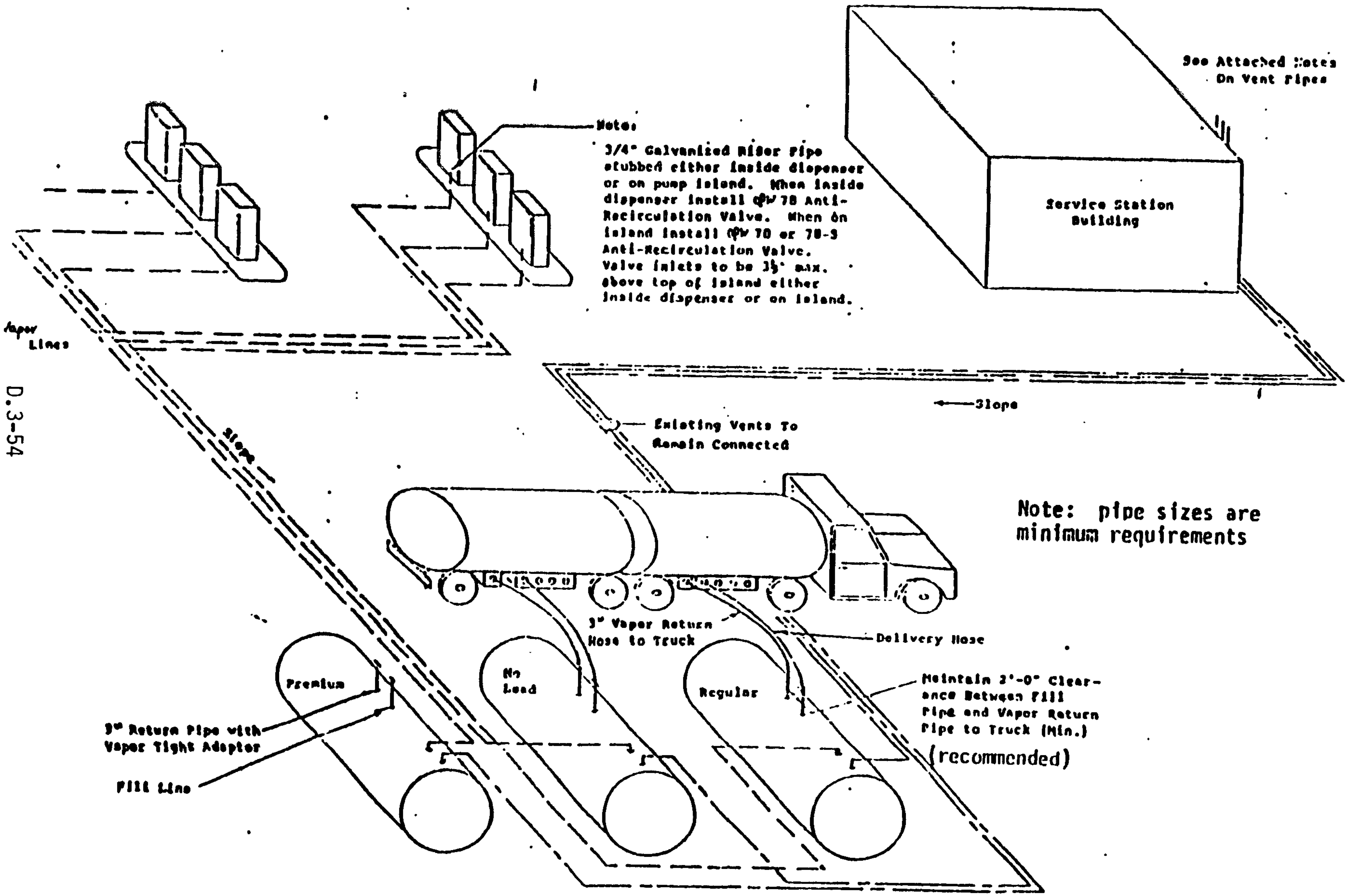
Executed at Sacramento, California this 24th day of October, 1986.

James D. Boyd
Executive Officer

OPW Balanc hase II
Vapor Recov.ry System
Manifolded Vapor Return Lines
EXHIBIT 1



**OPW B[illegible]nce Phase II
Vapor Recovery System
Individual Vapor Return Lines**



EXECUTIVE ORDER G-70-36-AC

NOTES TO ACCOMPANY EXHIBITS 1 AND 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 wnen 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.

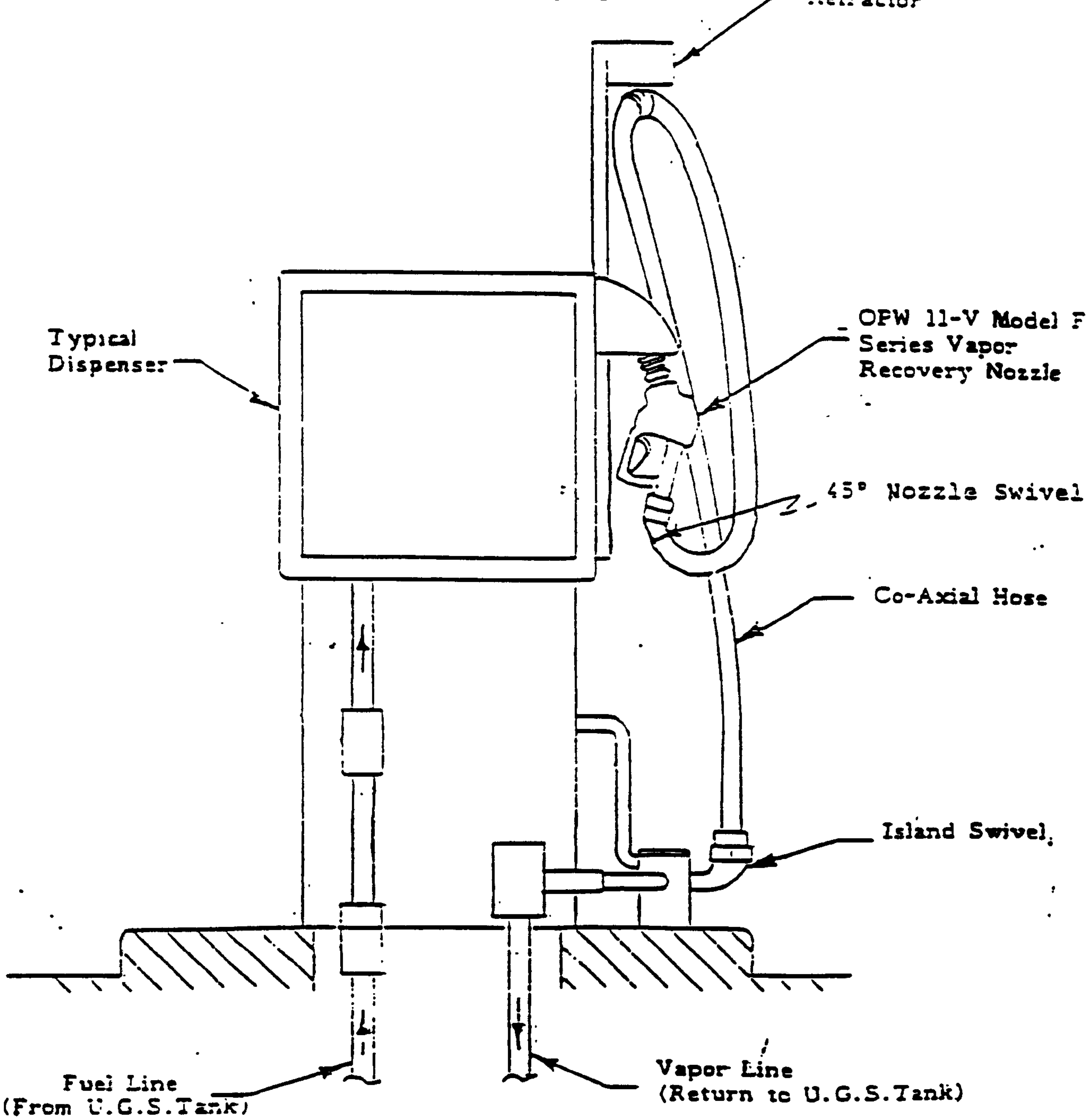
3. The vent pipes and vent manifold shall be adequately supported throughout their length and when they are supporting weights in addition to their own, additional supports may be required, such as anchoring to a building or other structure.

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 alternate equipment, design, or operating procedures acceptable to the Air Resources Board) are required for all underground manifold piping to prevent contamination of unleaded gasoline with leaded gasoline, via vapor recovery piping, during underground storage tank loading or overfill.

EXHIBIT 3

Executive Order G-70-36-AC
OPW Balance Phase II
Vapor Recovery System



State of California

AIR RESOURCES BOARD

Executive Order G-70-37-B

Relating to the Modification of the Certification of the Chevron Balance Phase II Vapor Recovery System with OPW Nozzles for Service Stations

Pursuant to the authority vested in the Air Resources Board (ARB) by Health and Safety Code Section 41954; and

Pursuant to the authority vested in the undersigned by Health and Safety Code Sections 39515 and 39516;

IT IS ORDERED AND RESOLVED: That the certification Executive Order G-70-37-A issued on November 15, 1979, for the Chevron balance Phase II vapor collection and disposal system is hereby modified to specify at least 95 percent effectiveness during self-serve use. The system is hereby certified to be at least 95 percent effective in self-serve and/or attendant use at gasoline service stations in conjunction with Phase I vapor recovery systems which have been certified by the Air Resources Board. The system is described in Exhibits 1, 2, and 3 attached hereto.

IT IS FURTHER ORDERED AND RESOLVED: That compliance with the applicable certification requirements and rules and regulations of the Division of Measurement Standards, the State Fire Marshal's Office, and the Division of Industrial Safety of the Department of Industrial Relations is made a condition of this certification.

IT IS FURTHER ORDERED AND RESOLVED: That the system certified hereby shall perform in actual use with the same effectiveness as the certification test system. Compliance with the applicable performance criterion shall be a condition of this certification, and failure to meet this criterion shall constitute grounds for revocation, suspension, or modification of this certification.

IT IS FURTHER ORDERED AND RESOLVED: That any alteration to the equipment, parts, design, or operation of the system certified hereby, is prohibited, and deemed inconsistent with this certification, unless such alteration has been approved by the undersigned.

IT IS FURTHER ORDERED AND RESOLVED: That the OPW-7VC nozzles shall be 100 percent performance checked at the factory including checks of proper functioning of all automatic shut-off mechanisms.

IT IS FURTHER ORDERED AND RESOLVED: That during installation of the OPW-7VC nozzles they shall be performance tested for ability to dispense gasoline without difficulty in the presence of the station manager or other responsible individual. The station manager, owner or operator shall also be provided with instructions on the proper use of the nozzles, their repair and maintenance, and where nozzle replacements and nozzle components can be readily obtained. A copy of the nozzle warranty shall be made available to the station manager, owner or operator.

IT IS FURTHER ORDERED AND RESOLVED: That in order for vapor return hoses longer than specified in this certification to be used the system shall incorporate a liquid blockage detector which is acceptable to the undersigned.

Executed at Sacramento, California this 22nd day of January, 1980.

Thomas C. Austin
Thomas C. Austin
Executive Officer

EXHIBIT 2
Executive Order G-70-37-B
Chevron Balance Phase II

Vapor Recovery System
Individual Vapor Return Lines

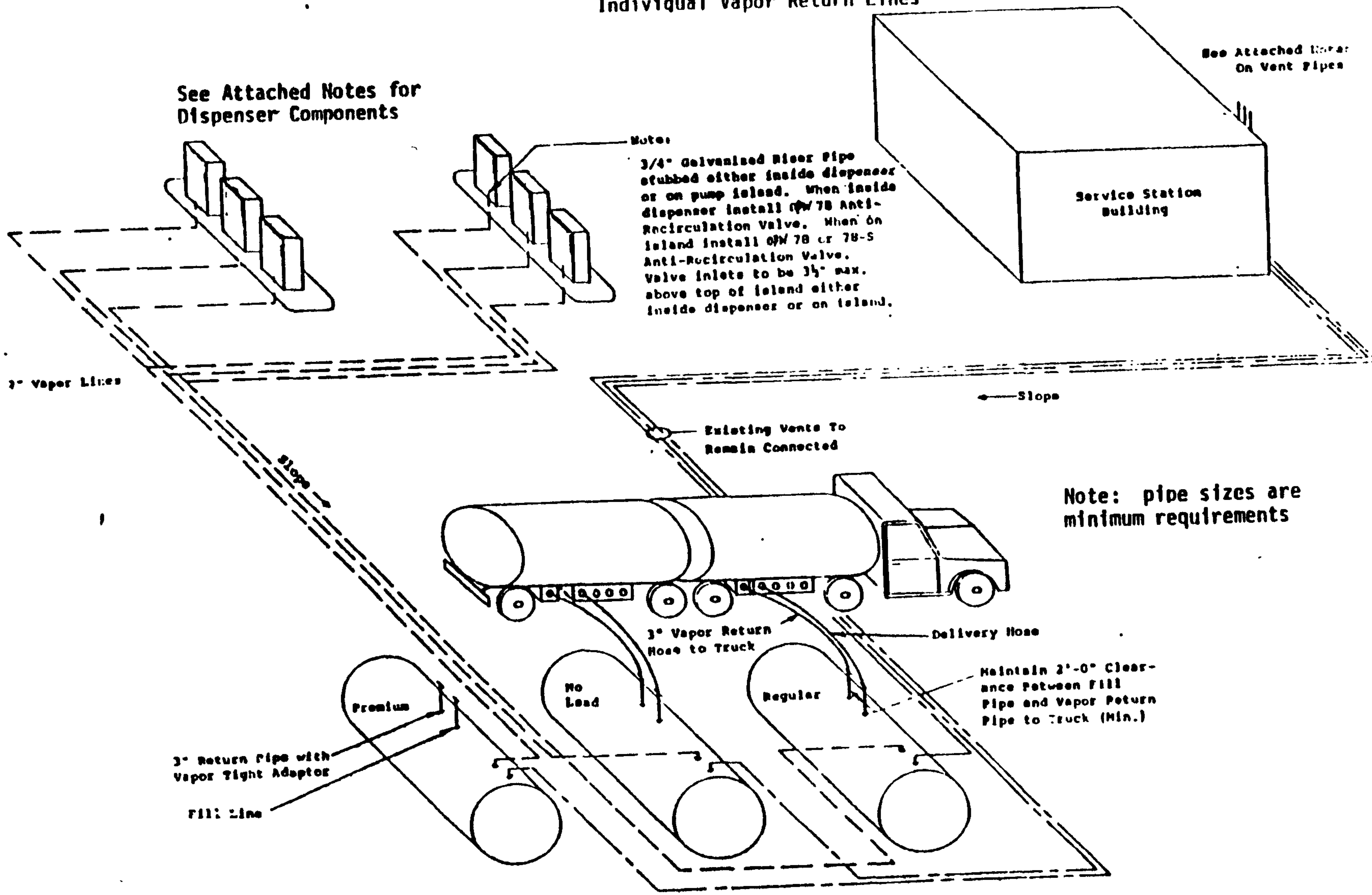


EXHIBIT 1
Executive Order G-70-37-B
Chevron Balance Phase II
Vapor Recovery System
Manifolded Vapor Return Lines

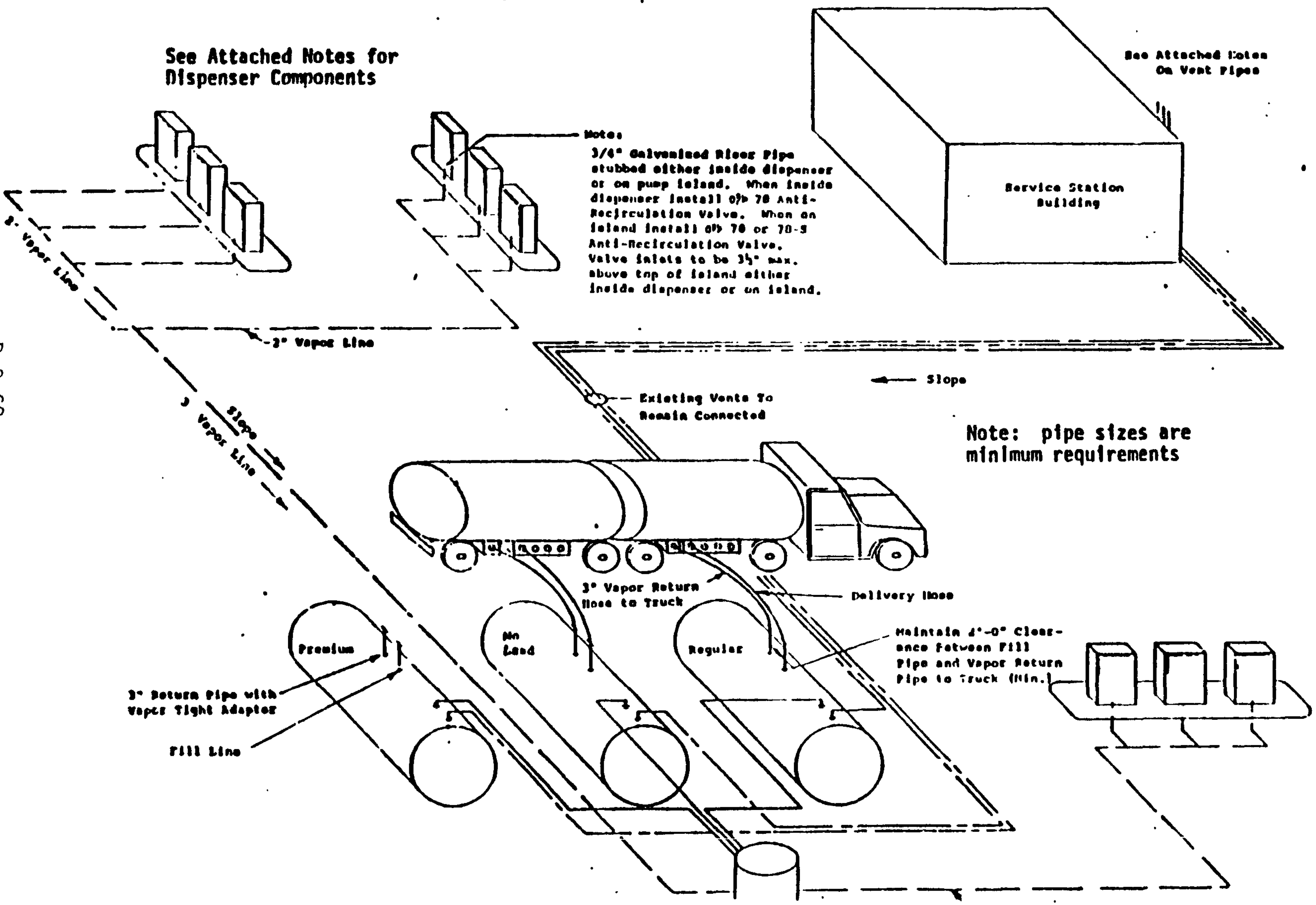


Exhibit 3

Executive Order G-70-37-B

Chevron Balance Phase II Vapor Recovery System with OPW Nozzles for Service Stations

Component List

Item	Manufacturer and Model	State Fire Marshal Identification Number	Substitute Equipment: Manufacturer and Model	Substitute Equipment: State Fire Marshal Identification Number
1a. Nozzle, leaded fuel	OPW 7-V Model C-22 OPW 7-V Model C-24	GVRC 001:008:18		
1b. Nozzle, unleaded fuel	OPW 7-V Model C-47 OPW 7-V Model C-49	GVRC 001:008:19		
2. Vapor hose	3/4 inch I.D. X 8 feet		5/8 inch I.D. X 8 feet	
3. Riser	3/4 inch or larger diameter Galvanized Pipe			
4. Anti-Recirculation Valve	OPW 78, 78-S, 78-E, or 78-ES	GVRC 001:008:13	Emco Wheaton A008-001	GVRC 001:007:4
5. Nozzle Swivel	State Fire Marshal approved 0.495 in. I.D. minimum			
6. Island Swivel	State Fire Marshal approved 0.495 in. I.D. minimum			

Pressure Drop Through the System*

(Includes Nozzle, Anti-Recirculation Valve, Vapor Hose, *Swivels*, and Underground Piping)

Flow (CFH)	Pressure Drop (inches H_2O)
20	~~0.2~~ *less than 0.15*
60	~~0.4~~ *less than 0.45*
100	~~0.9~~ *less than 0.95*

**Pressure drop test to be conducted with drybreak to underground tank open.*

Executive Order G-70-37-B

Notes to Accompany Exhibits 1, 2 and 3

1. Vent pipes shall be adequately supported throughout their length and when they are supporting weights in addition to their own, additional supports may be required - anchor to building or other structure.
2. Tank vent pipes two inches or less in nom. inside diameter shall not be obstructed by any device unless the tank and its associated piping and other equipment is protected to limit back pressure development to less than the maximum working pressure of the tank, piping and other equipment by the installation of an approved pressure/vacuum vent, rupture disc or other venting devices installed in the tank vent pipes.
3. Tank vent pipes shall terminate into the open atmosphere and shall be not less than 12 feet above the adjacent ground level. The outlet shall vent upward or horizontally and be located to eliminate the possibility of vapors accumulating or traveling to a source of ignition or entering adjacent buildings.
4. All vapor return and vent piping shall be provided 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. Each vapor hose shall be located such that the center line of the hose fitting, at the anti-recirculation valve (if externally mounted) or at the dispenser cabinet swivel mounting (if valve is internally mounted), is not

Exhibit 2, page 6

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
Coaxial Hose Breakaway Fittings - Factory or Kit Repairable Only														
Catlow C-200	005:030:003		X	X		X	X	X	X	X	X	X	X	X
Dayco C-200	005:033:005		X	X		X	X	X	X	X	X	X	X	X
Enterprise Brass Works 897	005:034:002		X	X		X	X	X	X	X	X	X	X	X
Husky 2730 Safe-T-Break	005:021:004		X	X		X	X	X	X	X	X	X	X	X
Richards Industries CXE-39	005:031:005		X	X		X	X	X	X	X	X	X	X	X
Coaxial Hose Breakaway Fittings - Designed to be Recoupled Without Repair Kit														
Catlow 2.N.1 (Nozzle end[20/] installation prohibited)	005:030:004											X		
Emco Wheaton A4019	005:007:031		X	X		X	X	X	X	X	X	X	X	X
Husky 3030 Safe-T-Break	005:021:004		X	X		X	X	X	X	X	X	X	X	X
Richards Industries CX-40	005:031:004		X	X		X	X	X	X	X	X	X	X	X
Richards Insustries RCX-40	005:031:004		X	X		X	X	X	X	X	X	X	X	X
OPW 66-C (w/ pigtail)	005:008:044											X		
66-CL (w/o pigtail)	005:008:047		X	X		X	X	X	X	X	X	X	X	X
Vapor Check Valves														
Emco Wheaton														
A225	005:007:23	X		X										
A225-003	005:007:23	X		X	X									
A226	005:007:23		X											
A227	005:007:23		X[19/]						X	X	X	X		
A228-001	005:007:024		X	X		X	X	X	X	X	X	X	X	X
Red Jacket systems only may also use:														
Red Jacket 104-184	002:001:003	X	X	X	X	X			X			X		
Hirt systems only may also use:														
Hazlett HC-2 ball check valve		X		X	X									
Hirt 3/4" NPT solenoid valve		X		X	X									

Component[1/] Executive Order G-70-52-AM
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
Swivels[5/]														
Nozzle Swivels														
Emco Wheaton														
A4110-001(45°)	005:007:31		X			X	X		X	X		X		
A4113-001(90°)	005:007:31					X			X					
Husky I+VI	005:021:2	X		X	X									
Husky I+VI F	005:021:2	X		X	X									
OPW 43	005:008:6	X		X	X									
OPW 43-C[6/] (30°)	005:008:27		X			X	X		X	X		X		
OPW 43-CF-(45°)	005:008:040		X			X	X		X	X		X		
OPW 43-T[6/] with 3/4" or 1" fuel line	005:008:31	X		X	X									
OPW 43-CR(90°)	005:008:46		X			X			X					
OPW 43-CRT(90°)	005:008:46		X			X			X					
Pomeco Model 7	005:025:2	X		X	X									
RCR 3 D	005:031:002	X		X	X									
Island Swivels														
Emco Wheaton A93-001	005:007:13		X											
OPW 36-CE	005:008:28		X											
Dispenser Swivels														
Emco Wheaton														
A4113-001 (90°)	005:008:31		X			X	X	X	X	X	X	X		
A92-001	005:007:11		X											
Wedgon PS 3445 VRM	005:013:2	X		X										
OPW 43-CR(90°)	005:008:46		X			X	X	X	X	X	X	X		
OPW 43-CRT(90°)	005:008:46		X			X	X	X	X	X	X	X		
Retractor Swivel														
Searle Leather & Packing B-1399 or State Fire Marshal approved equivalent			X											

Exhibit 2, page 8

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	4	5	6	7	8a	8b	8c	9a	9b	9c	10	11	11a
Flow Limiter														
Emco Wheaton A-10	001:007:1	X	X	X	X	X	X	X	X	X	X	X	X	X
or State Fire Marshal approved equivalent														
Recirculation Traps (Existing installations only) [17/]														
Emco Wheaton A008-001	001:007:4	X	X	X	X									
Emco Wheaton A94-001	005:007:8	X	X	X	X									
Emco Wheaton A95-001	005:007:9	X	X	X	X									
OPW 78, 78-S, 78-E, 78-ES	001:008:13													
	002:008:12	X	X	X	X									

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

1/ Specific components for the Red Jacket system are listed in the latest version of Executive Order G-70-14. Specific components for the Hirt system are listed in the latest version of Executive Order G-70-33.

2/ See Exhibit 3 for a Nozzle/System Cross-Reference.

3/ High-hang or high-retractor hose configurations are required on all existing Balance, Red Jacket and Hirt stations by July 26, 1986, except for dispensers in compliance with Exhibit 11.

4/ Other dispensers are in compliance with ARB requirements if they are approved by the Division of Measurement Standards and are applicable to any of the configurations shown by Exhibits 4,5,6, & 7 in this Executive Order.

5/ Other nozzle multiplane swivels and island single plane swivels may be used if approved by California State Fire Marshal. Nozzle multiplane swivels and island single plane swivels are required on all existing twin hose dispensers by July 26, 1986.

6/ 43-T swivel not allowed with Hirt ball check valve.

7/ Dual-port nozzles not permitted on new installations utilizing a balance type Phase II vapor recovery system.

8/ Boot protectors are prohibited on Emco Wheaton A4000-series nozzles, EZ-flo 4000-series and 11V-series nozzles and OPW 111V and Husky Model V nozzles.

9/ Specific components for EZ-flo rebuilt 3000-series vapor recovery nozzles are listed in the latest version of Executive Order G-70-101. Specific components for EZ-flo rebuilt A4000-series and 11V-series vapor recovery nozzles are listed in the latest version of Executive Order G-70-134.

10/ Specific components for the EZ-flo Rebuilt OPW 7V-E vapor recovery nozzle are listed in the latest version of Executive Order G-70-78.

11/ Specific components for the Rainbow Rebuilt Emco Wheaton A3003, A3005, A3006, and A3007 vapor recovery nozzles are listed in the latest version of Executive Order G-70-107.

12/ Emco Wheaton red and gray bellows for A3000-type nozzles may not be used after July 26, 1989. (Bellows discolor in use and may appear tan rather than red or gray.)

13/ The boot must be used with Daystar Spacer (Daystar part number F00232-NL-00), and is only approved for use on Emco Wheaton 3003- and 3005-type nozzles.

14/ Appropriate certified swivels must be used to prevent closure of vapor passage due to kinking.

15/ Use of Rainbow Petroleum Products RA3003/RA3005 Blow Molded Gasoline Vapor Recovery Bellows approved.

16/ Coaxial hose assemblies which do not contain liquid removal systems may be used on Exhibits which are not indicated provided they are used with a certified liquid removal system (such as the Gilbarco Co-Vent) which is certified for that Exhibit.

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

17/ Recirculation traps are permitted on existing installations only. Removal of internal assembly from existing recirculation traps is recommended whenever possible to reduce pressure drop.

18/ Any installation of blended product dispensers must be plumbed to allow the return of vapors from any product produced by blending to all tanks from which the component fuels may be withdrawn.

19/ The Emco Wheaton A227 vapor check valve may be installed in a vertical position (manufacturer's instructions specify installation within five degrees of horizontal) in Tokheim 262 dispensers manufactured before 1/1/90.

20/ Installation of the Catlow 2.N.1 breakaway at the nozzle end of the hose is prohibited.

21/ The Emco Wheaton A4042 fitting is to be marketed in combination with a gray scuff guard which clearly identifies it as an A4042 fitting. This gray scuff guard is not to be installed on A227 vapor check valves, and the use of the black scuff guard with which the A227 valve is marketed is prohibited with the A4042. Emco Wheaton A227 valves modified by removing poppets in an attempt to create A4042 fittings are considered uncertified equipment.

22/ Coaxial hoses with liquid removal systems are approved as indicated for Exhibits which require liquid removal systems. The use of hoses containing liquid removal systems is not prohibited on other Exhibits provided all requirements of the Exhibits, including hose loop specifications, are met.

Exhibit 3
Executive Order G-70-52-AM

Phase II Vapor Recovery System/Nozzle Cross-Reference
(Red Jacket and Hirt Assist Systems or Balance Systems)

Nozzle 1/	Dispensing Rate Systems Using Nozzles 2/	GPM Not To Exceed	Comments and Exhibit 2 Cross-Reference Number	
Emco Wheaton A3003, RA3003 EZ-flo 3003 Rainbow RA3003	Hirt Balance	10 3/ 10	Soft, tight-fitting faceplate Insertion interlock Dual-hose passageways Secondary (pressure) shutoff mechanism 4/ Vapor check valve in nozzle	|1|
Emco Wheaton A3005, RA3005 EZ-flo 3005 Rainbow RA3005	Hirt Balance	10 10	Same as A3003 except coaxial Insertion interlock Soft, tight-fitting faceplate Secondary (pressure) shutoff mechanism 4/ Vapor check valve in nozzle.	|2|
Emco Wheaton A3006, RA3006 EZ-flo 3006 Rainbow RA3006	Hirt Red Jacket	10 3/ 10	Loose-fitting assist-type facecone. No insertion interlock. Secondary (pressure) shutoff mechanism 4/ Slim handle. Dual-hose passageways Remote vapor check valve required.	|3|
Emco Wheaton A3007, RA3007 EZ-flo 3007 Rainbow RA3007	Hirt Red Jacket	10	Same as A3006 except coaxial passageways Loose-fitting assist-type facecone Secondary (pressure) shutoff mechanism 4/ Remote vapor check valve required.	|4|
Emco Wheaton A4000 5/ RA4000 5/ EZ-flo 4000 5/ 7/	Hirt Balance	10 3/ 10	Soft, tight-fitting faceplate Insertion interlock Secondary (pressure) shutoff mechanism 4/ Remote vapor check valve required Dual-hose passageways	|5|
Emco Wheaton A4001 5/ RA4001 5/ EZ-flo 4001 5/	Hirt Balance	10 10	Same as A4000 except coaxial. Insertion interlock. Soft, tight-fitting faceplate. Secondary (pressure) shutoff mechanism 4/ Remote vapor check valve required	|6|

Exhibit 3 (continued)
Executive Order G-70-52-AM

Phase II Vapor Recovery System/Nozzle Cross-Reference
(Red Jacket and Hirt Assist Systems or Balance Systems)

Nozzle 1/	Dispensing Rate Systems Using Nozzles 2/	GPM Not To Exceed	Comments and Exhibit 2 Cross-Reference Number	
Emco Wheaton A4002 5/ 7/ EZ-flo 4002 5/	Hirt	10 3/	Loose-fitting assist-type facecone. No insertion interlock. Secondary (pressure) shutoff mechanism 4/ Dual-hose passageways Remote vapor check valve required.	|7|
Emco Wheaton A4003 5/ EZ-flo 4003 5/ 7/	Hirt	10	Same as A4002 except coaxial passageways Loose-fitting assist-type facecone Secondary (pressure) shutoff mechanism 4/ Remote vapor check valve required.	|8|
Emco Wheaton A4005 5/ RA4005 5/ EZ-flo 4005 5/ 7/	Hirt Balance	10 10	Vapor check valve in nozzle. Insertion interlock. Soft, tight-fitting faceplate. Secondary (pressure) shutoff mechanism 4/ Coaxial passageways	|9|
OPW 7V Model E 6/ -34 (unleaded, with clip) -36 (leaded, w/out clip) -47 (unleaded, with clip) -49 (unleaded, w/out clip -60 (leaded, with clip) -61 (unleaded, with clip) -62 (leaded, w/out clip) -63 (unleaded, w/out clip)	Hirt Red Jacket	10 3/ 10	No insertion interlock. Loose-fitting assist-type facecone. Remote vapor check valve required. Dual passageways No new 7V nozzles being made by OPW. Secondary (pressure) shutoff mechanism 4	|10|
E-Z Flo EZE8 -34 (leaded, with clip) -36 (leaded, w/out clip) -47 (unleaded, with clip) -49 (unleaded, w/out clip)	Hirt Red Jacket	10 3/ 10	Rebuilt OPW 7V Model E nozzle. Loose-fitting assist-type facecone. No interlock, dual passageways. Remote vapor check valve required. Secondary (pressure) shutoff mechanism 4	|10a|
Rainbow Petroleum Products RPP-34 (leaded, w/ clip) RPP-36 (leaded, w/out clip) RPP-47 (unleaded, with clip) RPP-49 (unleaded, w/out clip)	Hirt Red Jacket	10 3/ 10	OPW 7V Model E nozzle with Rainbow boot. No insertion interlock. Secondary (pressure) shutoff mechanism 4/ Loose-fitting assist-type facecone. Remote vapor check valve required.	|10b|

Exhibit 3 (continued)
Executive Order G-70-52-AM

Phase II Vapor Recovery System/Nozzle Cross-Reference
(Red Jacket and Hirt Assist Systems or Balance Systems)

Nozzle 1/	Dispensing Rate Systems Using Nozzles 2/	GPM Not To Exceed	Comments and Exhibit 2 Cross-Reference Number	
OPW 11V Model C -22 (leaded, with clip) -24 (leaded, w/out clip) -47 (unleaded, with clip) -49 (unleaded, w/o clip)	Hirt Balance	10 10	Coaxial passageways. Insertion interlock. Soft, tight-fitting faceplate Secondary (pressure) shutoff mechanism 4/ Vapor check valve in nozzle No new Model C nozzles being made by OPW	11
OPW 11VS Model C -22 (leaded, with clip) -24 (leaded, w/out clip) -47 (unleaded, with clip) -49 (unleaded, w/o clip)	Hirt Balance	10 3/ 10	Same as 11V except dual passageways. Insertion interlock. Soft, tight-fitting faceplate. Secondary (pressure) shutoff mechanism 4/ Vapor check valve in nozzle No new Model C nozzles being made by OPW.	12
OPW 11V Model E -34 (leaded, with clip) -36 (leaded, w/out clip) -47 (unleaded, with clip) -49 (unleaded, w/out clip) EZ-flo 11V-E (coaxial) 5/	Hirt Red Jacket	10 10	Coaxial passageways. Loose fitting assist-type facecone. No insertion interlock. Remote vapor check valve required. Secondary (pressure) shutoff mechanism 4/	13
OPW 11VS Model E 5/ -34 (leaded, with clip) -36 (leaded, w/out clip) -47 (unleaded, with clip) -49 (unleaded w/out clip) EZ-flo 11V-E (dual) 5/	Hirt Red Jacket/	10 3/ 10	Same as 11V E except dual passageways. Loose fitting assist-type facecone. No insertion interlock. Remote vapor check valve required. Secondary (pressure) shutoff mechanism 4/	14
OPW 11V Model F -22 (leaded, with clip) -24 (leaded, w/out clip) -47 (unleaded, with clip) -49 (unleaded, without clip) EZ-flo 11V-F (coaxial) 5/	Hirt Balance	10 10	Vapor check valve in nozzle. Insertion interlock. Secondary (pressure) shutoff mechanism 4/ Soft, tight-fitting faceplate. Coaxial passageways.	15

Exhibit 3 (continued)
Executive Order G-70-52-AM

Phase II Vapor Recovery System/Nozzle Cross-Reference
(Red Jacket and Hirt Assist Systems or Balance Systems)

Nozzle 1/	Dispensing Rate Systems Using Nozzles 2/	GPM Not To Exceed	Comments and Exhibit 2 Cross-Reference Number	
OPW 11VS Model F -22 (leaded, with clip) -24 (leaded, w/out clip) -47 (unleaded, w/ clip) -49 (unleaded, w/o clip) EZ-flo 11V-F (dual) 5/	Hirt Balance	10 3/ 10	Same as 11V F except dual passageways. Vapor check valve in nozzle. Secondary (pressure) shutoff mechanism 4/ Insertion interlock. Soft, tight-fitting faceplate.	16
OPW 111V 5/ -22 (leaded, with clip) -24 (leaded, w/out clip) -47 (unleaded, with clip) -49 (unleaded, without clip)	Hirt Balance	10 10	Vapor check valve in nozzle. Insertion interlock. Secondary (pressure) shutoff mechanism 4/ Soft, tight-fitting faceplate. Coaxial passageways.	17
Husky Model V 5/	Hirt Balance	10 10	Vapor check valve in nozzle. Insertion interlock. Secondary (pressure) shutoff mechanism 4/ Soft, tight-fitting faceplate. Coaxial passageways.	18

1/ Spout and bellows may be changed from leaded to unleaded, or vice versa, when products in storage tanks are changed accordingly.

2/ The Executive Orders pertaining to Balance Phase II vapor recovery systems are listed in Exhibit 1.

3/ Flow rate of 12 gpm permitted only on dual Hirt systems which use 3/4" vapor hose.

4/ Secondary (pressure) shutoff mechanism at or below 10" water column (between 6" and 10", not over 10").

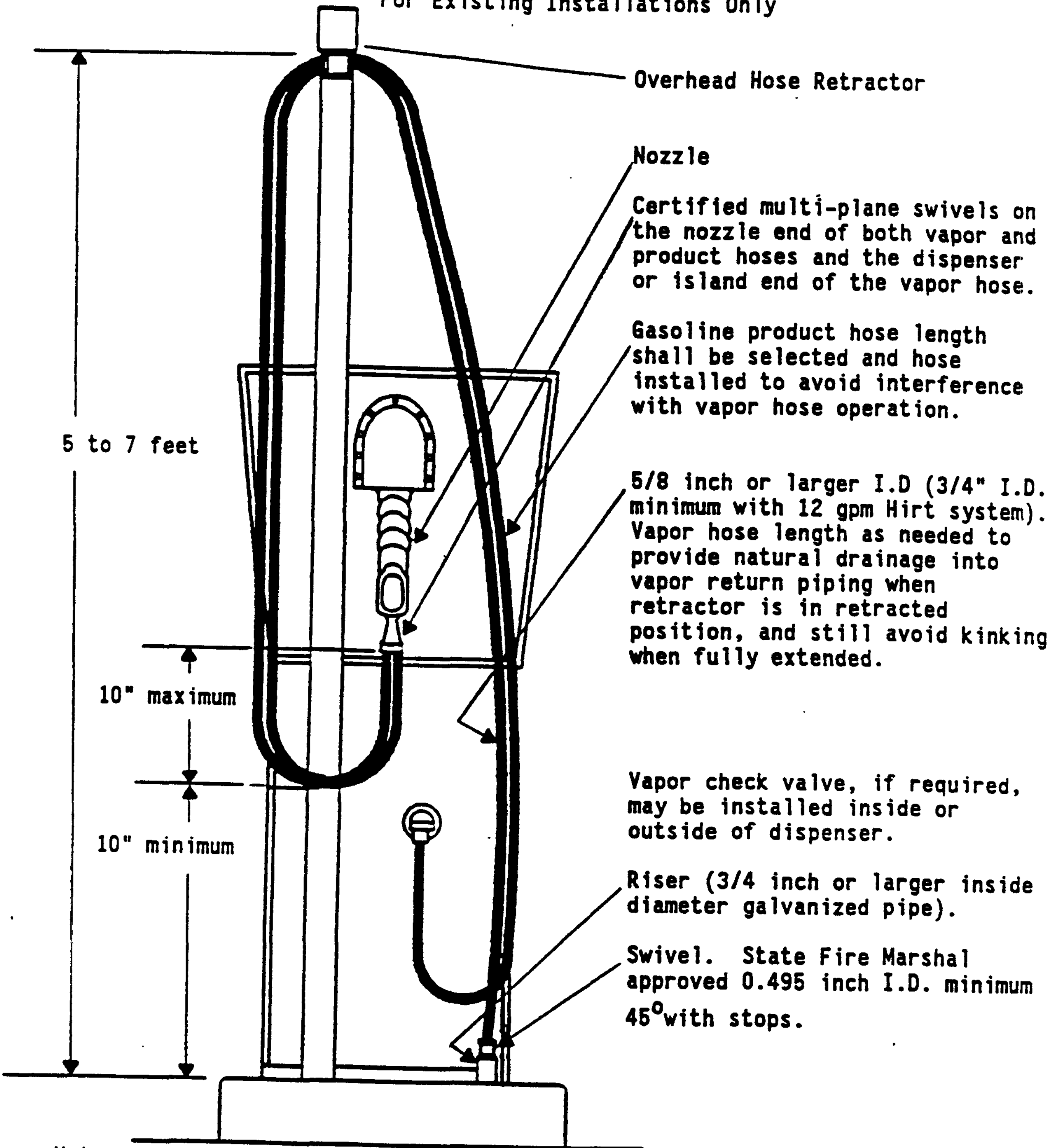
5/ Boot protectors are prohibited on Emco Wheaton A4000-series nozzles, EZ-flo 4000-series and 11V-series nozzles and OPW 111V and Husky Model V nozzles.

6/ OPW 7V Model E nozzle with OPW 7V Model H bellows/faceplate is acceptable.

7/ EZ-flo rebuilt nozzle bodies may be certified only with Emco Wheaton "front end" parts. Refer to the latest version of Executive Order G-70-134 for a listing of the approved combinations.

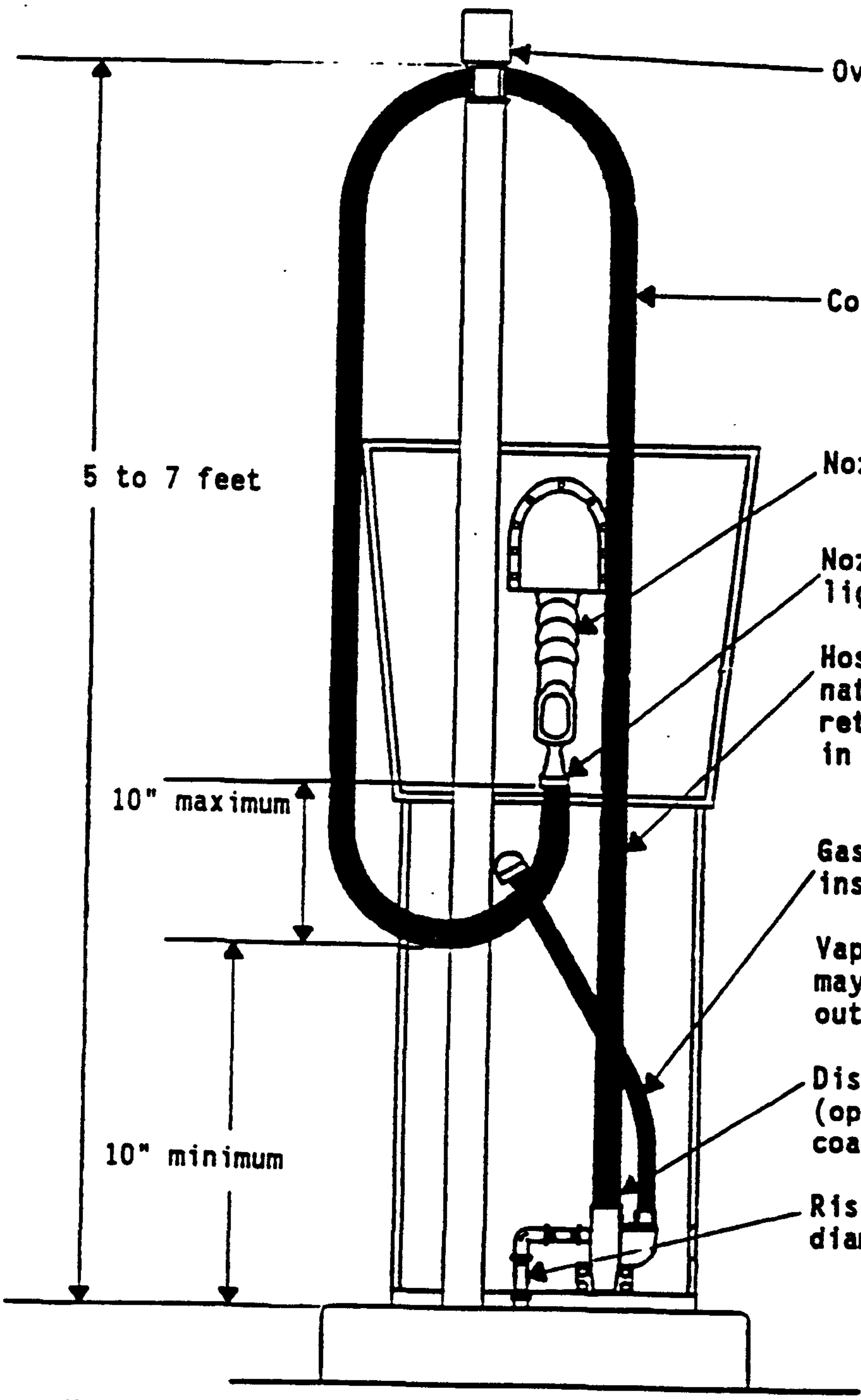
EXHIBIT 4
Executive Order G-70-52-AM

Dual Hose Side Mount High-Retractor Configuration
For Existing Installations Only



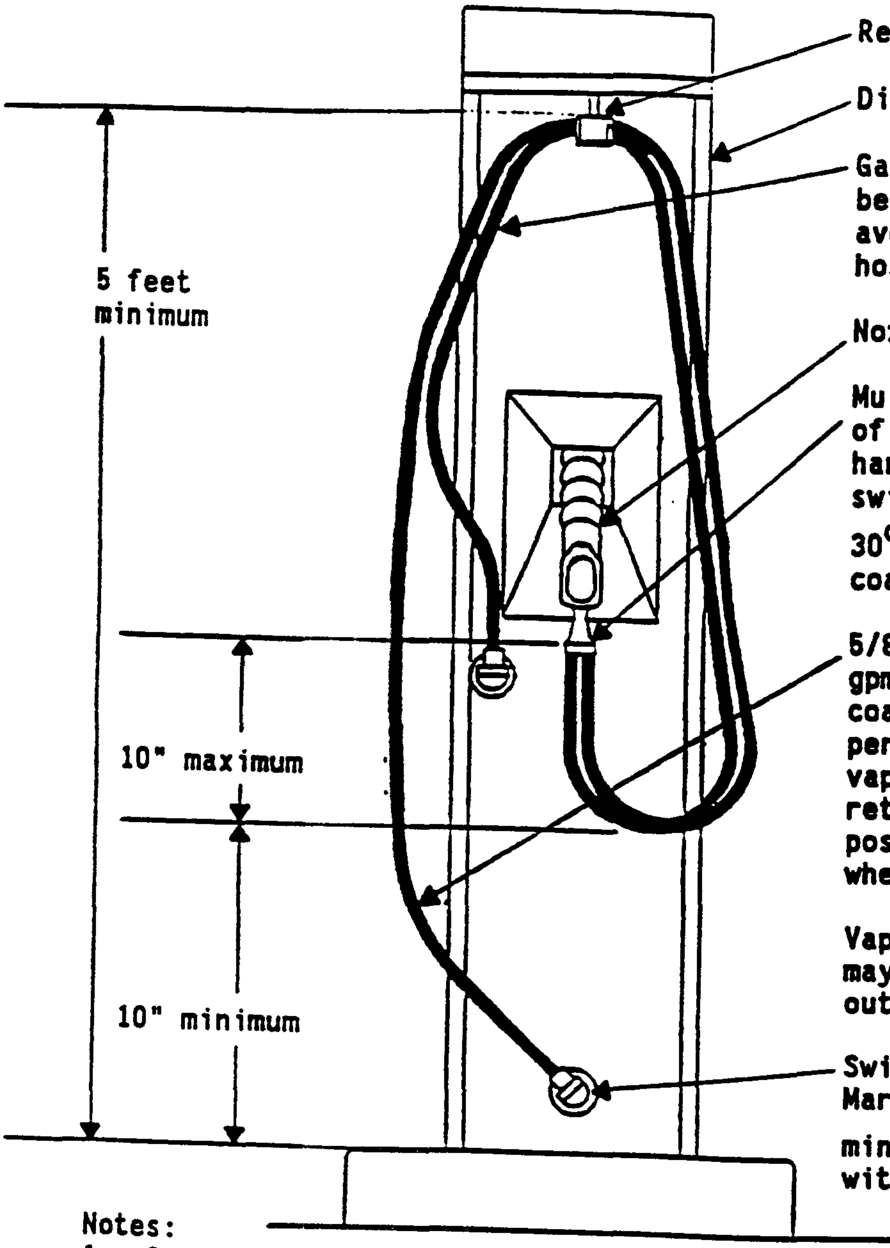
Notes:
1. See Exhibit 2 for the component list.
2. A flow limiter is required on dispensers that have a maximum flowrate in excess of 10 gpm. (A maximum flow rate of 12 gpm is permitted with the Hirt system provided vapor hoses are 3/4" ID.)
3. Use appropriate hose ties.
4. Vapor return piping may be installed on the inside or the outside of the dispenser cabinet.
5. The Emco Wheaton and EZ-flo A4000 and A4002 nozzles are permitted only when used in conjunction with certified vapor check valves.

EXHIBIT 5
Executive Order G-70-52-AM
Coaxial Hose Side-Mount High-Retractor Configuration
For New and Existing Installations



Notes:
1. See Exhibit 2 for the component list.
2. A flow limiter is required on 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.
3. Vapor return piping may be installed on the inside or on the outside of the dispenser cabinet.
4. The Emco Wheaton and EZ-flo A4001 and A4003 nozzles are permitted only when used in conjunction with approved vapor check valves.
5. Nozzle and dispenser or island swivels are required with hardwall coaxial hoses, and are optional with lightweight coaxial hoses.

EXHIBIT 6
Executive Order G-70-52-AM
Dual and Coaxial Hose Dispenser-Mount High-Retractor Configuration



Notes:

1. See Exhibit 2 for the component list.
2. A flow limiter is required on dispensers that have a maximum flowrate in excess of 10 gpm (12 gpm for dispensers with the Hirt system provided that 3/4" ID vapor hoses are used), and may be required on any gasoline dispenser at the discretion of the local air pollution control district.
3. Use appropriate hose ties.
4. Vapor return piping may be installed inside or outside dispenser cabinet.
5. Riser shall be 3/4 inch or larger inside diameter galvanized pipe.
6. The Emco Wheaton and EZ-flo A4000, A4001, A4002 and A4003 nozzles are permitted only when used in conjunction with approved vapor check valves.
7. The coaxial hose dispenser-mount high-retractor configuration can be used for all new and existing installations. The dual hose dispenser-mount high-retractor configuration may not be used for new installations.
8. Nozzle and dispenser swivels are required with dual hoses and with hardwall coaxial hoses, and are optional with lightweight coaxial hoses.

more than 3-1/2 inches above the top surface of the island and is as close as possible to the top surface of the island.

6. For dispenser islands greater than 5 feet in width, each vapor hose length shall not be longer than the sum of one-half the dispenser island width, in feet, plus 6 feet.

7. For only those non-retail outlets which fuel special vehicles, the installation of vapor recovery hoses longer than eight feet are allowed provided 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 hose length is no longer than required.

   c. 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.

   d. The Executive Officer of the Air Resources Board has approved the plans for compliance with conditions b and c.

8. State Fire Marshal approved swivels (and offsets if necessary) for this system shall be selected and installed on hoses to prevent hose kinking.

9. Product hose length shall be selected for each dispenser to provide for full extension of the vapor return hose.

10. If any OPW 78 series anti-recirculation valve is internally mounted in any dispenser, the top of the anti-recirculation valve shall not be higher than the top surface of the dispenser island and a vapor recovery piping shear section which meets State Fire Marshal requirements shall be installed.

11. For those dispensers classified as non-commercial by the Division of Measurement Standards and are not required to be tested and sealed by Weights and Measured officials, the use of anti-recirculation valves is optional. However, the use of anti-recirculation valves is recommended by the Division of Measurement Standards in any installation where the user utilizes the gallonage figures.

State of California
AIR RESOURCES BOARD

Executive Order G-70-132

Certification of Trusco Tank, Inc.
Supervault Aboveground Storage Tank
Filling/Dispensing 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 displaced during the filling of storage tanks at service stations ("Phase I vapor recovery systems") and for the control of gasoline vapor emissions from 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 I and 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, Trusco Tank, Inc., has applied for certification of the Supervault aboveground storage tank for balance Phase I and Phase II operation;

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; and

WHEREAS, I find that the Trusco Tank, Inc., Supervault aboveground storage tank system, when used with ARB Certified Phase I and Phase II vapor recovery components, conforms with all the requirements set forth in Sections I through VII of the Certification Procedures;

NOW, THEREFORE, IT IS HEREBY ORDERED that this certification applies to the Trusco Tank, Inc., Supervault aboveground storage tanks of 2,000 gallons or less capacity. The system certified hereby is shown in Exhibit 1 attached. Air Resources Board certified Phase I components from Exhibits 1 thru 3 of Executive Order G-70-97-A and certified Phase II components from Executive Order G-70 series are to be used.

IT IS FURTHERED ORDERED that any emergency vent installed on the tanks be leak free at the operating pressure of the tank when tested in accordance with ARB Method 2-6, "Test Procedures for Gasoline Vapor Leak Detection Using Combustible Gas Detector" as last amended September 1, 1982 (the "Test Procedures"), incorporated by reference in Section 94000 of Title 17, California Administrative Code.

IT IS FURTHER ORDERED that the threaded stem normally used with the Bobtail truck bulk delivery nozzle be replaced with an OPW 633 BA coupling/adaptor along with an OPW 633 BD reducing coupler (or an equivalent arrangement that allows for no leakage of gasoline) to connect the Bobtail truck bulk delivery nozzle with the storage tank fill adaptor during transfer of gasoline from the delivery truck to the storage tank. An OPW 633 A or 633 F adaptor coupled with 633 B or 633 D adaptors or equivalent may be used for interchangeability of the nozzle stem and 633 BD reducing coupler.

IT IS FURTHER ORDERED that the general exterior of the storage tanks be painted white or off-white.

IT IS FURTHER ORDERED that compliance with the rules and regulations of the local air pollution control district and local fire officials with jurisdiction where the installed system is located, shall be made a condition of this certification.

IT IS FURTHER ORDERED that the use of a PV valve shall require the prior approval of the local fire chief, and that the tanks and piping shall comply with the appropriate General Industry Safety Orders and in particular the provisions of articles 144, 145, and 146 thereof.

IT IS FURTHER ORDERED that compliance with all applicable certification requirements and rules and regulations of the Division of Measurement Standards, the Office of the State Fire Marshal, and the Division of Occupational Safety and Health of the Department of Industrial Relations shall be made a condition of this certification.

IT IS FURTHER ORDERED that any alteration of the equipment, parts, design, or operation of the configurations certified hereby, is prohibited, and deemed inconsistent with this certification, unless such alteration has been approved by the undersigned or the Executive Officer's designee.

Executed this 16TH day of OCTOBER 1990, at Sacramento, California.

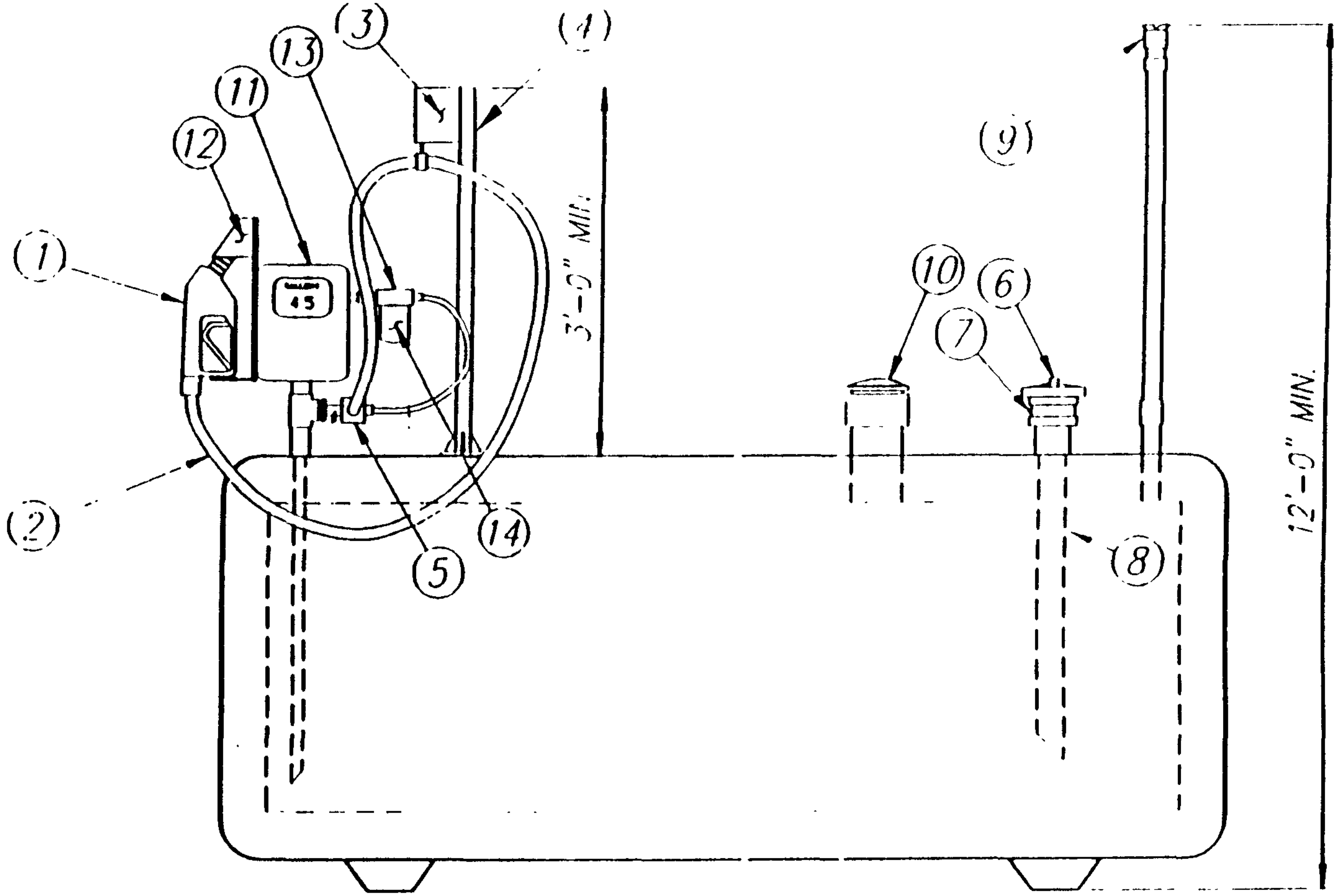
William W Sylte

f/ James D. Boyd
Executive Officer

Exhibit 1

Executive Order G-70-132

SUPERVAULT



COMPONENT DESCRIPTION

1 VAPOR RECOVERY NOZZLE
2 COAXIAL HOSE ASSEMBLY
3 OVERHEAD HOSE RETRACTOR
4 HOSE RETRACTOR BASE
5 COAXIAL ADAPTOR
6 FILL CAP
7 FILL ADAPTOR
8 COAXIAL DROP TUBE
9 PRESSURE/VACUUM VENT VALVE
10. EMERGENCY VENT
11. PUMP
12. NOZZLE HOOK & PROTECTIVE HOO
13 FILTER ADAPTOR
14 FILTER ELEMENT

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.

State of California
AIR RESOURCES BOARD

Executive Order G-70-133

Certification of LRS., Inc.
Fuelmaster Aboveground Storage Tank
Filling/Dispensing 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 displaced during the filling of storage tanks at service stations ("Phase I vapor recovery systems") and for the control of gasoline vapor emissions from 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 I and 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, LRS, Inc., has applied for certification of the Fuelmaster aboveground storage tank for balance Phase I and Phase II operation;

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; and

WHEREAS, I find that the LRS, Inc., Fuelmaster aboveground storage tank system, when used with ARB Certified Phase I and Phase II vapor recovery components, conforms with all the requirements set forth in Sections I through VII of the Certification Procedures;

NOW, THEREFORE, IT IS HEREBY ORDERED that this certification applies to the LRS, Inc., Fuelmaster aboveground storage tanks of 6,000 gallons or less capacity. The system certified hereby is shown in Exhibit 1 attached. Air Resources Board certified Phase I components from Exhibits 1 thru 3 of Executive Order G-70-97-A and certified Phase II components from Executive Order G-70 series are to be used.

IT IS FURTHERED ORDERED that any emergency vent installed on the tanks be leak free at the operating pressure of the tank when tested in accordance with ARB Method 2-6, "Test Procedures for Gasoline Vapor Leak Detection Using Combustible Gas Detector" as last amended September 1, 1982 (the "Test Procedures"), incorporated by reference in Section 94000 of Title 17, California Administrative Code.

IT IS FURTHER ORDERED that the threaded stem normally used with the Bobtail truck bulk delivery nozzle be replaced with an OPW 633 BA coupling/adaptor along with an OPW 633 BD reducing coupler (or an equivalent arrangement that allows for no leakage of gasoline) to connect the Bobtail truck bulk delivery nozzle with the storage tank fill adaptor during transfer of gasoline from the delivery truck to the storage tank. An OPW 633 A or 633 F adaptor coupled with 633 B or 633 D adaptors or equivalent may be used for interchangeability of the nozzle stem and 633 BD reducing coupler.

IT IS FURTHER ORDERED that the general exterior of the storage tanks be painted white or off-white.

IT IS FURTHER ORDERED that compliance with the rules and regulations of the local air pollution control district and local fire officials with jurisdiction where the installed system is located, shall be made a condition of this certification.

IT IS FURTHER ORDERED that the use of a PV valve shall require the prior approval of the local fire chief, and that the tanks and piping shall comply with the appropriate General Industry Safety Orders and in particular the provisions of articles 144, 145, and 146 thereof.

IT IS FURTHER ORDERED that compliance with all applicable certification requirements and rules and regulations of the Division of Measurement Standards, the Office of the State Fire Marshal, and the Division of Occupational Safety and Health of the Department of Industrial Relations shall be made a condition of this certification.

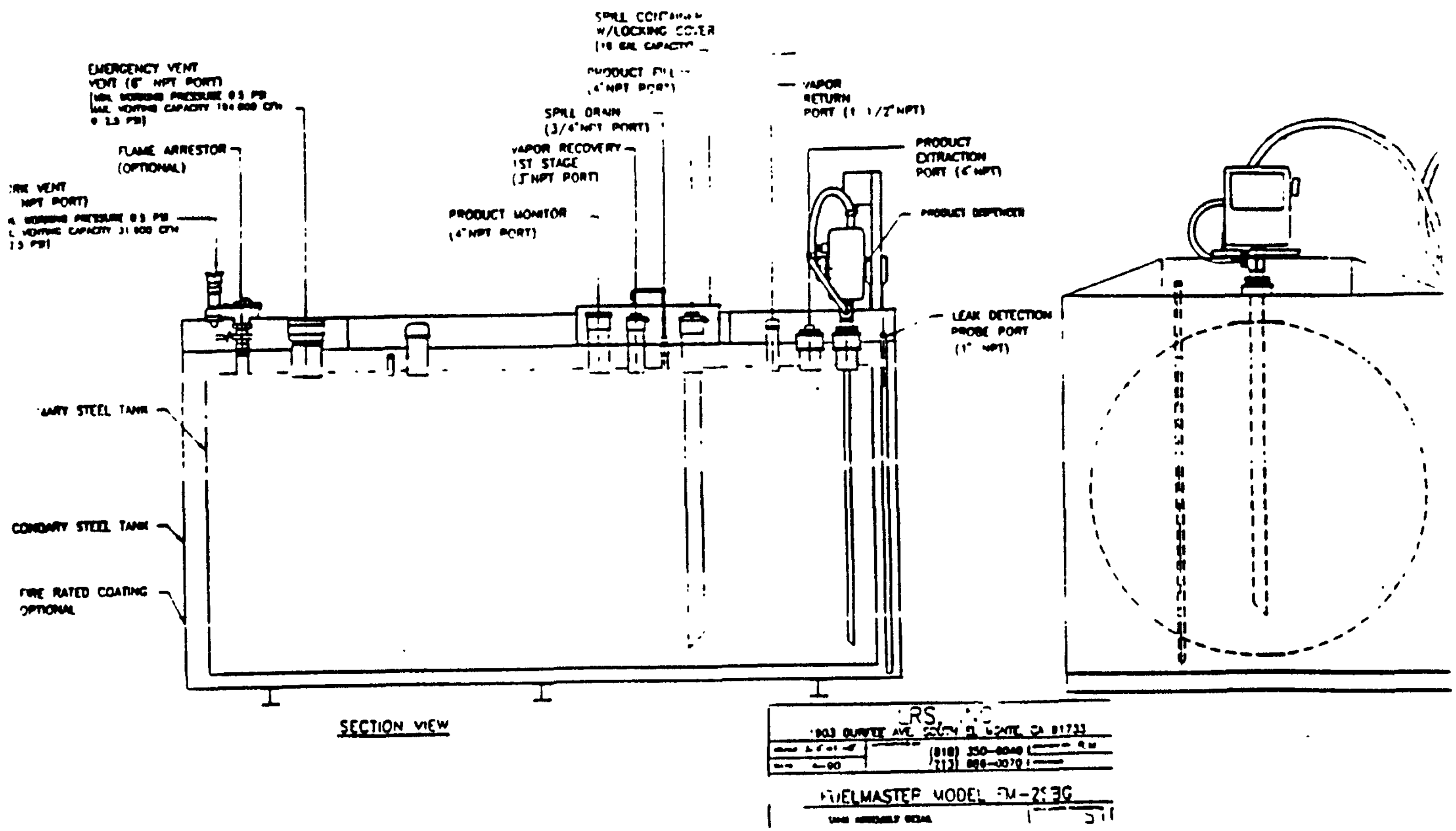
IT IS FURTHER ORDERED that any alteration of the equipment, parts, design, or operation of the configurations certified hereby, is prohibited, and deemed inconsistent with this certification, unless such alteration has been approved by the undersigned or the Executive Officer's designee.

Executed this 16TH day of OCTOBER 1990, at Sacramento, California.

James D. Boyd
Executive Officer

Exhibit 1

Executive Order G-70-133



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.

APPENDIX E

ILLUSTRATIVE EXAMPLE OF IN-USE EFFICIENCY CALCULATION PROCEDURES

As discussed in Chapter 4 (Section 4.4.2) of this document, in-use efficiency calculation procedures to be used to estimate actual efficiency of Stage II equipment after installation. The purpose of this Appendix is to provide an illustrative example of how these calculations are made. The example is based upon relatively recent inspections conducted in the Bay Area (San Francisco), South Coast (Los Angeles), and San Diego Areas of California.[1] The defect database used to determine frequency of defects was based upon the inspections of about 12,000 nozzles in the subject areas. Data were also available by nozzle type that allowed a comparison between older and newer equipment. As stated in Chapter 4, semi-annual inspections would best represent the enforcement scenarios in the areas where inspections took place. Summaries of the inspection results were available that were adequate to determine in-use efficiency. However, more detailed inspection data could be obtained by an agency conducting their own in-use efficiency study.

E.1 CALCULATION PROCEDURES

To illustrate the calculation procedures provided in Chapter 4, the data found in the California survey of Stage II balance systems is summarized in Table E-1. Data are separated for all nozzles and for old and new equipment. The discussion includes correlation of efficiency decreases presented in Table 4-2 and the defects presented in Table E-1. The efficiency decreases associated with each defect listed in Table E-1 are presented in Table E-2. The following describes each defect found in this study and how the data were analyzed to determine in-use efficiency. This

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.

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

is an example of the analysis procedures, and provides information on a semi-annual enforcement scenario. This example analysis pertains only to balance systems since that was the vast majority of the data contained in the data base. This same approach could be used for hybrid or vacuum assist systems.

- Defective Faceplate. The faceplate was considered defective when the capability to achieve a seal at the fillpipe interface was affected for one fourth of the circumference of the faceplate. This was identical to the torn faceplate definition used in previous studies.[2] Therefore the efficiency decrease of 10 percent was again assigned.

- Improper Faceplate. This applied to instances when the faceplate was not attached correctly. No other information describing this defect was given. Because of this lack of information, no efficiency decrease was assigned to this defect.

- Missing Faceplate. This defect was assigned when the faceplate was missing altogether. This was identical to the "face seal only to installed" defect presented in Table 4-2. Therefore, the same efficiency decrease was assigned (22 percent).

- Defective Nozzle Boot. A defective nozzle boot resulted from a triangular shaped tear 1/2 inch or more on a side, a slit at least one inch long, or a hole 1/2 inch or more in diameter. This fit the definition of the "torn boot" defect in Table 4-2 so the efficiency decrease (30 percent) was used.

- Improper Nozzle Boot. This defect was assigned when the boot was not securely clamped to the nozzle or if the inside support spring was missing. It was unclear how insecure the boot assembly was and how this would affect emissions capture. However, it was felt that some minor emissions decrease would be associated with this defect, so an efficiency decrease of 5 percent (half of the defective faceplate value) was assigned.

- Leaking Nozzle Boot. A leaking nozzle boot was defined in the inspectors instructions. However, it was assumed this meant the same as a torn or defective nozzle boot. Consequently, the efficiency decrease of 30 percent used for defective nozzle boots was assigned to this defect also.

- Missing Nozzle Boot. This applied when no nozzle boot was present. No vapor collection can occur without the nozzle boot, therefore, an efficiency decrease of 100 percent was assigned (as was assigned in Table 4-2).

- Uncertified Nozzle Boot. This defect was noted when the wrong boot was used with the wrong system. This did not mean the boot was defective, so it was unclear what affect this would have on emissions capture. Since no additional information was available, no efficiency decrease was assigned to this defect.

- Defective Nozzle Body. This defect was noted when the nozzle shut off was not working. This would be similar to "nozzle damage" presented in Table 4-2 and an efficiency decrease of 22 percent was assigned.

- Leaking Nozzle Body. This was assigned when gasoline leaked anywhere from the nozzle body. This again was similar to the "nozzle damage" category presented in Table 4-2, and, therefore, an efficiency decrease of 22 percent was assigned.

- Missing Nozzle Body. This defect was assigned when the nozzle was missing and the vapor hose was left open to the atmosphere. This obviously would be a 100 percent decrease in efficiency.

- Uncertified Nozzle Body. This was noted when a decertified nozzle was used. This does not imply that there was anything wrong with the nozzle, only that it was not certified. No efficiency decrease was assigned to this defect.

- Defective Check Valve. This defect was used when the vapor check valve does not work (i.e., the valve was stuck open). If the vapor check valve is stuck open, vapors can be collected during refueling, but some vapors may be released again during times when the nozzle was idle. No additional information was provided but it was felt that some efficiency reduction should be applied to this defect. This decrease could range from 10 to 100 percent but for calculation purposes a value of 30 percent was assumed (equal to that of a defective nozzle boot).

- Improper Check Valve. An improper check valve meant the valve was installed in the wrong place or installed backwards. If the valve were installed backwards, vapors could not pass the valve and be collected, therefore, the efficiency decrease would be 100 percent. If the valve were installed in the wrong place there could possibly be no affect on efficiency. To compromise, an efficiency decrease of 30 percent, equal to a defective check valve, was assumed.

- Missing Check Valve. This defect meant that a required check valve was missing. This would be the same as a check valve stuck open and, as a result, would have an efficiency decrease equivalent to the defective check valve (30 percent).

- Kinked/Flattened Hoses. Kinked hoses were noted when there was one or more kinks found that would not unkink when the hose was stretched to fill a fuel tank. A flattened hose was a hose that had 3 or more feet of accumulated length flattened. Each of these defects has the potential to essentially eliminate vapor flow and therefore vapor capture. However, the study did not indicate that the defect was severe enough to completely halt vapor collection. Therefore an efficiency decrease of 30 percent was assumed.

- Leaking Hoses. This defect was noted when the inspector was sure that a leak was present. The efficiency for "torn hoses" from Table 4-2 was assigned to this defect since it was unclear what was causing the leak, but that a leak was noted.

- Wrong Hose Length. This defect was assigned when the vapor hose was the wrong length based on certification requirements. This may mean loops in hoses that reached allowable certification requirements. This would have the same affect as a broken retractor that allows vapor hoses to droop. Therefore the 5 percent efficiency decrease assigned to "retractor broken" reported in Table 4-2 was also used for this defect.

- Torn/Punctured Hoses. A torn hose was a hose torn, usually at the swivel ends. A punctured hose was noted when any hole was found in the vapor hose that went all the way through the wall and allowed vapors to escape. This was the intent of the "Torn vapor hose" category in Table 4-2, therefore, this same efficiency decrease (10 percent) was assigned.

- Defective Retractor. A defective retractor was one that did not work at all or the cord was broken. This fit the description of "retractor broken" in Table 4-2 and the 5 percent efficiency decrease was assigned to this defect.

- <u>Improper Retractor</u>. This defect was noted when the retractor would not retract all the way back to the full retracted position and would not allow proper hose configuration. The efficiency decrease used both for "wrong hose length", and "defective retractor" (5 percent) was considered appropriate for this defect, since, as with these other defects, the proper hose configuration could not be achieved.

E.2 SAMPLE CALCULATIONS

Using the equation discussed in Chapter 4 and the data in Tables E-1 and E-2, the actual in-use efficiency for a Stage II system (assuming all equipment installed) could be calculated as follows:

$$
\begin{aligned}
&\text{Average In-use Efficiency} = (0.95)\ [(1.00-(0.011)(0.10))\\
&\text{(Old equipment)} = (1.00-(0.003)(0.22))\\
&\quad (1.00-(0.015)(0.30))\\
&\quad (1.00-(0.047)(0.05))\\
&= (1.00-(0.0001)(.30))\\
&\quad (1.00-(0.0004)(1.00))\\
&= (1.00-(0.0003)(0.22))\\
&\quad (1.00-(0.0002)(0.22))\\
&\quad (1.00-(0.0002)(1.00))\\
&\quad (1.00-(0.044)(0.30))\\
&\quad (1.00-(0.006)(0.30))\\
&\quad (1.00-(0.0005)(0.30))\\
&\quad (1.00-(0.003)(0.30))\\
&\quad (1.00-(0.0004)(0.10))\\
&\quad (1.00-(0.01)(0.05))\\
&\quad (1.00-(0.002)(0.10))\\
&\quad (1.00-(0.004)(0.05))\\
&\quad (1.00-(0.045)(0.05))\\
&= 0.922\\
&= 92.2 \text{ percent}
\end{aligned}
$$

Using the same calculation procedures for new equipment would yield an inuse efficiency of 94.1 percent, and for all nozzles tested 92.5 percent.

E.3 REFERENCES

1. Inspection summaries of California Air Resources Board Phase II Vapor Recovery Inspections. August 1986 through October 1987. Received from Laura McKinney, October 1991.

2. Draft Regulatory Impact Analysis: Proposed Refueling Emission Regulations for Gasoline-Fueled Motor Vehicles -- Volume I - Analysis of Gasoline Marketing Regulatory Strategies. U.S. Environmental Protection Agency. Office of Air Quality Planning and Standards and Office of Mobile Sources. EPA-450/3-87-001a. July 1987.

APPENDIX F

STAGE II PROGRAM SUMMARIES

This appendix is intended to provide brief summaries of several Stage II programs throughout the country. These programs range from areas such as San Diego which has almost 20 years experience with Stage II to areas such as Massachusetts and Dade County, Florida with programs only recently adopted. The following is an outline of the individual program summaries.

STAGE II PROGRAM SUMMARY OUTLINE

I. Reason for Initiating Program

II. Major Public Comments

III. Number of Service Stations

IV. Regulations

- A. Exemption levels
- B. Phase-In/Compliance schedule

V. Identification of Sources

- A. Identifying sources
- B. Contacting Sources
- C. Follow-up

VI. Permit application process

VII. Procedure after permit application received

VIII. Approved or "certified" systems for that State

IX. Enforcement

- A. Number of Inspectors
- B. Inspector Training
- C. Frequency of inspections per year

D. Inspection procedures
E. Handling of Violations

X. Miscellaneous Aspects of Program

XI. Problems encountered and Suggestions to other Agencies

The programs discussed are as follows:

Long term programs

San Diego

Bay Area

South Coast

District of Columbia

St.Louis

Programs in "mid" enforcement stages

New Jersey

New York

Programs in initial enforcement stages

Dade County, FL

Massachusetts

Pennsylvania/Philadelphia

PROGRAM REGULATORY AGENCY INFORMATION

Name of Agency:	San Diego Air Pollution Control District [DRAFT: PENDING DISTRICT REVIEW]
Address:	San Diego, CA
Telephone:	(619) 694-3307
Stage II Contact:	Barney McEntire San Diego Air Pollution Control District

REASON FOR INITIATING PROGRAM

Stage II controls were implemented for VOC control as the entire San Diego area has been classified as a non-attainment area for the criteria pollutant ozone.

MAJOR PUBLIC COMMENTS

NUMBER OF SERVICE STATIONS

Stage II affects approximately 1,200 retail and 600 private gasoline dispensing facilities in the San Diego district.

REGULATIONS

San Diego Air Pollution Control Rule number 61.4 on the Transfer of Volatile Organic Compounds into Vehicle Fuel Tanks applies to any retail service station where VOC's are dispensed into motor vehicle tanks with a capacity of 260 gallons or more or any non-retail service station where VOC's are dispensed into motor vehicle tanks from any stationary storage tank with a capacity greater than 550 gallons and where more than 2000 gallons of VOC's are transferred into motor vehicle tanks in any calendar month. San Diego has several exemption levels:

(1) VOC's into motor vehicle fuel tanks from any intermediate refueler provided VOC's are not sold directly from the intermediate refueler; or

(2) Natural gas or propane when not mixed with any other VOC; or

(3) VOC's into any vehicles performing emergency work necessary to restore property to a safe condition following a public calamity or work required to protect persons or property from imminent exposure to danger or damage.

(4) VOC's from any stationary storage tank that:

(i) Is used primarily in the fueling of aircraft and/or intermediate aircraft refuelers, or boats; or

(ii) Is used exclusively in the filling of tanks with a capacity if 5 gallons (18.93 liters) or less; or

(iii) Is located on the parcel of land on which not more than 2000 gallons (7570 liters) are transferred into motor vehicles during any calendar month, provided that the facility is not a retail service station where:

(A) no stationary storage tank with a capacity of 260 gallons (984 liters) or more is added, installed, or replaced at the facility after March 14, 1989; and

(B) no modification, replacement or repair of any underground liquid VOC piping from the stationary storage tank to the dispensers occurs at the facility after March 14, 1989; and

(C) the retail service station does not exceed a VOC throughput of 480,000 gallons (1817 kiloliters) in any calendar year after March 7, 1990; or

(iv) is located in the desert portion of San Diego County at any dispensing facility other than a retail service station; or

(v) has a capacity of less than 260 gallons (984 liters).

IDENTIFICATION OF SOURCES

Stage II in San Diego was first implemented in August of 1972. The initial stations were identified primarily through the phone book and through past facility inspections.

PERMIT APPLICATION PROCESS

Each facility is required to complete a permit application with a planned layout of the system to be installed. After the application has been received, a "plan check" is run on as built drawings. If the facility is approved, then the authority to construct is granted. After construction, tests are required. Permission to operate ensues as soon as the results are approved as being in compliance and a permit is sent to the facility.

PROCEDURE AFTER PERMIT APPLICATION IS RECEIVED

Tests on the new system are conducted by hired consultants. The tests performed are pressure decay, liquid blockage, and pressure versus flow. The district must be notified before tests can be conducted. In most instances, a representative from the district is present during testing. If the tests are passed, the station is granted a start-up authorization. Testing is not repeated unless reconstruction is done to the facility which would increase emissions which would affect emissions.

APPROVED OR CERTIFIED SYSTEMS

The San Diego District uses only CARB certified Stage II vapor recovery equipment.

ENFORCEMENT

Number of Inspectors

The exact number of inspectors that the San Diego District currently has is unknown. These inspectors' duties are not exclusive to the Stage II program.

Inspector Training

The inspectors are trained within the district and do not attend ARB training courses. In addition they have an inspection manual which was developed in the district.

Frequency of Inspections Per Year

The inspection program is not specific to Stage II as the inspectors are not dedicated to Stage II. The inspection frequency is once per year for private facilities and 2 or 3 per year for retail service stations. They have a computer system which indicates which stations are due for their next inspection.

Inspection Procedures

Inspections generally concentrate on equipment defects, and have additional defects identified by the district in addition to the ARB defects.

Handling of Violations

Any violations discovered are subject to fines. San Diego does, however have a tag-out list with specific offenses spelled out in the State laws.

MISCELLANEOUS ASPECTS OF PROGRAM

The San Diego is proud of Stage II program, specifically in the areas of permitting and testing of systems. Most of their effort has been concentrated on their underground piping, as most of their problems occur in that area.

PROBLEMS ENCOUNTERED AND SUGGESTIONS TO OTHER AGENCIES

It is believed that the single most important element to a Stage II program is to ensure that the systems are initially installed correctly. It is estimated that over 50 percent of the stations would only get 50-60 percent recovery without a rigid testing program to identify improper systems.

The inspection program should be considered closely to avoid creating a situation where inspectors are in effect performing the maintenance program for the service stations.

PROGRAM REGULATORY AGENCY INFORMATION

Name of Agency: Bay Area Air Quality Management District
[DRAFT: PENDING DISTRICT REVIEW]

Address: San Francisco, CA

Telephone: (415) 771-6000

Stage II Contact: Gale Karels
Bay Area Air Quality Management

REASON FOR INITIATING PROGRAM

The Bay Area AQMD was the first District in the country to require Stage II controls (see enclosed Board of Directors Resolution Number 764 - January 3, 1973). These

Stage II controls were implemented as an ozone reduction measure.

MAJOR PUBLIC COMMENTS

NUMBER OF SERVICE STATIONS

Stage II controls currently affect 2,027 retail gasoline dispensing facilities (GDF) and 738 non-retail GDF for a total Stage II nozzle population of 28,300 nozzles. There are 424 GDF exempt from Stage II requirements.

APPROVED OR "CERTIFIED" SYSTEMS

The Bay Area only uses California Air Resources Board (CARB) certified and tested Stage II recovery equipment.

ENFORCEMENT

Number of Inspectors

Bay Area presently has approximately six GDF inspectors who report to one GDF supervisor.

Inspector Training

The GDF inspectors currently undergo a 24 hour training course followed by a week working with an experienced inspector. They are also required to attend the CARB Uniform Training Course #232 (GDF Vapor Recovery). On a quarterly basis the inspectors attend in-service training to learn of any new requirements or inspection techniques.

Frequency of Inspections Per Year

The Bay Area inspects each retail facility at least twice per year. For thise facilities with a poor compliance record, the inspections may be conducted every three months.

A list of GDF to be inspected each month is generated by our computer. All inspection data is entered into our Data Bank.

Inspection Procedures

Inspection procedures usually focus on general equipment defects such as bellows, etc.

Handling of Violations

The Bay Area AQMD uses both the "Out of Order" program and Notices of Violations depending on the severity of the defects. The settlement costs of first time violation notices usually range from $100 to $313.

MISCELLANEOUS ASPECTS OF PROGRAM

The Bay Area AQMD has adopted a Manual of Procedures (MOP) for Permitting Gasoline Dispensing Facilities. Enclosed is a copy of the Permitting Handbook.

The Bay Area has, according to CARB, the finest computer tracking system for GDF. Enclosed are copies of the Data Bank Files used by our District. A functional computer tracking system is a definite requirement for effective enforcement and permitting programs.

PROBLEMS ENCOUNTERED AND SUGGESTIONS TO OTHER AGENCIES

It was felt that service stations are using the tagging out of service program as a maintenance program. Facilities tend not to replace equipment unless a violation is found by an inspector.

Several recommendations were given that may aide areas in implementation of Stage II controls. An effective training program is essential to successful maintenance of Stage II controls.

Many suggestions were regarding permitting. The development of standard permit conditions and recommended practices for each type of system would help insure a well-rounded program. These conditions would include stringent testing requirements.

PROGRAM REGULATORY AGENCY INFORMATION

Name of Agency: South Coast Air Quality Management District
[DRAFT: PENDING DISTRICT REVIEW]

Address: El Monte, CA

Telephone: (213) 403-3450

Stage II Contact: Lou Roberto
South Coast Air Quality Management

REASON FOR INITIATING PROGRAM

Stage II controls were implemented for VOC control as the entire South Coast area has been classified as a non-attainment area for the criteria pollutant ozone.

MAJOR PUBLIC COMMENTS

NUMBER OF SERVICE STATIONS

Stage II affects approximately 6,000 retail service stations. The exact number of non-retail facilities is not known.

REGULATIONS

Essentially, South Coast does not have any exemption levels outside of stationary tanks exclusively for fueling agricultural wind machines. These facilities are located in the dessert.

The compliance schedule can be found in Rule 461. Gasoline Transfer and Dispensing (e)(1)2(2) & (3).

(1) The owner or operator of a new facility must comply at the time gasoline receiving and/or dispensing is initiated.

(2) Any owner/operator of any altered facility who was previously exempted from the provisions of this rule now must comply.

(3) Any owner/operator of any other existing facility, who was previously exempt from the rule, who has not earlier been required to come into compliance, must achieve compliance by March 4, 1990.

IDENTIFICATION OF SOURCES

South Coast utilized their operating permit database to identify which sources were subject to the changes. This database contains a list of manufacturers' code which is capable of distinguishing those types of service stations.

PERMIT APPLICATION PROCESS

A permit to construct must be issued to the facility in order to begin the permit process. After this step, the equipment is installed and the equipment is tested. The inspectors to the backfill and the back pressure test themselves. Once the inspection is complete and all subsequent tests are passed, a permit is issued.

PROCEDURE AFTER PERMIT APPLICATION RECEIVED

APPROVED OR CERTIFIED SYSTEMS

South Coast only uses CARB certified Stage II vapor recovery systems.

ENFORCEMENT

Number of Inspectors

The ideal number of inspectors for the service station population is 15. South Coast currently has 12 inspectors on staff. Their duties include Stage I as well as Stage II inspection duties.

Inspector Training

Inspectors for the South Coast must attend a seven week training program. For two weeks the trainees work in conjunction with experienced instructors. They also have training videos on inspection technique.

Frequency of Inspections

While they would like to average two inspections per year, this is not possible because of the slight manpower shortfall which leaves the inspection average at 1.9 times per year. Their inspection program is not necessarily geared to inspect each station twice annually, but rather it is a priority inspection program. Stations which have exhibited recurrent problems in the past are inspected three times per year, average situations twice per year, and very conscientious stations are only inspected once per year.

Inspection Procedures

The inspection procedures consists of a visual inspection of the nozzles, hoses, as well as an inspection of the Stage I system. They inspect the burner for assist systems and make sure it is operating properly.

Handling of Violations

South Coast Air Quality Division tags out equipment as described by ARB rules/California law. They issue a notice of violation when two tags are issued at a facility.

MISCELLANEOUS ASPECTS OF PROGRAM

South Coast is currently involved with an experimental "self inspection" program where larger companies implement their own inspection program. An overall evaluation of this program has not been conducted.

PROBLEMS ENCOUNTERED AND SUGGESTIONS TO OTHER AGENCIES

It has been suggested that any Stage II vapor recovery program should ensure that the underground piping is installed properly through testing and other means. The public awareness aspect of a Stage II program is also important. This awareness includes good equipment usage instruction, the education of the service station industry, self maintenance programs by all affected service stations, and instruction courses provided by the air pollution agency.

PROGRAM REGULATORY AGENCY INFORMATION

Name of Agency:	District of Columbia Department of Consumer and Regulatory Affairs [DRAFT: PENDING DISTRICT REVIEW]
Address:	Washington, D.C.
Telephone:	(202) 727-7000

Stage II Contact: Ron Wambsgang

REASON FOR INITIATING PROGRAM

Stage II controls have been implemented for the control of Volatile Organic Compounds (VOCs). Washington, DC is an area designated as non-attainment for the criteria pollutant ozone.

NUMBER OF SERVICE STATIONS

Stage II affects approximately 150 retail gasoline dispensing facilities in addition to a couple hundred private or governmental facilities.

REGULATIONS

District of Columbia Air Rules 341:705.1-requires that all gasoline dispensing facilities with the exception of facilities available to the public by virtue of having some membership or military status may have no more than one nozzle which does not comply with requirements, or the same facilities having 3 or less dispensing nozzles implement Stage II vapor recovery equipment.

The compliance schedule is effective in accordance with the District of Columbia Air Pollution Control Act of 1984.

IDENTIFICATION OF SOURCES

Gasoline dispensing facilities were identified by using State Licensing Facility records. The major oil companies were contacted and lists of facilities were given. The notices for implementation were sent via the First Class Mail.

PERMIT APPLICATION PROCESS

The facility sends the permit application to the proper State agency. The application is subsequently reviewed and a permit is issued if there are no problems.

PROCEDURE AFTER APPLICATION RECEIVED

Once the permit is issued, an inspection is required. Washington, DC uses an inspection checklist that must be completed in order to determine if a facility is in violation.

"APPROVED" OR "CERTIFIED" SYSTEMS

All vapor control systems will meet the requirements for certification and shall be operated in accordance with the Standards of the District of Columbia Air Pollution Control Act of 1984 as established by the California State Fire Marshall, the Division of Measurement Standards of the Department of Food and Agriculture, or the Health and Safety Code. These requirements are subject to change. Alternate vapor recovery systems may also be used if they satisfy the above requirements.

ENFORCEMENT

The Number of Inspectors and Frequency of Inspections

An exact number of inspectors could not be given due to the fact that the inspectors are from several different branches in the agency. There are relatively six inspections a year for each station. All facilities are inspected during the summertime due to the increase in ozone at that time. Every report is submitted by an inspector includes the checklist used.

Violations

The Department of Consumer and Regulatory Affairs has found the most effective way of handling violations is through the Civil Infractions Program, which issues tickets and subsequent fines. These fines range from $50-500 dollars.

MISCELLANEOUS ASPECTS OF PROGRAM

PROBLEMS ENCOUNTERED

PROGRAM REGULATORY AGENCY INFORMATION

Name of Agency:	Missouri Air Pollution Control
Address:	St. Louis, MO
Telephone:	(314) 751-4817

Stage II Contact: Budd Pratt
Missouri Air Pollution Control Division

REASON FOR INITIATING PROGRAM

Stage II controls were implemented for VOC control as the St. Louis area is classified as non-attainment area for the criteria pollutant ozone.

MAJOR PUBLIC COMMENTS

NUMBER OF SERVICE STATIONS

It is estimated that there are approximately 1,200 gasoline dispensing facilities that will implement Stage II. A breakdown of retail vs. non-retail facilities was unavailable.

REGULATION

Missouri Administrative Code CSR10-5.220 requires that storage tank with a capacity greater than 2,000 gallons must be equipped with a submerged fill pipe in addition to installing Stage II vapor control systems.

The compliance schedule is contained in CSR10-5.220. It is stated that all affected gasoline loading installations with a monthly throughput greater than or equal to 600,000 gallons per year, must achieve final compliance by July 1, 1978. The compliance dates for facilities with monthly throughputs between 600,000 and 120,000 gallons was August 12, 1986.

IDENTIFICATION OF SOURCES

The exact methods used in identifying sources could not be determined at this time.

PERMIT APPLICATION PROCESS

Each facility receives a construction permit in order to make the proper modifications. Facilities must send in their individual plans for Stage II implementation. Missouri Air Pollution Control reviews these plans and sends the facility their consent to begin modifications.

PROCEDURE AFTER PERMIT APPLICATION RECEIVED

Once the facility has completed the modifications to its facility, drive-by inspectors begin. Once an inspection is made, that facility is entered into a data base. No formal testing of the equipment is required.

APPROVED OR CERTIFIED SYSTEMS

Missouri uses only California Air Resources Board (CARB) certified equipment as outlined by the Executive Order. Any deviations of this equipment are non-negotiable.

ENFORCEMENT

Number of Inspections

In most areas, the inspections are conducted by county employees that have other duties. Missouri inspectors have a training session which includes use of a Stage II orientation book distributed by CARB.

Frequency of Inspections

The inspection program is set up such that after an initial visit, the facility is entered into a database, from there, inspections are scheduled twice a year. The inspectors use an inspection checklist for each facility.

Violations

Missouri inspectors have found the "tag out" method to be more effective than fines in handling violations. Once a violation is discovered, the responsible party has 15 days to correct it. A test of the appropriate equipment must be performed and compliance proved through an outside contractor. The facility must make an appointment to have the inspector come again.

MISCELLANEOUS ASPECTS OF PROGRAM

A unique aspect of St. Louis is that they only allow coaxial hoses for their gasoline dispensing facilities.

PROGRAM REGULATORY AGENCY INFORMATION

Name of agency: New Jersey Department of Environmental Protection

Address: Trenton, NJ
Stage II Permitting\
Contact: Patrick Zigrand
Division/Section: New Source Review
Telephone: (609) 530-8249

Stage II Enforcement Contact: David Volz
Division/Section: Minor Source Compliance
Telephone: (609) 584-4243

REASON FOR INITIATING PROGRAM

Originally, NJ proposed rules requiring Stage II vapor recovery for the control of VOC emissions related to ozone formation. However, no final action was ever taken on this proposal. Then, on September 14, 1987, the United States District Court (in response to American Lung Association v. Keon, Civil No. 87-288) ordered the DEP to propose a schedule for prompt implementation of Stage II vapor recovery. Therefore, the true motivation for the actual adoption of the Stage II program was the Court order.

NUMBER OF SERVICE STATIONS

DEP estimates that there are approximately 5,300 facilities subject to the regulation. No breakdown was available regarding for public vs. private.

REGULATIONS

New Jersey Administrative Code 7:27-16-3 (f) requires that all gasoline dispensing facilities with throughputs greater than 10,000 gallons per month install a vapor control system that is "approved by the Department and that is designed, operated and maintained so as: (1) To prevent VOC emissions to the outdoor atmosphere by no less than 95 percent by weight . . ., and (2) To prevent overfilling and spillage." Marine loading facilities are also exempt.

The compliance schedule is contained in 7:27-16-3 (r) and (s). It is stated that all 40,000 gallons per month facilities had to obtain a permit by March 21, 1988, begin construction by June 21, 1988, and be in compliance by December 30, 1988. The dates for facilities with monthly throughputs between 10,000 and 40,000 gallons were November 1, 1988 for permits, March 1, 1989 for initiation of construction, and December 29, 1989 for full compliance.

There were some problems with the implementation schedule. It is estimated that they had received approximately 300 requests for extended compliance schedules. The main reasons for these difficulties were equipment and contractor availability.

IDENTIFICATION OF SOURCES

The DEP mailed a letter stating that a Stage II equipment was required on every facility with an average monthly throughput of 10,000 gallons or greater. Each facility was required to obtain a Stage II permit which indicated the type of system to be installed.

New Jersey law (N.J.A.C. 7:27-8.1) requires owners/operators of air pollution control devices to obtain permits to construct, install or alter air pollution control devices prior to their installation. Once the permit application is received by the DEP a review of the application is conducted to determine whether the proposed installation will meet the Department's "state of the art" criteria. Actually, New Jersey relies on CARB certification for this determination and the permit applications list those systems which are approved.

Upon acceptance by the DEP, the permit is approved with conditions requiring a pressure decay test and a liquid blockage test within 90 days of installation of the equipment. It further requires that documentation of such tests be kept on site along with the approved permit.

APPROVED OR "CERTIFIED" SYSTEMS FOR THAT STATE

While, the regulation states that a system be used which is "approved by the Department", the permit applications list those the systems which are approved. Actually, New Jersey relies on CARB certification for this determination. The permit application actually lists the CARB executive order number with the system.

ENFORCEMENT

Number of Inspectors and Inspector Training

In most areas, the inspections are conducted by county employees that have many other duties. The state provides funding for each county participating in the program. New Jersey inspectors have a two day training session which include a Stage II training film (1 day in classroom, 1 day in field).

Frequency of inspections

The inspection program is set up so that 20 percent of the stations are to be inspected annually. This means that each station should be inspected about every 5 years.

Inspection procedures

There is no inspection checklist used by New Jersey inspectors. They feel that the use of checklists limits what an inspector examines. The following are the typical items covered during a Stage II inspection of a facility.

1) Check to see that the paperwork is on-site and available for review. This includes the pressure decay and liquid blockage test documentation and the permits.

2) Check to determine if the type of system on the permit is the system actually installed and in-use at the facility. No mixing of equipment types is allowed.

3) Inspect all nozzles, boots, face plates, and hoses for any cuts, tears, or other types of disrepair. Any sized hole or tear is considered a violation.

4) Check to see if any other problems exist with the equipment. Examples of the things which could be

checked are nozzle check valves, nozzle latches, etc.

Violations

Detailed State policy regarding fines is in place and used by the DEP. For each type of violation, they impose a fine. They do not have a "list" of defects. The inspectors determine what is considered to be a violation when the equipment is not in the condition as permitted (re: Items 2, 3, and 4 above).

MISCELLANEOUS ASPECTS OF PROGRAM

An unique issue in New Jersey is that self service facilities are not allowed so the general public does not come directly in contact with the Stage II equipment. DEP officials certainly believe this lessens the number of complaints received from the public. No operating instructions are required to be on the pumps and it is not believed that much of the industry trains their personnel on the proper usage of Stage II. There is an environmental hotline for the State which handles all environmental complaints, but no assessment has been done to determine the number regarding Stage II.

PROBLEMS ENCOUNTERED AND SUGGESTIONS TO OTHER AGENCIES

NJ DEP officials indicated that a problem exists for facilities which have claimed an exemption based on throughput. This is due to two reasons. The first is the date listed in the regulation for determining throughput. The exemption is for facilities with average monthly throughput less than 10,000 gallons per month and "average monthly throughput shall be based on the average of the monthly throughputs between September 1, 1986, and August 31, 1987". The situation was brought up that a station could have increased its throughput in the 4 years since that time to be above the cutoff, but is not required to install Stage II. Another problem is that documentation requirements for determining throughputs is not clearly stated and is relatively easy to "hide" throughput so that one falls below the cutoff. New regulation will alleviate all the above problems.

NJ DEP representatives felt it would be a good idea to require that additional tests be conducted when the tanks, piping and other components are replaced.

PROGRAM REGULATORY AGENCY INFORMATION

Name of Agency:	New York Department of Environmental Conservation (DEC)
Address:	Albany, NY
Stage II Contact:	Robert S. Praisner
Division/Section:	Sr. Engineering Technician

REASON FOR INITIATING PROGRAM

In 1982, the New York DEC submitted a SIP to EPA that did not include Stage II and also did not demonstrate compliance. The Governor indicated a commitment to demonstrate attainment but Stage II was still not implemented. However, the Natural Resources Defense Council (NRDC) sued New York to require Stage II. Stage II controls were implemented for VOC control as the metropolitan area is designated non-attainment for ozone.

NUMBER OF SERVICE STATIONS

The metropolitan area of New York has approximately 2400 to 3000 gasoline dispensing facilities. A breakdown of retail versus non-retail was not available.

REGULATIONS

Installation of Stage II began in April 1988 and service stations with gasoline throughput greater than 500,000 gallons per year had until July 1988 to comply, and those stations with a gasoline throughput greater than 250,000 gallons per year had until July 1989 to comply.

PERMIT APPLICATION PROCESS

Each affected facility must file for a permit to construct and operate. An outside contractor tests the equipment and the results are sent to the Department of Environmental Conservation (DEC).

PROCEDURE AFTER PERMIT APPLICATION RECEIVED

Once the permit application is received by the DEC, and the results from the contractor have been reviewed, a permit is mailed to the facility.

ENFORCEMENT

Number of Inspectors and Inspection Training & Frequency of Inspection

The NYDEC would only commit to saying that they inspect their facilities "periodically". It is felt that twice per year, random inspections is the best way to enforce the regulations.

The NYDEC currently uses 6 inspectors to inspect facilities in the nine county New York Metropolitan Area.

Inspection Procedures

The NYDEC does utilize an equipment checklist for the inspectors to follow during each inspection.

Violations

New York does not use "Tag-Out-of-Service" procedures like those used in other States. New York has established a fine or fee system for each violation.

MISCELLANEOUS ASPECTS OF PROGRAM

The NYDEC regulations require a system that is 90 percent efficient. The NYDEC has a policy that they cannot cite another State's code, therefore, the NYDEC could not allow a wholesale acceptance of equipment certified in California. The NYDEC had to come up with its own approval or certification methods. Certification in California, however, may be sufficient proof to NYDEC that the system could be installed in New York.

PROGRAM REGULATORY AGENCY INFORMATION

Name of Agency:	Metropolitan Dade County, Florida Department of Environmental Resources Management (DERM)
Stage II Contact:	Robert Wong
Division/Section:	Environmental Monitoring Division/Air Section
Telephone:	(305) 858-0601

REASON FOR INITIATING PROGRAM

Dade County is designated by the U.S. Environmental Protection Agency (EPA) as a nonattainment area for the pollutant ozone. Stage II implementation will serve as a long-term measure to prevent smog which is directly related to uncontrolled releases of volatile organic compounds (VOCs). Additionally, Stage II is seen as an immediate and effective measure to reduce public exposure to benzene emissions from gasoline refueling.

MAJOR PUBLIC COMMENTS

DERM indicated that there have been few major comments other than the independent service station owners queries as to where the financial backing will come from. Representatives of both major oil companies and independent service stations requested an advance period for compliance with Stage II requirements.

NUMBER OF SERVICE STATIONS

It is estimated that approximately 2,000 service stations exist in metropolitan Dade County. A breakdown of private versus public stations was unavailable.

REGULATION

A Stage II policy adopted pursuant to the Dade County Administrative Code Section 24-20 requires that all gasoline service stations that dispense 10,000 gallons or more gasoline/ gasohol per month are required to install Stage II vapor recovery equipment. Existing facilities have until December 14, 1992 to comply and new facilities without certificate of occupancy are required to comply immediately.

IDENTIFICATION OF SOURCES

Service stations were identified through Dade County's rigorous underground piping program.

PERMIT APPLICATION PROCESS

Each facility must complete the Stage II Vapor Recovery System Specifications form for each system and submit to DERM for approval. Within 90 days following completion of the installation of the vapor recovery equipment, a written notification of such installation and arrangements for a certification test must be done.

PROCEDURE AFTER PERMIT APPLICATION RECEIVED

Once the permit application is received DERM assumes that the Stage II equipment is being installed and plans to inspect the day of certification testing. The two tests used to determine the certification of the system are a pressure decay test and a liquid blockage test. A certification number will be issued after the DERM air section approves the test results.

APPROVED OR "CERTIFIED" SYSTEMS FOR THAT STATE

DERM will accept (the latest generation) systems currently certified by California Air Resources Board (CARB) as outlined in their Executive Order. Only coaxial hose vapor recovery systems will be approved. Original manufacturer rebuilt nozzles will only be approved and existing dispensers shall be retrofitted with original manufacturers parts only. Existing facilities have until December 14, 1992 to comply. New facilities, however, must apply for a permit immediately if they do not have a certificate of occupancy.

ENFORCEMENT

Number of Inspectors and Inspector Training

Dade County presently has approximately 6 people who conduct the inspections in addition to their other duties. The training program entails a Stage II training video, as well participation in equipment manufacturers seminars.

Frequency of Inspections

The inspection program is still very much in the planning stages and is subject to be modified. At present, it is intended that the initial inspection occurs on the system certification test date, with a follow-up after approximately 3 years. Compliance inspectors will also perform routine inspections or respond to complaints received.

Inspection Procedures

The inspectors are present to make sure the type of system on the permit is actually the one that is installed. They inspect all nozzles, boots, faceplates and hoses for any cuts, tears, or other types of disrepair, and any other possible problems that might exist.

Violations

Because it is early in their program, DERM has not had to handle any violations, but when a violation is discovered a Notice of Violation will be sent prior to follow up enforcement by DERM.

PROBLEMS ENCOUNTERED AND SUGGESTIONS TO OTHER AGENCIES

DERM reports no major problems so far during implementation. DERM representatives advise other States that are thinking about implementing Stage II to recommend that service stations install the necessary piping, and to require that only the latest coaxial vapor recovery systems be approved and that a certification program be instituted to ensure that the system needs performance standards.

REGULATORY AGENCY INFORMATION

Name of Agency:	Massachusetts Department of Environmental Quality Engineering Division of Air Quality Control
Address:	Boston, MA
Telephone:	(508) 292-5630
Stage II Contact:	Leah Weiss
Division/Section:	Massachusetts Division of Air Quality Control
Stage II Contact:	Laurel Carlson
Division/Section:	Massachusetts Division of Air Quality Control
Stage II Contact:	Rich Driscol
Division/Section:	Massachusetts Division of Air Quality Control

REASON FOR INITIATING PROGRAM

Stage II controls were implemented for VOC control as the entire Commonwealth of Massachusetts has been classified as a non-attainment area for the criteria pollutant ozone.

MAJOR PUBLIC COMMENTS

There were three major issues raised during the public comment process. One, the installation and maintenance cost estimates were generally found to be either too high or low. Two, the time schedule for the petroleum industry to comply with Stage II regulations was a problem. Three, Stage II itself is an inefficient method for controlling Volatile Organic Compound emissions (VOC).

NUMBER OF SERVICE STATIONS

Stage II will affect 1,000 gas stations in the first year of implementation and up to 2,400 gas stations by April of 1993.

REGULATIONS

Massachusetts Administrative Code 310 CMR 7.24(6) requires that all gasoline dispensing facilities which have been constructed or substantially modified on or before November 1, 1989 and at which any time since January 1, 1988 have had a throughput of at least 20,000 gallons in any one calendar month, or any dispensing facility that was modified after November 1, 1989 install Stage II vapor control systems regardless of size. The retrofit of the existing stations will take place over three years, according to the following schedule:

- by April 1, 1991 where the annual (calendar year) throughput of the motor vehicle fuel dispensing facility is 1,000,000 gallons of motor vehicle fuel or more;or
- by April 1, 1992 where the annual throughput of the motor vehicle dispensing facility is 500,000 gallons or more of motor vehicle fuel, but less than 1,000,000 gallons; or
- by April 1, 1993 for any motor vehicle fuel dispensing facility dispensing less than 500,000 gallons per year, and more than 20,000 gallons per month.

Facilities, constructed or modified after November 1, 1989 must install and operate Stage II by April 1, 1991 or at the time of construction or modification, whichever is later.

IDENTIFICATION OF SOURCES

Sources were identified utilizing State licensing agencies, in addition to contacting major oil companies for their lists. The Department of Environmental Quality Engineering delivered notices of the pending regulations to the service stations through mass mailings and certified mail.

PERMIT APPLICATION PROCESS

Each facility is required to obtain and complete a Stage II registration and classification form that contains information regarding the owner of that facility, the complete mailing address, business phone, annual and monthly throughput information, fuel dispenser, and a signed statement certifying the information provided is accurate.

The next step is the permit application itself. The same general information regarding station location and owner etc. is included on this page, as well as additional information. The form lists the type of vapor collection and control system that will be installed, the number of nozzles, hoses etc. to be installed, and the anticipated completion date of installation.

PROCEDURE AFTER APPLICATION RECEIVED

Field inspection to verify proper installation is the most cursory assessment of compliance. To accomplish verification of as many sites as possible, a protocol for "drive-by" or screening inspections was developed. It will be used during the first month or two after a compliance deadline is passed. It is a one time check unless violations are found, in which case a full facility compliance inspection is done.

The full facility compliance inspection involves a checklist containing specific pieces of equipment which must be checked in order to assure proper installation and maintenance. When the inspection is complete, the owner/service station manager is given a receipt that states that an inspector has visited the facility.

Upon completion of the report by the inspector, it is determined whether or not the facility is in compliance and a permit is presented accordingly.

APPROVED OR "CERTIFIED" SYSTEMS FOR THAT STATE

The regulation states that a system must be CARB certified in order for approval. The permit application lists the CARB Executive Order number. This rule is very stringent and any modifications are not subject to discussion.

ENFORCEMENT

Number of Inspectors and Inspector Training

A compliance coordinator has a master fuel dispensing facility list which identifies facilities assigned for screening inspectors as well as full inspection and identification of any necessary follow-up action and the person assigned to take on that action.

State employees chosen to participate in screening inspections are required to attend a 2-hour training session where they are briefed on the program and trained to visually identify vapor recovery equipment in the field.

Full facility inspection training involves all of the above in addition to training in examining equipment for proper installation and maintenance. The staff are also trained in the protocols for documenting each inspection and taking enforcement action.

Frequency Inspections

Screening inspections should be completed within 4 weeks of April 1, 1991. No further action will be taken if no violations are found. Facilities could be scheduled for full inspection on a random basis throughout the year, every year.

Inspection Procedures

The screening inspections require that the screeners identify each or most of the fuel dispensers, product hoses, and nozzles on the site. A full facility inspection has an inspection form that must be filled out completely. The product dispensers, hoses, nozzles, and tank seals as well as signs must be examined and listed.

Violations

When a violation is discovered, a notice of noncompliance (NON) is issued. The facility has 21 days to either:

1. submit evidence of compliance
2. not submit evidence of compliance
3. submit evidence that they cannot comply due to a third party

An Administrative Consent Order (ACO) is issued which gives the facility specified time to comply. If found guilty of violations, the facility will be fined. Penalties are assessed using the Guidelines for Calculating Administrative Penalties.

MISCELLANEOUS ASPECTS OF PROGRAM

Massachusetts Air Quality Division has provided a Stage II information line for questions, complaints, and general information queries for the station owners and operators.

PROBLEMS ENCOUNTERED AND SUGGESTIONS

The Massachusetts Division of Air Quality Control indicated that the Stage II phase-in has gone relatively smoothly. One of the main difficulties with the program was properly identifying sources. Division of Air Quality Control did not give any suggestions on how to remedy this. Another problem mentioned was the shortage of staffing that they encountered. They suggested that States be aware of the kind of manpower a project like this entails.

PROGRAM REGULATORY AGENCY INFORMATION

Name of Agency:	Philadelphia Department of Public Health Air Management Services
Address:	Philadelphia, PA
Telephone:	(215) 875-5623
Stage II Contact:	Bob Ostrowski Philadelphia Air Management

REASON FOR INITIATING PROGRAM

Stage II controls were implemented for volatile organic compounds (VOC), toxics and benzene as the entire Philadelphia metropolitan area is classified as non-attainment for ozone.

NUMBER OF SERVICE STATIONS

Representatives from the Philadelphia Department of Public Health, Air Management Services (AMS) estimate a total of approximately 300 retail and non-retail facilities.

REGULATION

Philadelphia Air Management Region V, Section V.C requires that the following gasoline dispensing facilities install Stage II vapor control equipment:

1. Any existing gasoline dispensing facility with a Total 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 the regulation 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 June 25, 1991.

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 December 25, 1991.

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 June 25, 1992.

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 June 25, 1993.

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 the regulation (June 15, 1990).

IDENTIFICATION OF SOURCES

The proper gasoline dispensing facilities were identified primarily through lists provided by the major oil companies. The Department of Licenses and Inspections, Flammable Liquid Licensing inventory was also employed to potential facilities.

PERMIT/LICENSE APPLICATION PROCESS

The owner or operator of each affected gasoline dispensing facility must apply for an installation permit and obtain an annual operating license, as provided in the Air Management Code. Compliance inspections of facilities will be conducted by authorized representatives of AMS to verify installation, permit conformity, and proper operation and maintenance of vapor control systems. Annual operating license issuance and renewal is subject to approval by AMS and continuing compliance of the facility with all applicable operating requirements.

APPROVED OR "CERTIFIED" SYSTEMS

Only certified Stage II gasoline vapor recovery equipment will be approved by AMS for installation at gasoline dispensing facilities as referenced by the State of California Executive Orders. Certification of gasoline vapor control systems will be accomplished pursuant to applicable requirements and procedures of the Commercial and Industrial Fire Inspection Unit of the Department of Licenses and Inspections. All compliance certification testing (pressure and blockage testing) must be completed prior to initial operation following installation of vapor recovery and control equipment. Also, the owner or operator of each affected facility must provide adequate training and written instructions and procedures for facility employees related to proper operation, maintenance and use of the Stage II vapor control system. Documentation of such training, instructions and procedures must be made available to AMS upon request.

ENFORCEMENT

Number of Inspectors and Inspector Training

There are approximately 10 field inspectors assigned within the city of Philadelphia. The inspectors are trained in Stage II inspection techniques in cooperation with the State of New Jersey officials who are already enforcing Stage II requirements. Annual operating license issuance and renewal is subject to approval to AMS.

Handling of Violations

Violations of Stage II control requirements will be handled according to established local enforcement procedures.

VIOLATIONS

Violations are generally handled on a case-by-case basis with the facility in violation usually receiving a notice of violation which would indicate the exact nature of the violation along with an offer settlement subject to prompt resolution of the violation. Frequent or protracted instances of violation are referred to the city's law dept for legal action.

APPENDIX G
PUBLIC AWARENESS INFORMATION

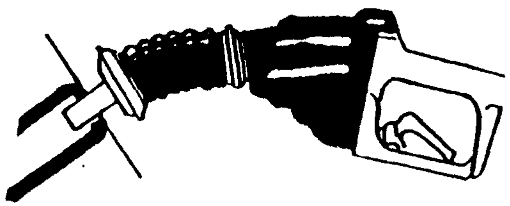
As discussed in Chapter 6, public acceptance is vital to the success of any Stage II program and an agency should consider ways to inform and educate the public about the Stage II program. This appendix contains a couple of examples of information provided by agencies to the public that help to inform about Stage II. Specifically, this appendix contains:

Section G.1	Public Information Pamphlet from Massachusetts
Section G.2	CARB self inspection manual

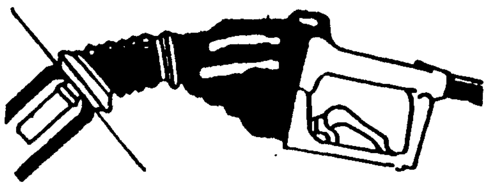
APPENDIX G.1

MASSACHUSETTS PUBLIC AWARENESS BROCHURE

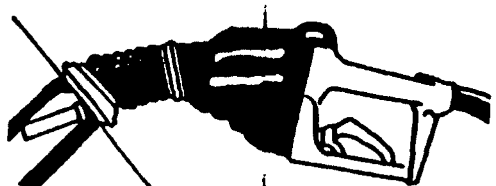
How to Use a Stage II Nozzle



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!

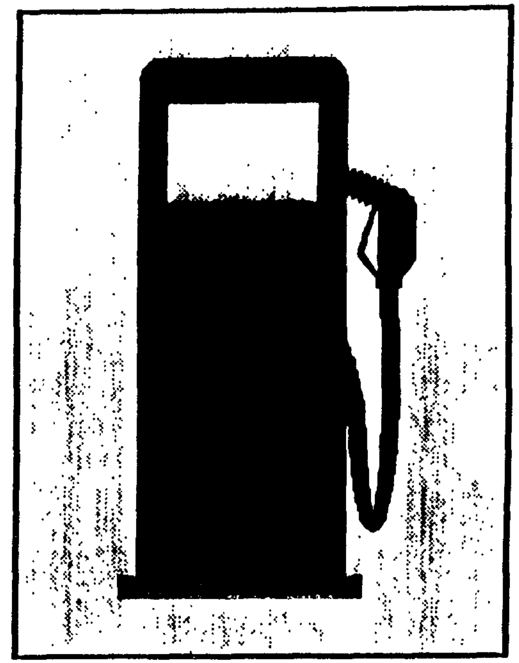
5. Wait a few seconds before removing the nozzle from your car's fill pipe after automatic shutoff to let the remaining gasoline drain out.

Printed on Recycled Paper

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

THE STAGE II PROGRAM

You may have noticed a new type of nozzle on the pumps at the gasoline station where you normally fill up your car. The new nozzles are part of the Stage II Vapor Recovery program — a major air pollution prevention initiative by the Department of Environmental Protection.

HOW DOES IT WORK?

The Stage II system is designed to prevent the escape of gasoline vapors into the atmosphere while your car is being filled up. Each pump is equipped with an accordion-like sheath, or bellows, and a coaxial hose (a hose within a hose). With Stage II in place, the vapors which are displaced from your tank by the gasoline being dispensed into it are captured and recycled. DEP is requiring installation of Stage II at the largest service stations in Massachusetts by April 1991. All but the smallest gas stations will be equipped with vapor recovery systems by the middle of 1993.

DEP

This brochure was distributed as a public service by the Department of Environmental Protection. For additional information about Stage II, call DEP's Division of Air Quality Control at 617-556-1035 or write the Division at One Winter Street, 8th Floor, Boston, MA 02108.

CLEANER AIR

By 1993, Stage II vapor recovery systems will reduce air pollution from gasoline stations in Massachusetts by an average of 24.6 tons per day, or a total of 9,000 tons annually. And from Day One, they will substantially reduce gasoline odors at the pump.

REDUCED HEALTH RISKS

Gasoline vapors contribute to ground-level ozone, or smog, which aggravates respiratory ailments such as asthma, bronchitis and emphysema. Smog can make it difficult even for healthy people to breathe comfortably. Gas vapors also contain cancer-causing agents. So Stage II greatly reduces your exposure to harmful substances.

ENERGY CONSERVATION

Vapors recovered by Stage II go back to underground storage tanks where they are condensed into gasoline. In Massachusetts, that will mean a savings of nearly three million gallons of fuel per year.

FIRE PREVENTION

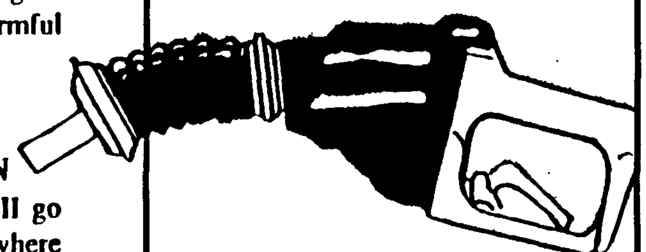
Stage II helps reduce the hazard of fire at service stations by preventing the escape of flammable vapors.

THREE IMPORTANT WAYS

***YOU* can help make Stage II Vapor Recovery work even better:**

- **Don't "top off" your tank. If you try to pump more gas into your car after the nozzle has automatically shut off, fuel travels down the vapor hose and blocks the line. If that happens, you or the next customer could be sprayed with gasoline. And in extreme cases, it can cause equipment failure.**

- **If the nozzle doesn't work and a sign has not been posted to indicate it is out of order, tell the station attendant.**



- **If you have any questions or comments about vapor recovery or wish to complain about faulty equipment, please call the Stage II office at DEP's Division of Air Quality Control.**

617-556-1035

APPENDIX G.2

CARB SELF INSPECTION MANUAL

SELF-INSPECTION HANDBOOK

GASOLINE FACILITIES

PHASE I & II VAPOR RECOVERY

AIR RESOURCES BOARD
COMPLIANCE DIVISION
COMPLIANCE ASSISTANCE PROGRAM

COMPLIANCE ASSISTANCE?

SELF INSPECTIONS CAN SAVE YOU MONEY, HELP THE ENVIRONMENT AND IMPROVE CUSTOMER SATISFACTION!

G.2-3

This handbook is designed to help you know what the law is and how you can benefit from compliance. Read on, and see how easy it is to improve your working conditions, keep your boss out of trouble and make your customers happy.

Vapor Recovery Systems...

Vapor recovery systems:

1. Increase your profits.
2. Reduce the formulation of lung damaging smog.
3. Reduce your cancer risk by decreasing toxic fumes.
4. Save 50 million gallons of gasoline per year in California.
5. Reduce fire hazards.
6. Reduce gasoline odors.

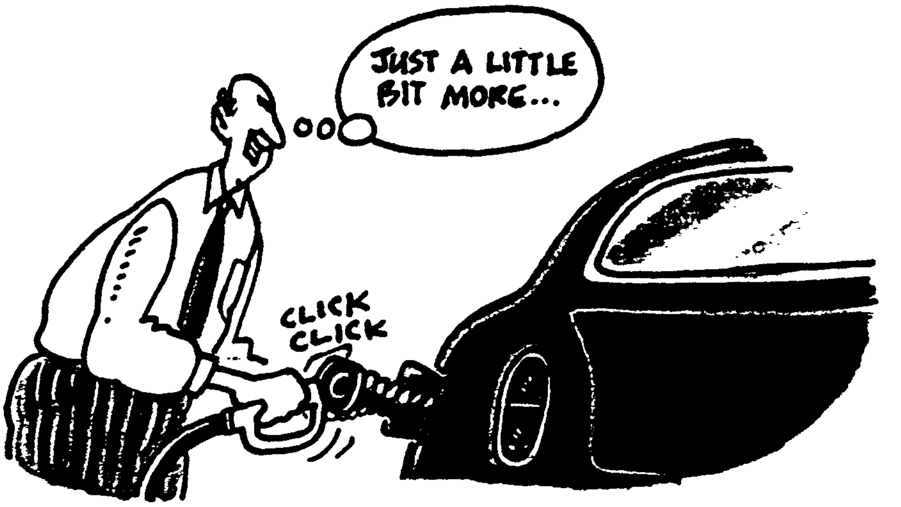
The penalties for violating air pollution regulations can be $10,000 per day or more. Plus, your pumps may be locked out of service until they are repaired. Use this handbook to help you inspect your equipment daily to be sure you are in compliance. Remember, the benefits of keeping your equipment in good condition is not simply avoiding penalties,... but also provides a safer workplace, a healthier environment and greater profits.

INSPECT EQUIPMENT DAILY

REPAIR OR REPLACE EQUIPMENT WHEN NECESSARY

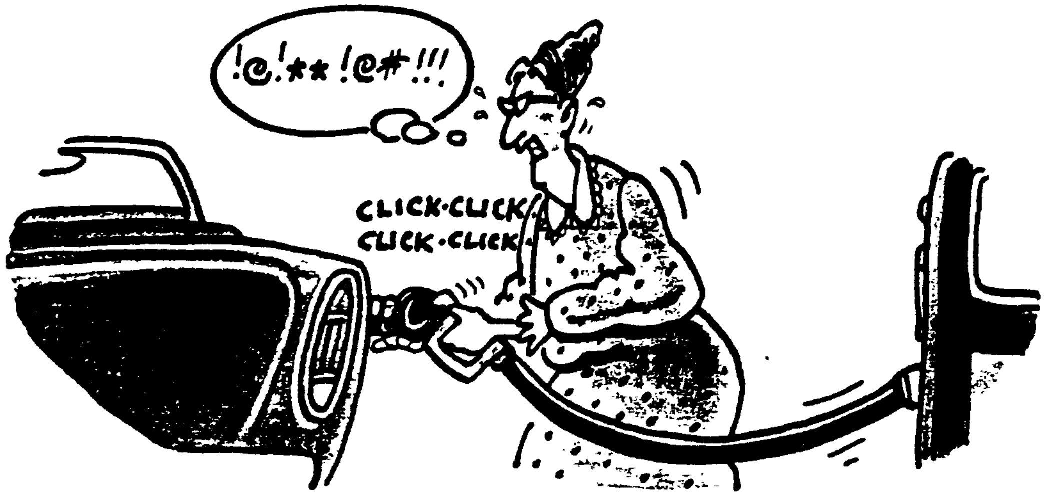
The California Air Resources Board is asking for your help to teach the public. When a customer has a problem with the equipment, take time to check it out. In most cases, just by showing the customer the correct way to operate the equipment, the problem can be solved. By inspecting your vapor recovery equipment every day and keeping it in good working condition, you can improve customer satisfaction while cleaning up the air. If you find a problem, remove the equipment from service until you can fix or replace it.

ON'T TOP OFF!
LIQUID GASOLINE WILL BLOCK THE VAPOR LINE...



...WHEN A WORKING NOZZLE SHUTS OFF—THE TANK IS FULL!
and...

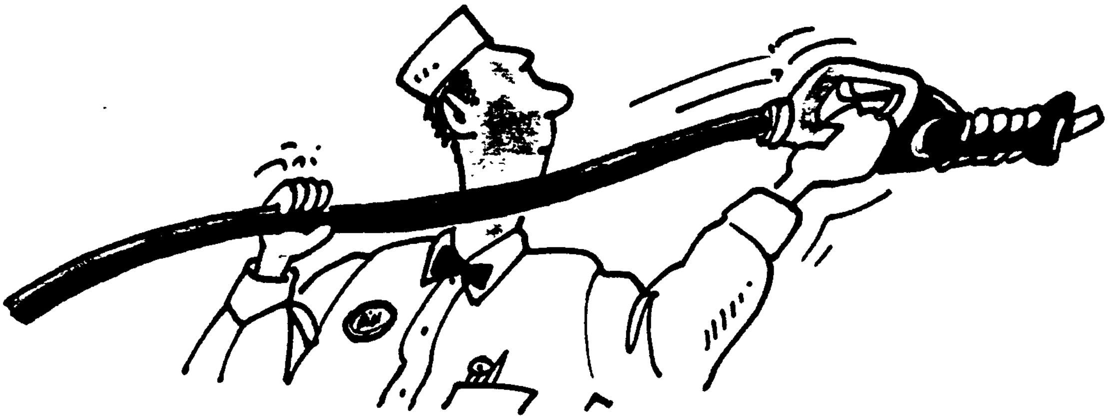
BLOCKED LINES ARE FRUSTRATING!



NOZZLES THAT CLICK OFF TOO SOON...
INDICATE A BLOCKAGE IN THE VAPOR LINE.

The most common cause of blocked vapor lines is customers topping off their gas tank. When a gas tank overfills, gas travels back down the vapor hose and blocks the line. Unless the line is cleared, the next customer will have trouble keeping the nozzle from automatically shutting off while pumping gas. Please warn your customers not to top off their tanks.

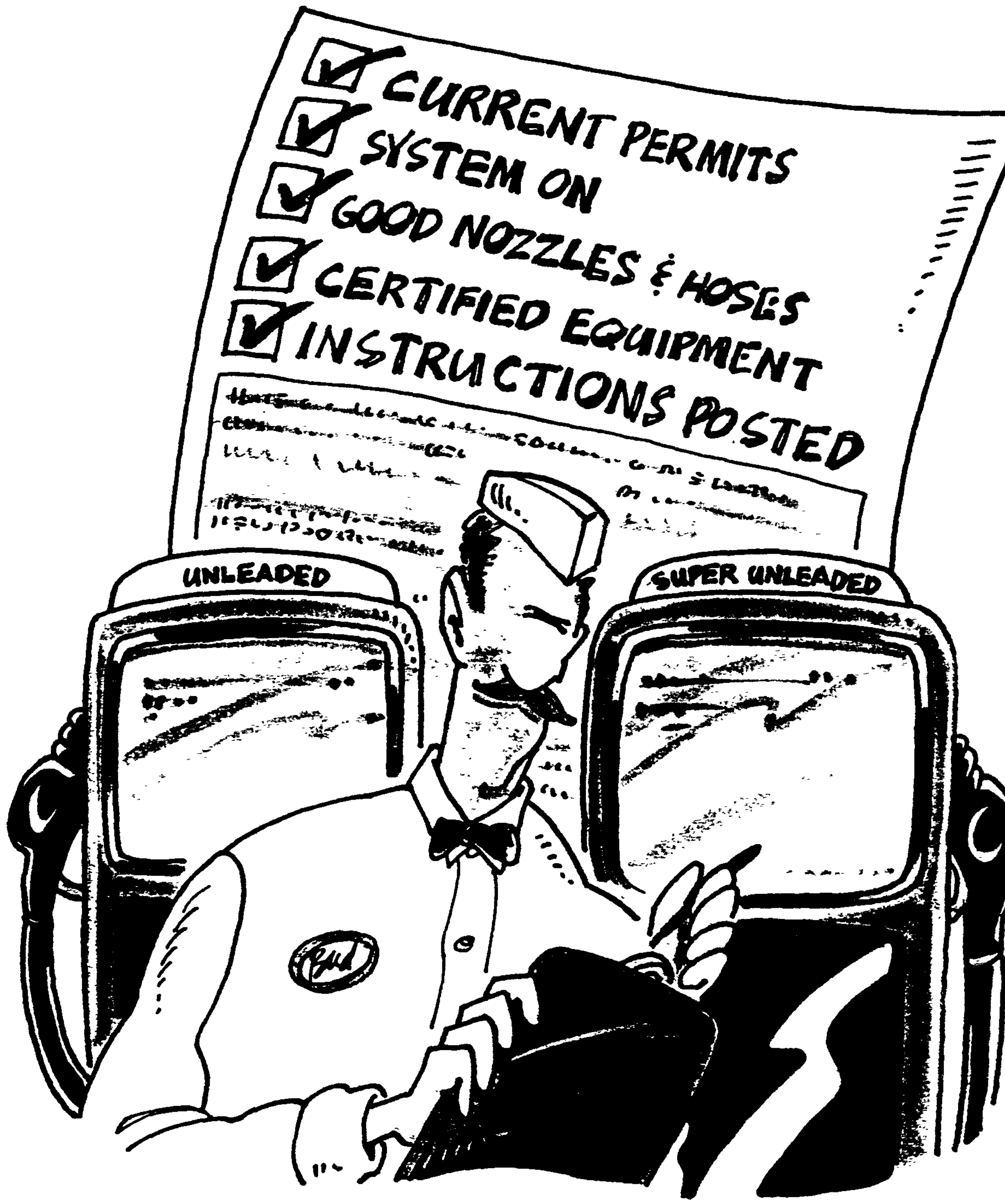
CLEARING THE VAPOR LINE...



... BY RAISING AND EXTENDING THE HOSE...

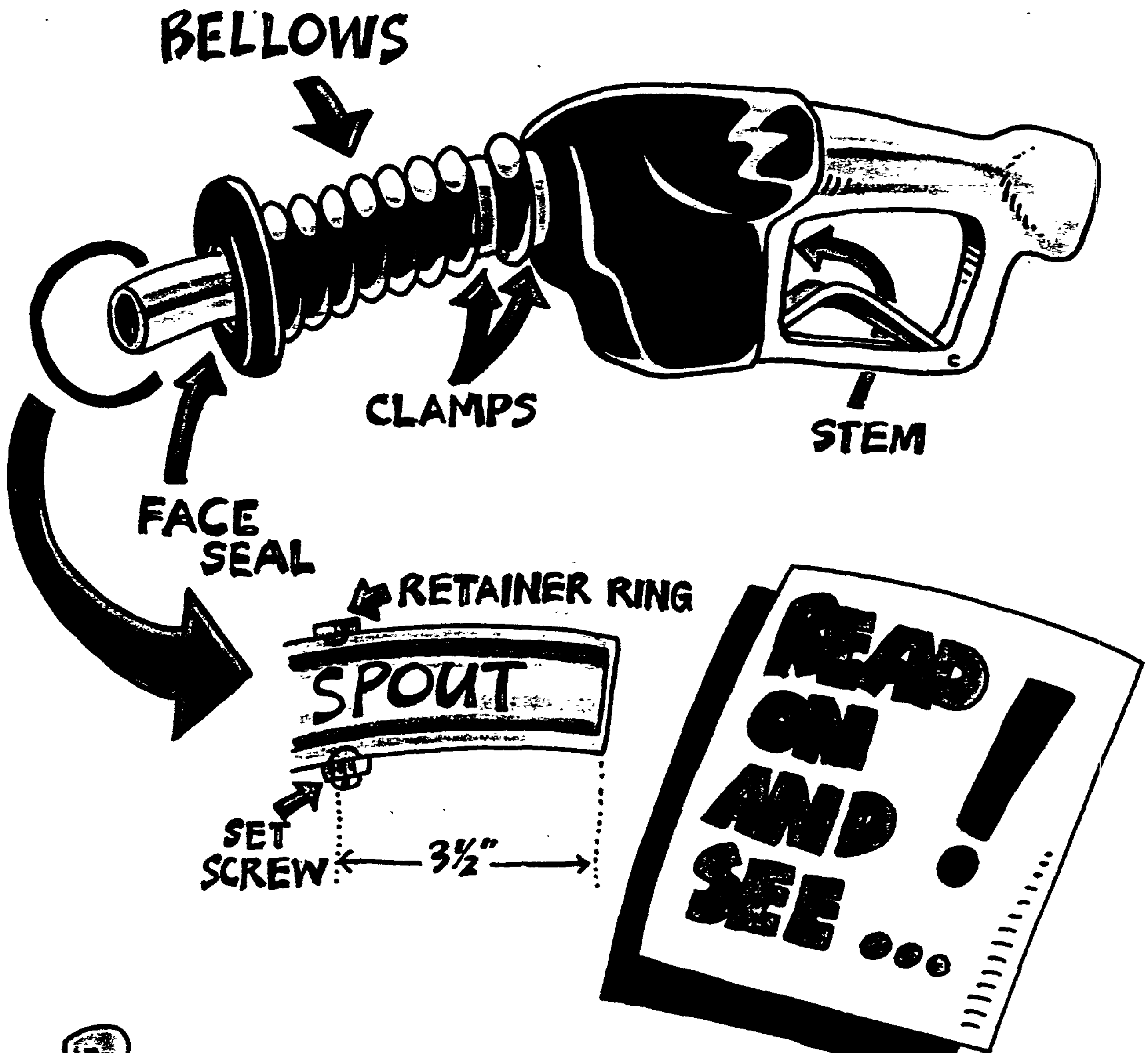
CAN LEAD TO SATISFIED CUSTOMERS!

When a nozzle continually shuts off when trying to fill an empty tank, this indicates either 1) a liquid blockage in the vapor line or, 2) a broken or improperly installed nozzle component. You can clear the line by raising and extending the hose. If the nozzle continues to shut off, contact your service representative. Remove malfunctioning nozzles until the problem is fixed.



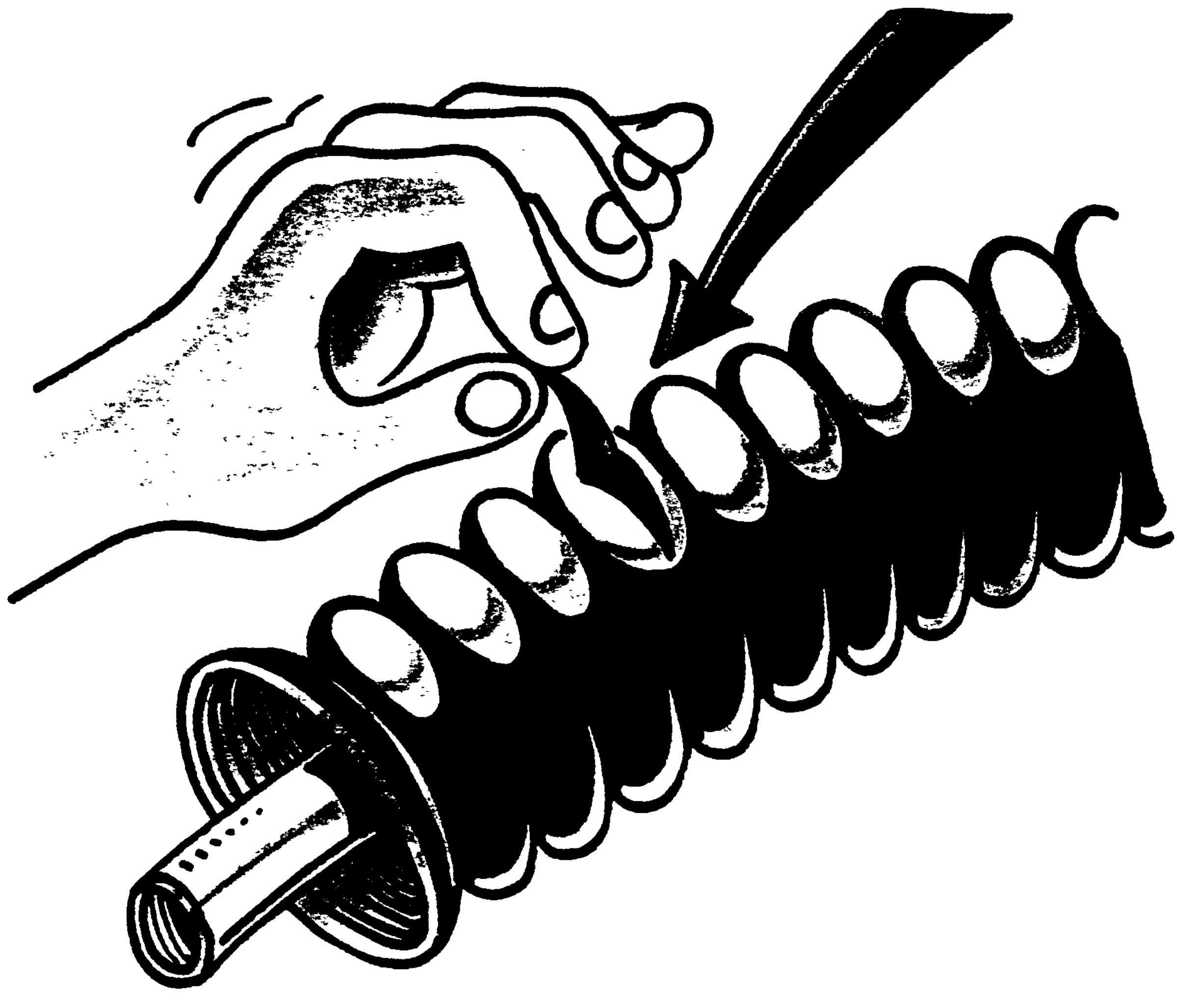
The air pollution control inspector will visit your station periodically throughout the year to conduct a complete inspection. The inspector will be checking your vapor recovery system to see if it is in good working order. This will include checking all components to see that they are certified and defect free. Also, operating instructions and a toll free air pollution control district phone number must be placed in plain view of the general public.

WHAT TO LOOK FOR...



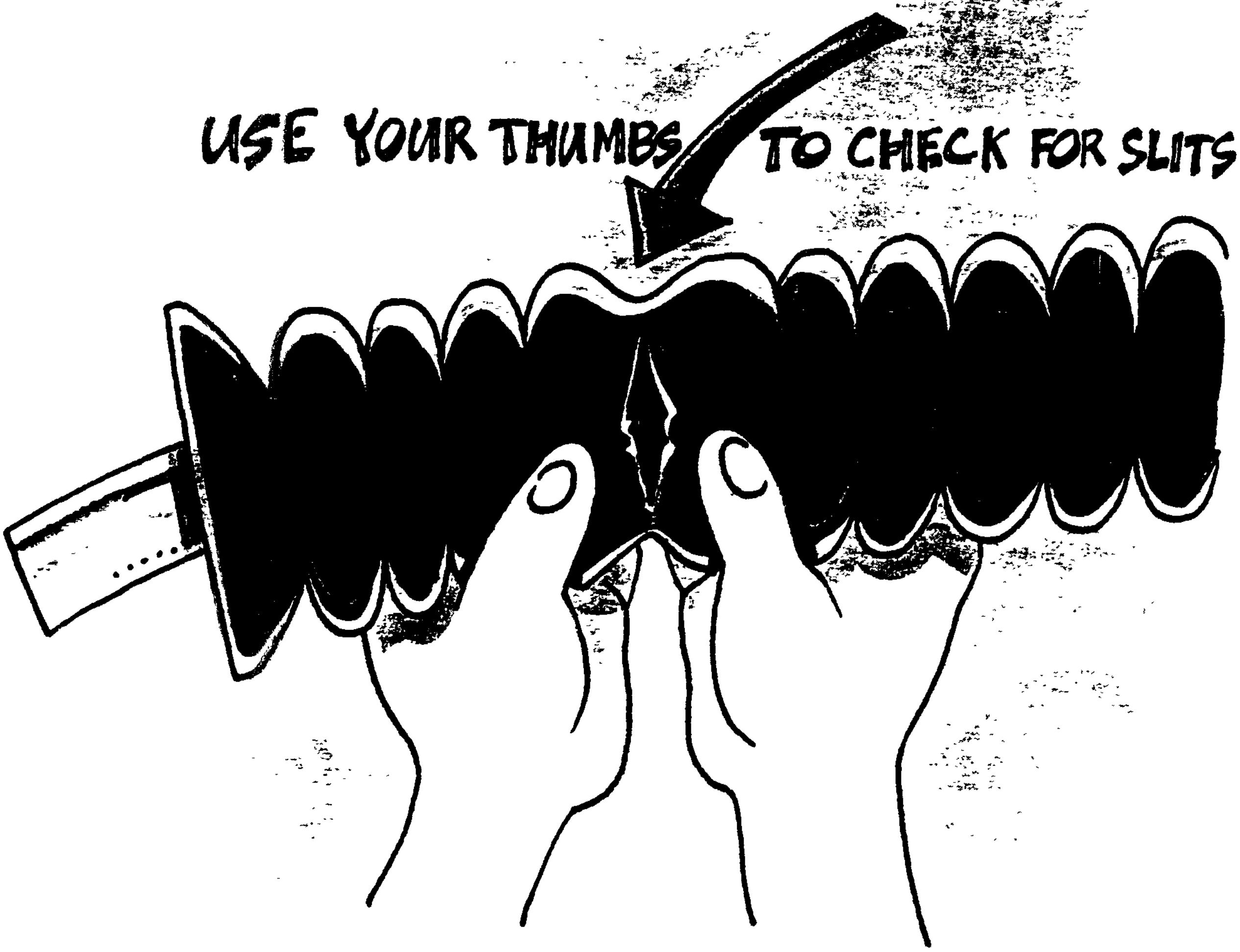
PROTECT YOURSELF!
KNOW THE LAW!

REPLACE BOOTS WHICH HAVE TRIANGULAR TEARS.



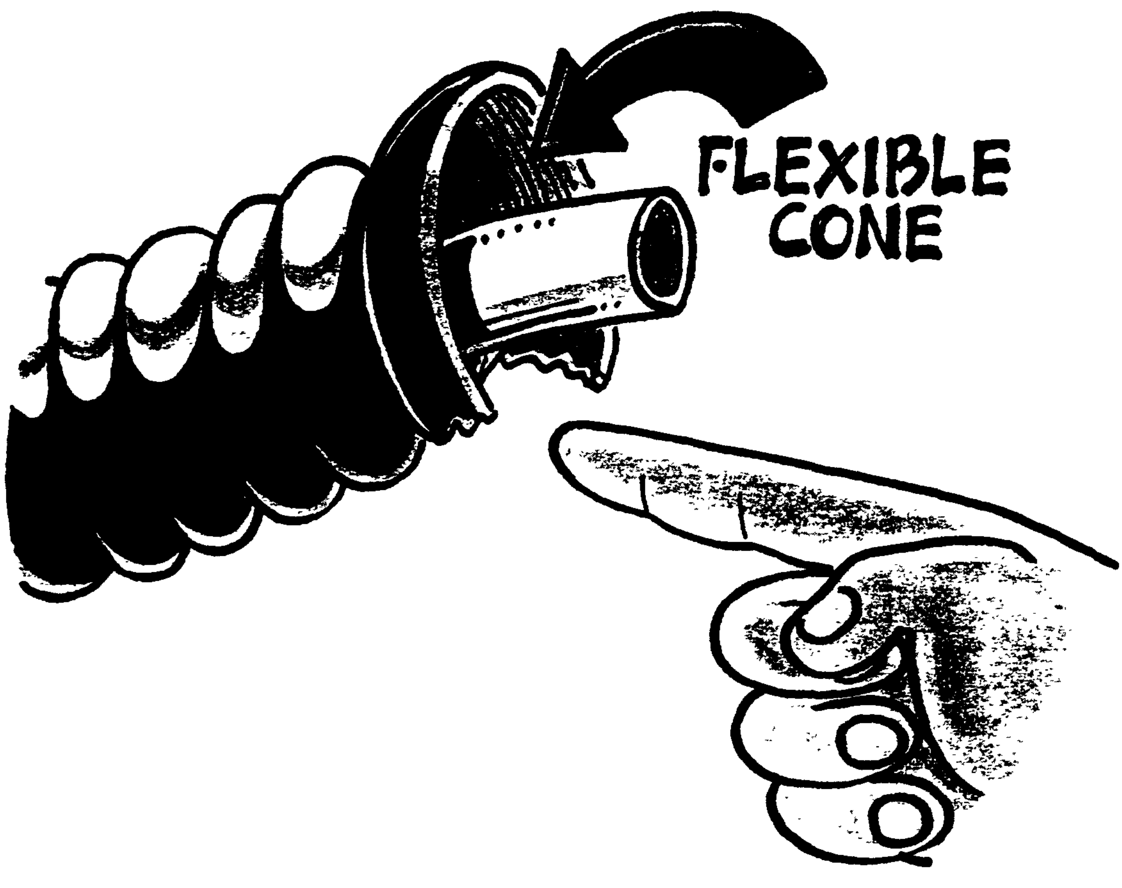
Sometimes customers catch the boot fabric on a sharp object near the gas cap. When this happens the boot fabric can tear in the shape of a triangle. Any tear larger than ½ inch on a side of the triangle tear means that the boot must be replaced or repaired. Generally, if you cover the tear with a penny and you can still see the tear, the boot needs to be fixed.

SLIT BOOTS...
SHOULD BE REPLACED



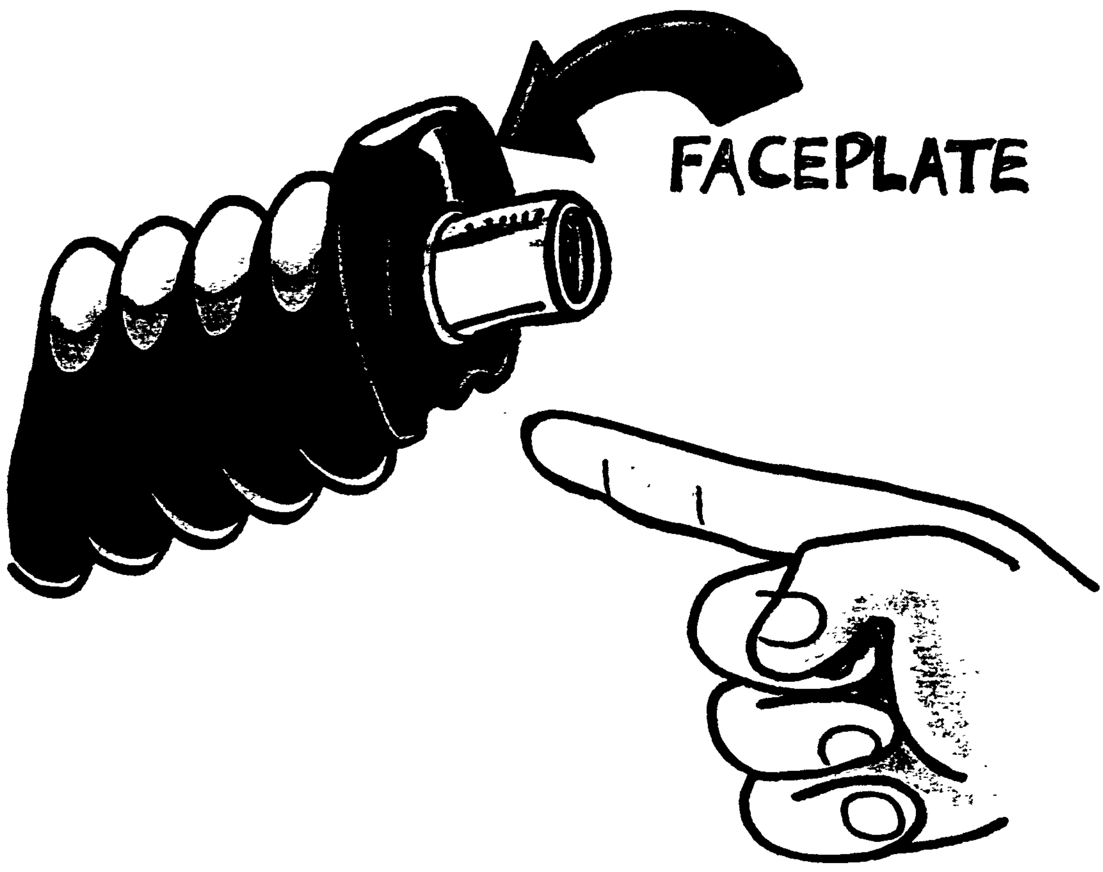
Wear and tear may cause slits to form in the depressions of the boot fabric which will cause a vapor leak. Use your thumbs to separate the ribs of the boot to check for these slits. Replace or repair all boots that have slits one inch or larger. Its a good practice to replace any torn boot.

AT LEAST...
3/4 OF THE FLEXIBLE CONE IS NEEDED

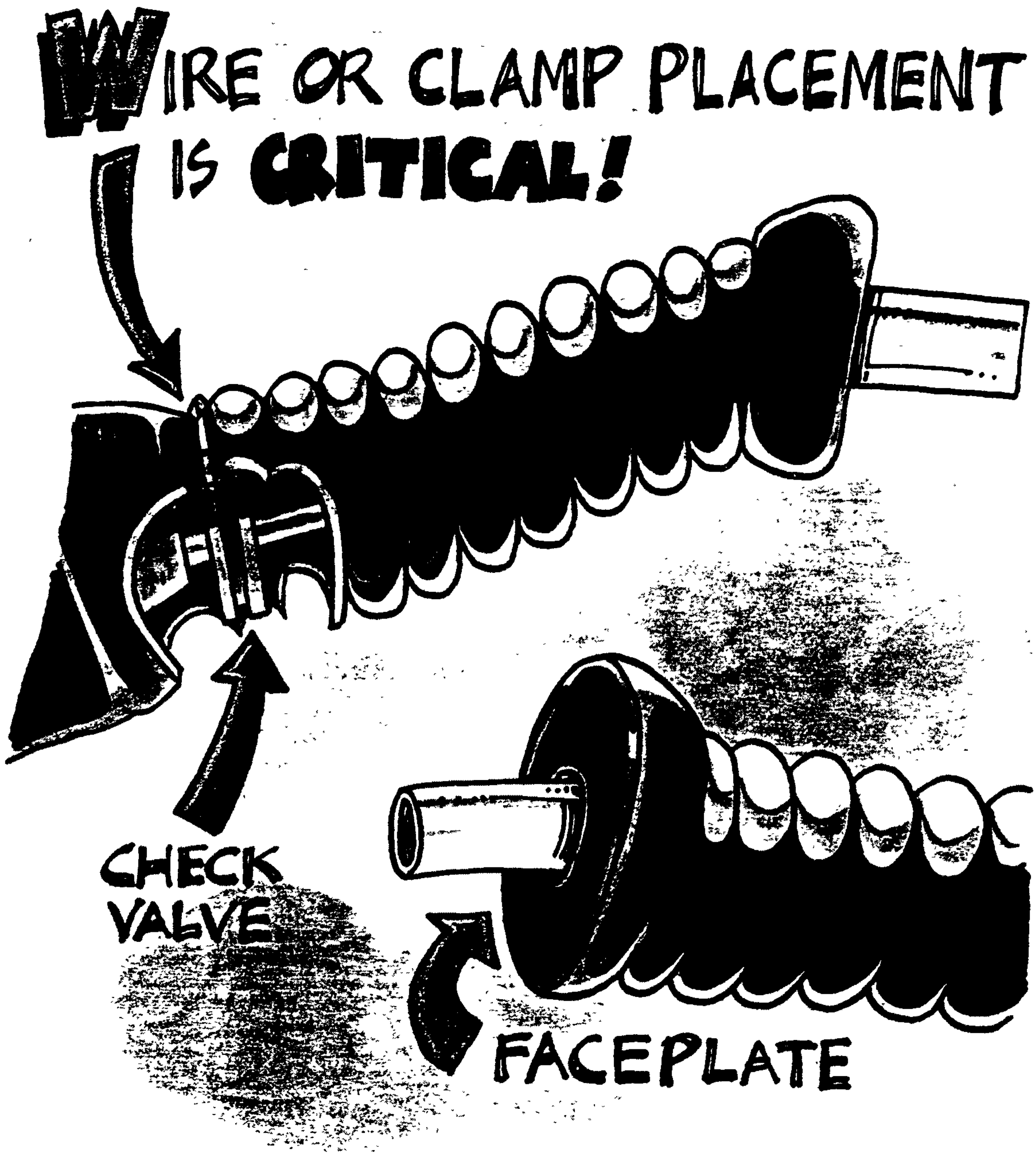


If your vapor recovery system nozzles have flexible cones (assist system), replace any damaged flexible cones. The law requires that at least ¾ of the flexible cone must be present when used to dispense gasoline. Examine each flexible cone daily to ensure that at least ¾ of the circle is intact. Remember, it's best to replace any flexible cone that is damaged or partially missing.

AT LEAST... ¾ OF THE FACEPLATE MUST MAKE A SEAL!



If your vapor recovery system nozzles have faceplates (balance system), replace any damaged or warped faceplates. The law requires that at least ¾ of the faceplate must make a good seal when used to dispense gasoline. Examine each nozzle faceplate daily to ensure that a good seal will occur and that at least ¾ of the faceplate is intact. Remember, it's best to replace any faceplate which does not provide a good seal with the automobile gas tank.



On some vapor recovery nozzles equipped with a faceplate (not a flexible cone) the wire or clamp on the upper portion of the boot attaches the boot snugly to a "check valve" inside. If the wire or clamp is too low, the valve will not open and the nozzle will click off. If the wire or clamp is too high, the valve will stay open and vapors will escape. Always make sure that the wires and clamps are placed properly.

REPLACE ANY FLATTENED, KINKED OR TORN HOSES.

Hoses that are flattened or kinked will restrict the vapor return line. When this happens the vapors cannot return to your underground tank and are therefore released into the air. Torn hoses allow the vapors to escape out of the tear. Also, hoses that are kinked, flattened or full of gasoline cause the nozzle to constantly shut off while fueling. This makes customers very unhappy. Check your hoses daily and replace any damaged lines.

REMOVE...

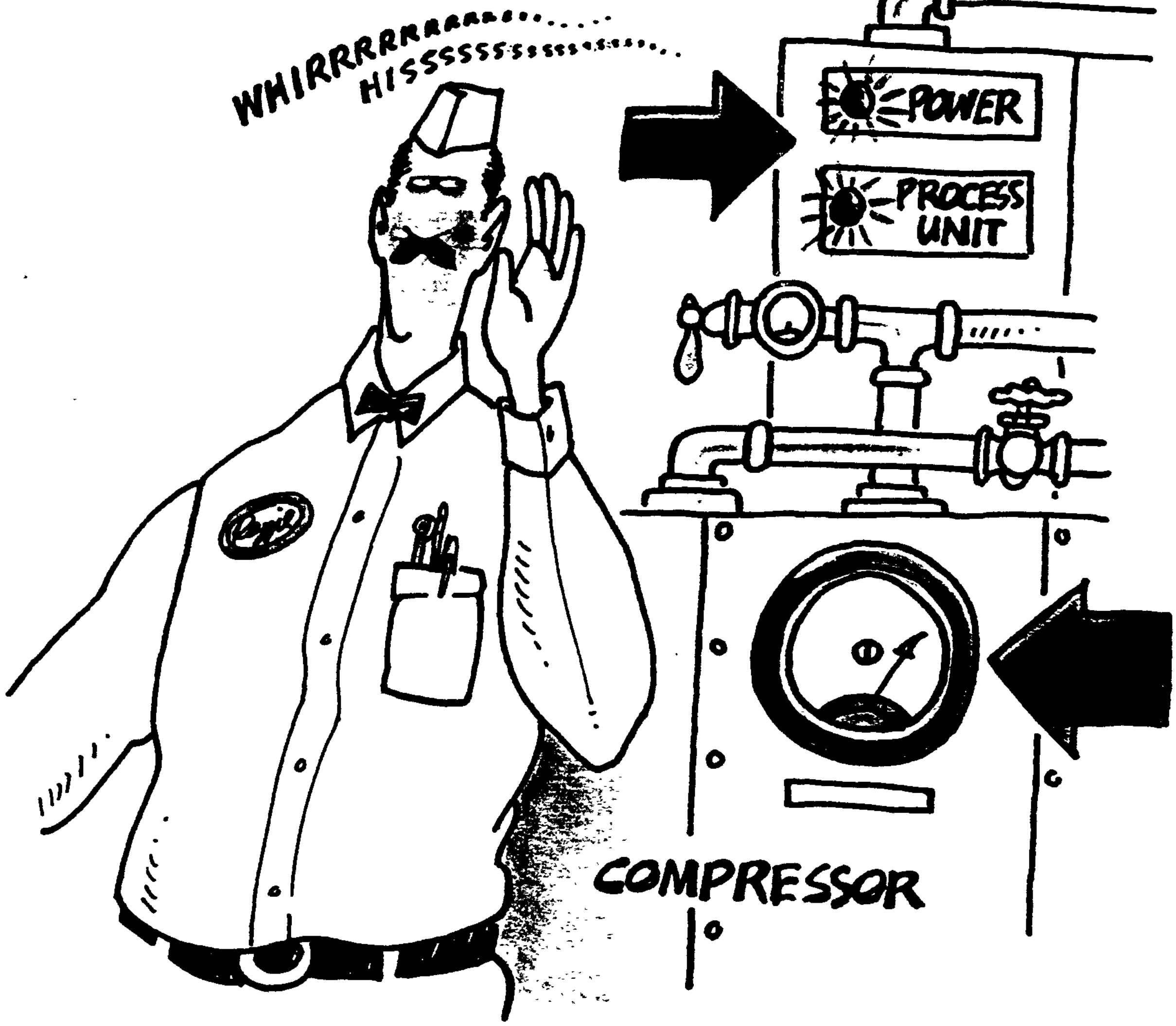
MALFUNCTIONING NOZZLES FROM SERVICE

**IF A NOZZLE FAILS TO SHUT OFF...
REMOVE IT FROM SERVICE IMMEDIATELY!**

Sometimes the interior components of the nozzle can fail. When a micro-switch is broken the nozzle will not automatically shut off. This can cause overfilling of the tank and, as with topping off, result in liquid gas blocking the vapor line. Remove these malfunctioning nozzles from service and get them repaired.

WATCH AND LISTEN TO YOUR GAUGES!

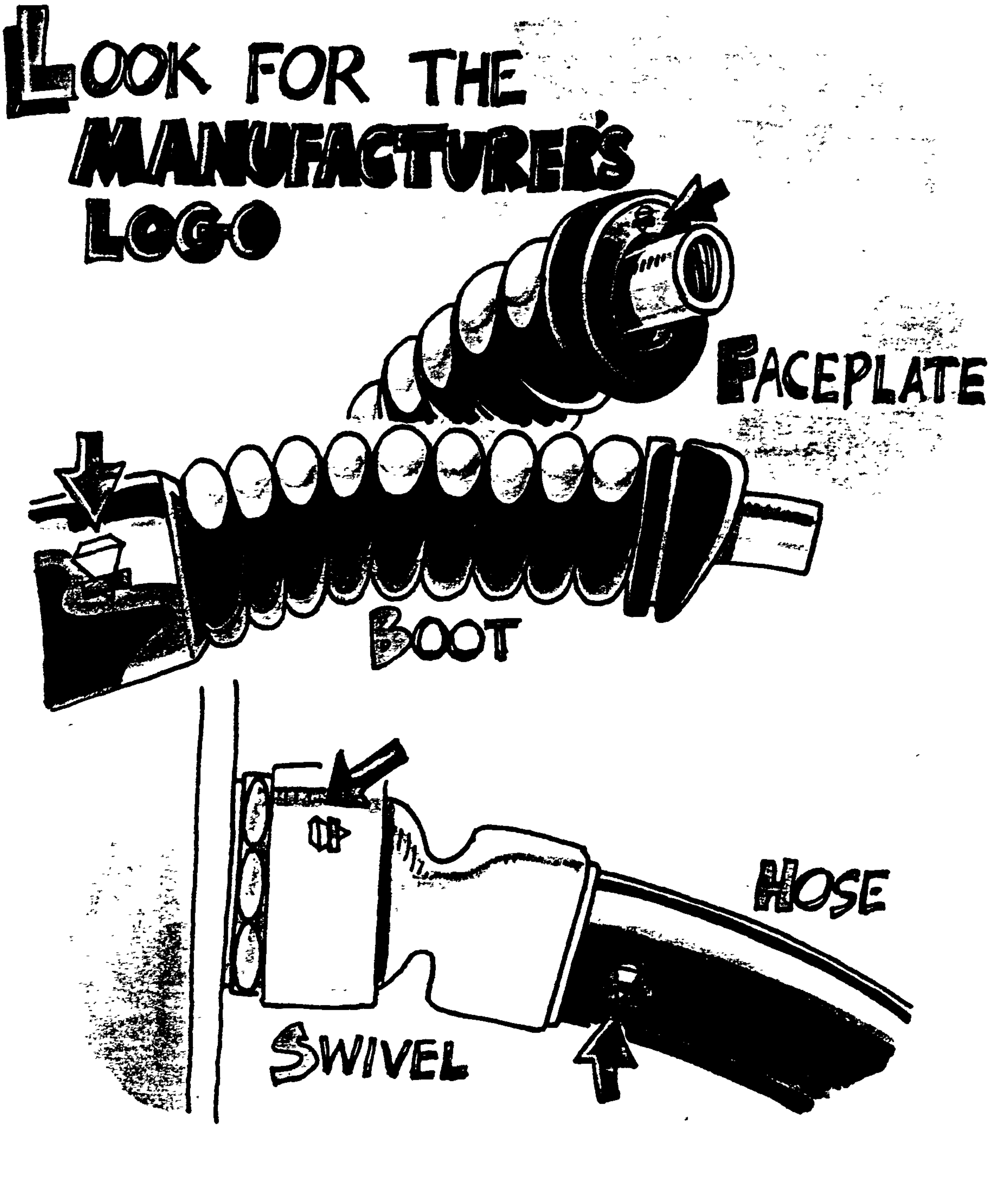
IF YOU HAVE A PROCESS UNIT MAKE SURE IT'S WORKING!



Make sure your process unit (if you have one) is operating while gas is being pumped. For Hirt, Hasstech and similar systems, both process lights on the control panel must be lit. This will indicate that the power is on to the system and that the pilot light is lit. When a customer pumps gas, you should hear a "whirring" sound and a hiss of combustion outside at the process unit. For a Hirt system, vapors are often collected using pressure from the air compressor; take the time to see that the pressure gauge is within the normal range.

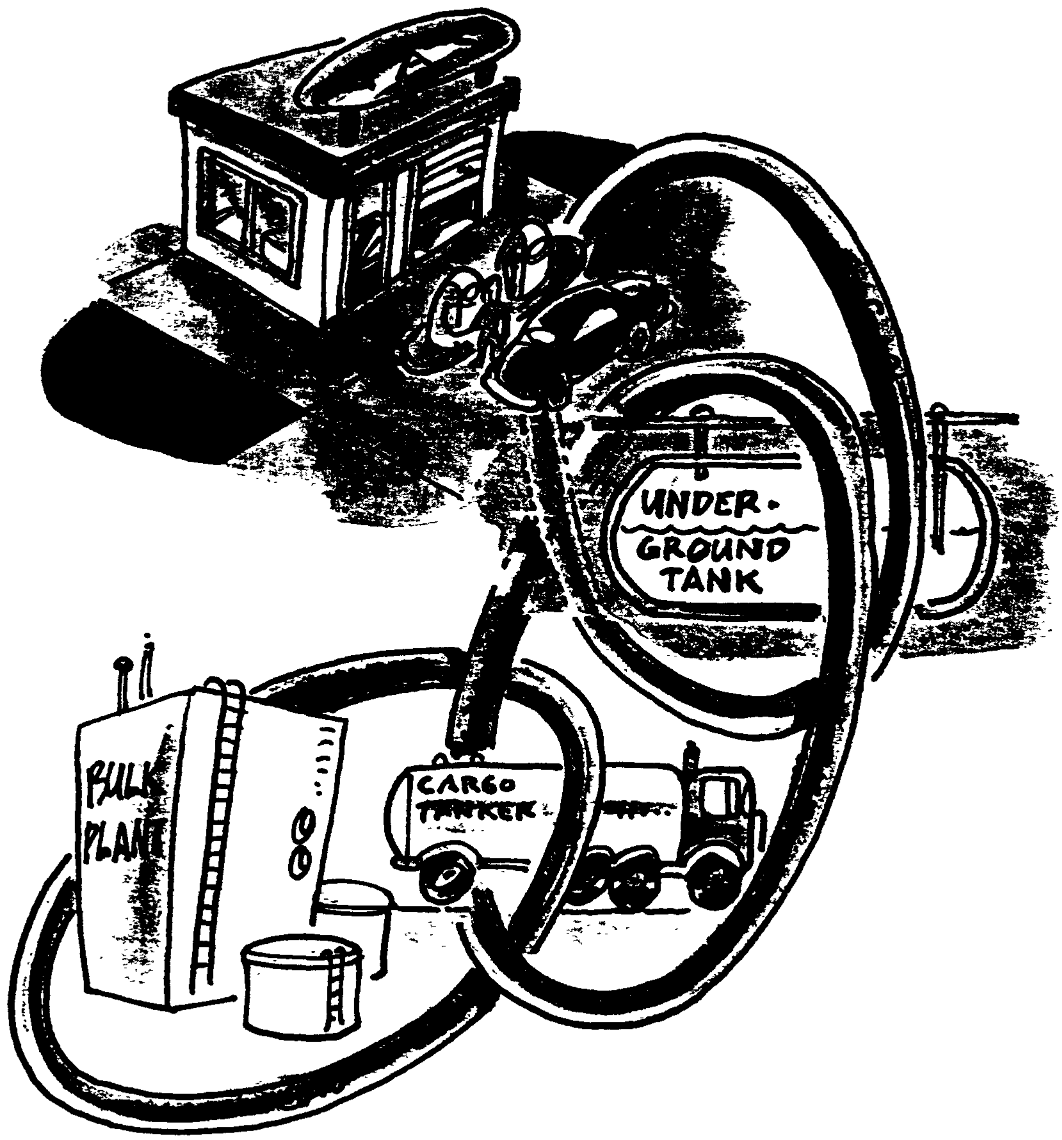
IS THE PART CERTIFIED?

Make sure your vapor recovery components are certified. If you cannot determine if a part you are using is certified for use with your system, call and find out. First, contact your company supplier. If you still aren't sure, contact your local air pollution control district at ______________________ or the Air Resources Board at 1-800-952-5588. Remember the use of uncertified components subjects you to a fine of $10,000 per day or more.



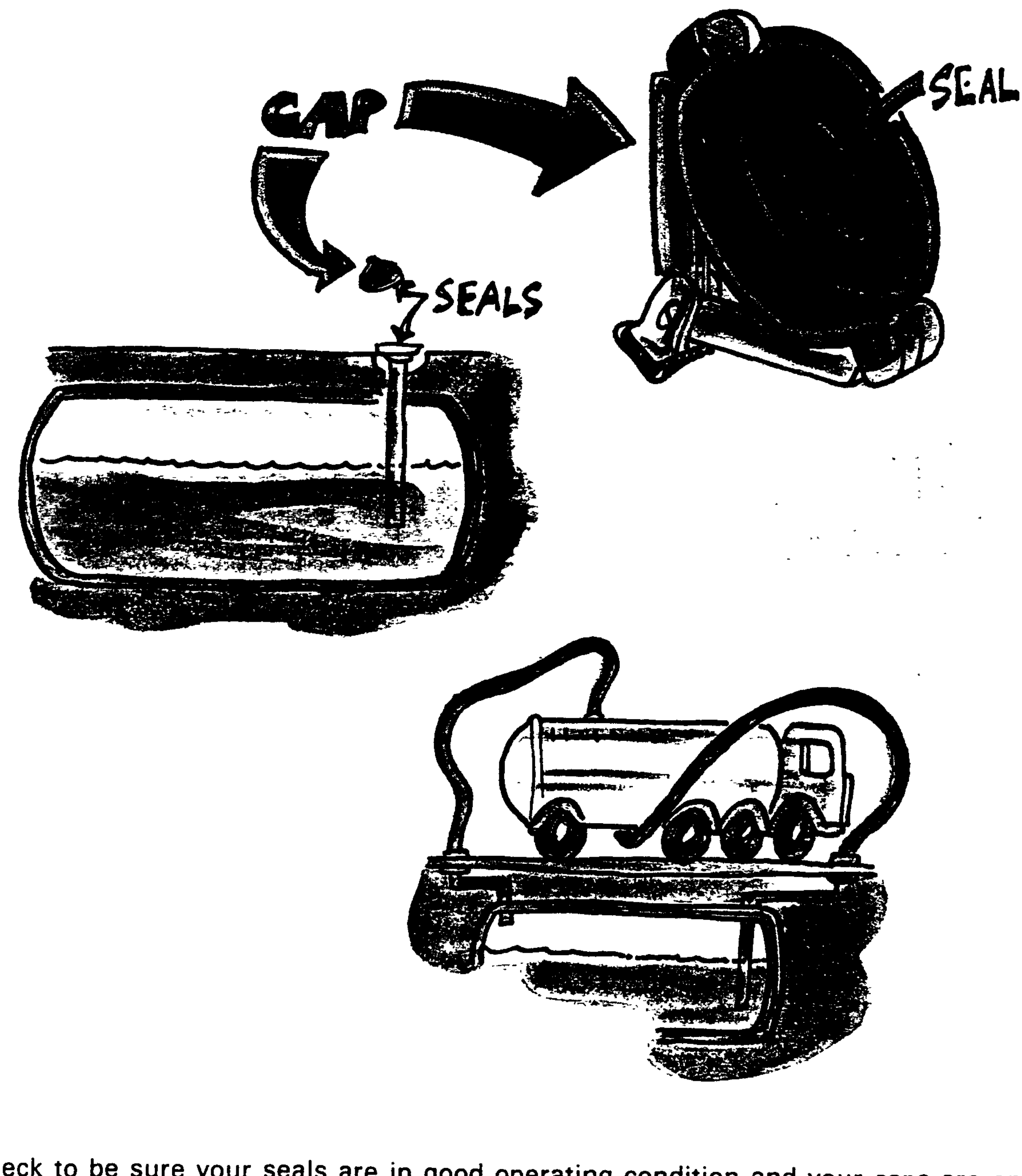
The California Air Resources Board must certify all equipment used on your vapor recovery system to ensure that the components work properly and do not cause a fire hazard. The use of equipment which has not been certified by the State is against the law and you may be subject to a large fine. It is your responsibility to make sure all of your equipment is certified. Look for the manufacturer's logo and the State Fire Marshal sticker.

DON'T BREAK THE CHAIN...



The reason your station is equipped with a vapor recovery system, is to collect vapors from your customers' gasoline tanks and return them to the refinery to be reprocessed into gasoline. This process involves your customers, you, the delivery truck which delivers your gasoline and the facilities where the delivery trucks got the gasoline. If at any location along this chain, someone fails to use the vapor recovery or forgets to keep it in good working order, these harmful vapors escape and contribute to our air pollution and toxic problems.

CHECK YOUR:
TANKS, SEALS & CAPS!

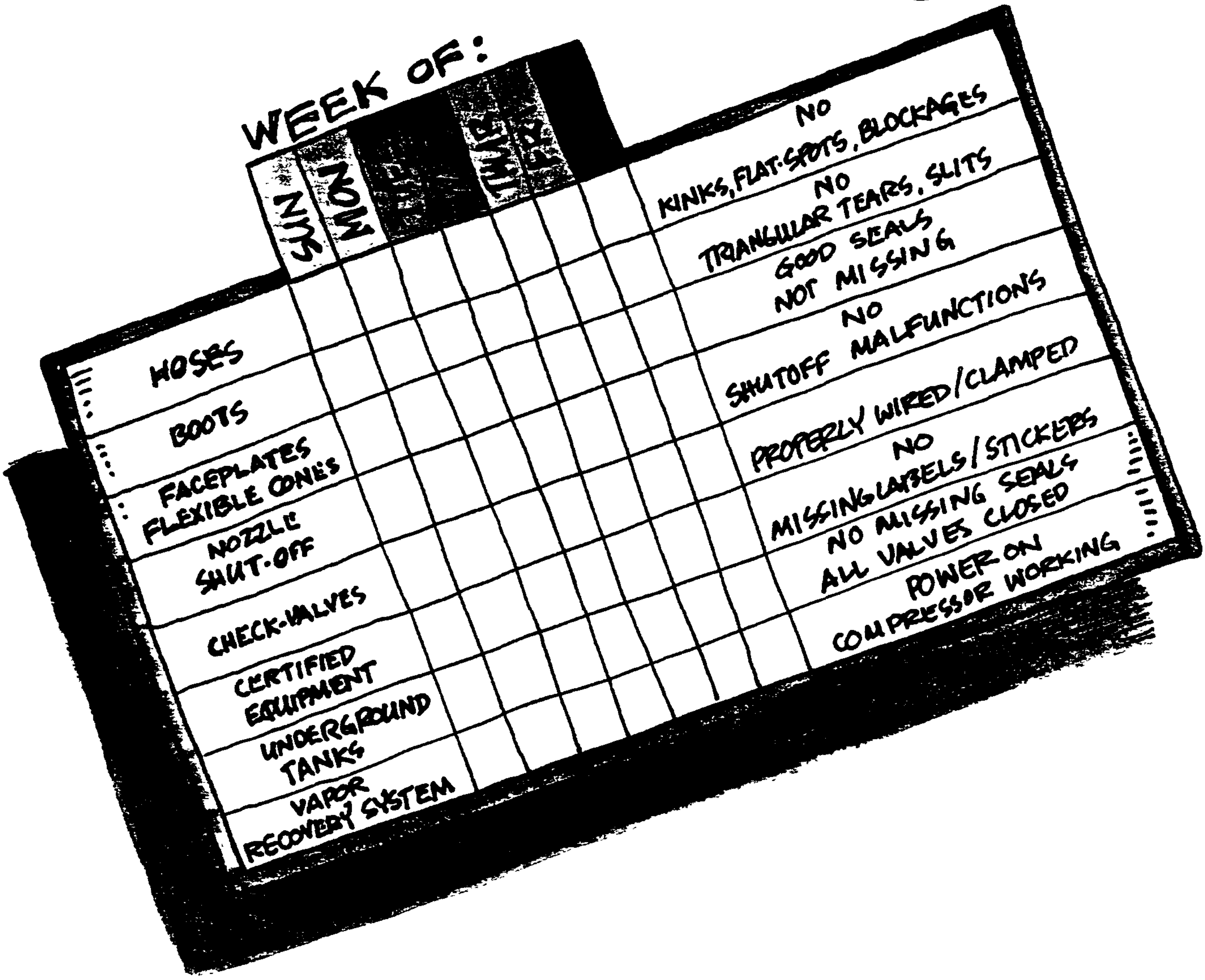


Check to be sure your seals are in good operating condition and your caps are on the underground tanks. This is especially important after a gasoline delivery is made. Also, be sure the driver of the delivery truck hooks up both the gasoline line and the vapor line.

GIVE YOUR SYSTEM THE "ONCE OVER" DAILY

Every morning when you unlock the pumps, or better yet at each shift change, give your vapor recovery system the "once over." Check each piece of vapor recovery equipment for wear and damage making sure everything is in good working condition. Identify any potential problems and take action. Replace or repair defective components immediately. Do your part to help yourself, your customers, and the environment.

SELF INSPECTION CHECKLIST



This self inspection checklist is a good way to protect yourself from large penalties and loss of business. This checklist used with your vapor recovery handbook will help you prepare for your periodic air pollution control inspection. The information contained in the handbook and checklist covers the basic requirements you need to know. For further information, you should read your air pollution control permit and ask your inspector any specific questions you may have about your specific vapor recovery system. Experience tells us that the best way to comply with air pollution regulations, is to know the law and inspect your equipment daily.

APPENDIX H
STAGE II REGULATIONS

Development of appropriate rules is necessary in order to satisfy the intent of the program and determine individual facility compliance. As with any regulation, Stage II regulations should be clearly written and specific. The rules should contain definitions; requirements for the equipment installation, operation, and maintenance; exemptions levels; compliance schedules; and testing and recordkeeping requirements. Many Stage II regulations also require that operating instructions be posted at the pumps. This appendix containes copies of current Stage II regulations. Specifically, this appendix contains the following regulations:

Section H.1	Model Benzene Phase II Rule By California Air Resources Board given to Districts
Section H.2	Bay Area Air Quality Management District
Section H.3	South Coast Air Quality Management District
Section H.4	San Diego Air Pollution Control District
Section H.5	District of Columbia
Section H.6	Missouri/St. Louis
Section H.7	New Jersey
Section H.8	New York
Section H.9	Dade County, FL
Section H.10	Massachusetts
Section H.11	Philadelphia

Section H.12 Washington State

APPENDIX H.1

CALIFORNIA AIR RESOURCES BOARD
MODEL BENZENE RULE

6. Amendment filed 2-25-87; effective thirtieth day thereafter (Register 87, No. 9).
7. Amendment filed 10-8-87; operative 11-7-87 (Register 87, No. 43).
8. Amendment filed 3-15-88; operative 4-14-88 (Register 88, No. 13).
9. Amendment filed 7-22-88; operative 8-21-88 (Register 88, No. 31).
10. Amendment adding methylene chloride filed 6-7-90; operative 7-7-90 (Register 90, No. 30).

Subchapter 7.5 Airborne Toxic Control Measures

§ 93100. Nonvehicular Airborne Toxic Control Measures.

The nonvehicular airborne toxic control measures contained in this subchapter have been adopted by the state board and shall be implemented by adoption of regulations by local air pollution control and air quality management districts pursuant to Health and Safety Code Section 39666.

NOTE: Authority cited: Sections 39600, 39601, 39650 and 39666, Health and Safety Code. Reference: Sections 39650 and 39666, Health and Safety Code.

HISTORY

1. New section filed 6-16-88; operative 7-16-88 (Register 88, No. 26).

§ 93101. Benzene Airborne Toxic Control Measure—Retail Service Stations.

(a) Definitions. For the purposes of this section, the following definitions shall apply:

(1) "ARB-certified vapor recovery system" means a vapor recovery system which has been certified by the state board pursuant to Section 41954 of the Health and Safety Code.

(2) "Excavation" means exposure to view by digging.

(3) "Gasoline" means any organic liquid (including petroleum distillates and methanol) having a Reid vapor pressure of four pounds or greater and used as a motor vehicle fuel or any fuel which is commonly or commercially known or sold as gasoline.

(4) "Motor vehicle" has the same meaning as defined in Section 415 of the Vehicle Code.

(5) "Owner or operator" means an owner or operator of a retail service station.

(6) "Phase I vapor recovery system" means a gasoline vapor recovery system which recovers vapors during the transfer of gasoline from delivery tanks into stationary storage tanks.

(7) "Phase II vapor recovery system" means a gasoline vapor recovery system which recovers vapors during the fueling of motor vehicles from stationary storage tanks.

(8) "Retail service station" means any new or existing motor vehicle fueling service station subject to payment of California sales tax on gasoline sales.

(9) "Existing retail service station" means any retail service station operating, constructed, or under construction as of the date of district adoption of regulations implementing this control measure.

(10) "New retail service station" means any retail service station which is not constructed or under construction as of the date of district adoption of regulations implementing this control measure.

(11) "Tank replacement" means replacement of one or more stationary storage tanks at an existing retail service station or excavation of 50 percent or more of an existing retail service station's total underground liquid piping from the stationary storage tanks to the gasoline dispensers.

(12) "Throughput" means the volume of gasoline dispensed at a retail service station.

(b) Phase I Vapor Recovery System Requirements.

(1) No owner or operator shall transfer, permit the transfer, or provide equipment for the transfer of gasoline, and no other person shall transfer gasoline from a gasoline delivery tank equipped with a vapor recovery system into a stationary storage tank at a retail service station unless an ARB-certified Phase I vapor recovery system is installed on the stationary storage tank and used during the transfer.

(2) The provisions of subdivision (b)(1) shall not apply to:

(A) A transfer to a stationary storage tank with a capacity of less than 1.0 cubic meter (260 gallons).

(B) A transfer to a stationary storage tank used the majority of the time for the fueling of implements of husbandry as defined in Division 16, Chapter 1, of the Vehicle Code.

(C) A transfer to a stationary storage tank used exclusively to fuel motor vehicles with a fuel capacity of five gallons or less.

(D) An existing retail service station with an annual station gasoline throughput from tanks other than those described in subdivisions (b)(2)(A), (b)(2)(B) and (b)(2)(C) of 480,000 or fewer gallons during the calendar year prior to district adoption of the measure. If during any calendar year thereafter the gasoline throughput from such tanks at the existing retail service station exceeds 480,000 gallons, this exemption shall cease to apply commencing with the first day of the following calendar year.

(E) A transfer to a stationary storage tank at an existing retail service station which receives gasoline exclusively from delivery tanks that are not required to be equipped with vapor recovery systems.

(3) Notwithstanding (b)(2)(D), at the time of tank replacement at an existing retail service station, ARB-certified Phase I vapor recovery systems shall be installed and used thereafter on all of the station facilities, except those which are exempt from the Phase I requirement by (b)(2)(A), (b)(2)(B), (b)(2)(C) or (b)(2)(E).

(c) Phase II Vapor Recovery System Requirements.

(1) No owner or operator shall transfer, permit the transfer or provide equipment for the transfer of gasoline from a stationary storage tank at a retail service station into a motor vehicle fuel tank unless an ARB-certified Phase II vapor recovery system is installed and used during the transfer.

(2) The provisions of subdivision (c)(1) shall not apply to:

(A) A transfer of gasoline from a stationary storage tank which is exempt from Phase I requirements under subdivision (b)(2)(A), (b)(2)(B), or (b)(2)(C).

(B) An existing retail service station which is exempt from Phase I requirements under subdivision (b)(2)(D).

(3) Notwithstanding (c)(2)(B), at the time of tank replacement at an existing retail service station, ARB-certified Phase II vapor recovery systems shall be installed and used thereafter on all of the station facilities, except those which are exempt from the Phase II requirement by (c)(2)(A).

(d) Correction of Defects. No owner or operator shall use or permit the use of any Phase II system or any component thereof containing a defect identified in Title 17, California Code of Regulations, Section 94006 until it has been repaired, replaced, or adjusted, as necessary to remove the defect, and, if required under Health and Safety Code Section 41960.2, district personnel have reinspected the system or have authorized its use pending reinspection. Nothing in this subdivision shall excuse compliance with subdivision (c)(1).

(e) Compliance Schedule. For purposes of this section, the following compliance schedule shall apply:

(1) The owner or operator of any new retail service station subject to this section shall comply with the provisions of this section at the time gasoline is first sold from the station.

(2) The owner or operator of any existing retail service station without ARB-certified Phase I and II vapor recovery systems shall notify the air pollution control officer in writing in advance of an intended tank replacement and shall secure all necessary permits and other approvals for the installation of Phase I and II vapor recovery systems. The owner or operator of an existing retail service station shall comply with the provisions of this section upon completion of the tank replacement.

(3) The owner or operator of an existing retail service station subject to this section, who has not earlier complied in accordance with (e)(2), shall within 15 months after district adoption of the regulations implementing this control measure secure all permits and other approvals nec-

essary for installation of the equipment required by this section. The owner or operator shall comply with the provisions of this section within 24 months after district adoption of regulations implementing this control measure.

(4) Excluding those existing retail service stations subject to this section as a result of tank replacement, the owner or operator of a previously exempt stationary storage tank or retail service station where the operation or annual throughput has changed such that the exemption from either the Phase I or II requirements or both is no longer applicable, shall comply with the section's provisions in accordance with (e)(3) above, provided that the first day the retail station or stationary storage tank is no longer exempt shall be considered as the date of district adoption of regulations implementing this control measure.

NOTE: Authority cited: Sections 39600, 39601, 39650 and 39666, Health and Safety Code. Reference: Sections 39650 and 39666, Health and Safety Code.

HISTORY

1. New section filed 6-16-88; operative 7-16-88 (Register 88, No. 26).

APPENDIX H.2

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

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)

8-7-200 DEFINITIONS

8-7-201 **CARB Certified Vapor Recovery System:** A vapor recovery system which has been certified by the California State Air Resources Board (CARB) pursuant to Section 41954 of the California Health and Safety Code.
(Adopted November 30, 1983, Amended October 17, 1990)

8-7-202 **Gasoline:** Motor fuel containing any petroleum distillate where the Reid vapor pressure of the fuel is greater than 4.0 pounds.
(Adopted November 30, 1983, Amended October 17, 1990)

8-7-203 **Leak Free:** A liquid leak of no greater than three drops per minute.
(Adopted November 30, 1983, Amended October 17, 1990)

8-7-204 **Phase I:** Gasoline vapor recovery during transfer of gasoline into stationary tanks at dispensing facilities. (Adopted November 30, 1983, Amended October 17, 1990)

8-7-205 **Phase II:** Gasoline vapor recovery during motor vehicle refueling operations from stationary tanks. (Adopted November 30, 1983)

8-7-206 **Vapor Tight:** A leak of less than 100 percent of the lower explosive limit on a combustible gas detector measured at a distance of 2.5 cm (1 inch) from the source or no visible evidence of air entrainment in the sight glasses of liquid delivery hoses or as determined by the Manual of Procedures, Volume IV, ST-30.
(Adopted 11/30/83, deleted and amended 3/4/87, Amended 10/17/90)

8-7-207 **Submerged Fill Pipe:** Any discharge pipe or nozzle which meets either of the following conditions:

207.1 Where the tank is filled from the top, the end of the discharge pipe or nozzle must be totally submerged when the liquid level is 15 cm (6 inches) from the bottom of the tank.

207.2 Where the tank is filled from the side, the discharge pipe or nozzle must be totally submerged when the liquid level is 46 centimeters (18 inches) from the bottom of the tank. (Adopted November 30, 1983)

8-7-208 **Top Off:** To attempt to dispense gasoline to a motor vehicle fuel tank after a vapor recovery dispensing nozzle has shut off automatically. The filling of those vehicle tanks which, because of the nature and configuration of the fill pipe, causes premature shut off of the dispensing nozzle, and which are filled only after the seal between the fill pipe and the nozzle is broken, shall not be considered topping off.
(Renumbered November 30, 1983)

8-7-209 **Gasoline Dispensing Facility:** Any stationary facility which dispenses gasoline directly into the fuel tanks of motor vehicles. This facility shall be treated as a single source which includes all necessary equipment for the exclusive use of the facility, such as nozzles, dispensers, pumps, vapor return lines, plumbing and storage tanks. (Adopted March 4, 1987)

8-7-300 STANDARDS

8-7-301 **Phase I Requirements:** A person subject to Phase I vapor recovery requirements shall comply with all of the following requirements:

301.1 A person shall not transfer or allow the transfer of gasoline into stationary tanks at a gasoline dispensing facility unless a CARB certified Phase I vapor recovery system is used.

301.2 All Phase I vapor recovery systems at gasoline dispensing facilities shall be installed as per CARB certifications and shall recover at least 95% of gasoline vapors. This standard shall apply to each stationary tank during each bulk gasoline delivery.

301.3 All Phase I vapor recovery systems shall be equipped with a submerged fill pipe.

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 Practives:** 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)

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)

8-7-602 Determination of Phase I Vapor Recovery Efficiency: Phase I Vapor Recovery Efficiency shall be determined as prescribed in the Manual of Procedures, Volume IV ST - 36. (Adopted October 17, 1990)

8-7-603 Determination of Applicability: To determine the applicability of this Rule, samples of gasoline shall be analyzed as prescribed in the Manual of Procedures, Volume III, Method 13. (Adopted October 17, 1990)

APPENDIX H.3

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

(Adopted Jan. 9, 1976)(Amended Sept. 3, 1976)(Amended Feb. 4, 1977)
(Amended Nov. 18, 1977)(Amended Feb. 3, 1978)(Amended Jan. 5, 1979)
(Amended May 4, 1979)(Amended Dec. 7, 1979)(Amended Jan. 16, 1981)
(Amended Oct. 15, 1982)(Amended Nov. 1, 1985)(Amended March 4, 1988)
(Amended July 7, 1989)

RULE 461. GASOLINE TRANSFER AND DISPENSING

(a) Purpose

This rule is intended to control gasoline vapor emissions from gasoline transfer and dispensing operations.

(b) Definitions

For the purpose of this rule, the following definitions shall apply:

(1) ALTERATION(S) AND/OR REPAIR(S) of a previously exempted Gasoline Storage and/or Dispensing Facility is any of the following:

(A) The replacement of one or more existing storage tank(s);

(B) The removal or addition of storage tank(s) or dispensing nozzle(s), piping or any other component.

(C) The replacement of storage tanks, dispensing nozzle(s), piping or any other component with different characteristics from those of the existing or original equipment;

(D) Any excavation (exposure to view by digging) of an existing gasoline storage tank and/or the underground liquid piping from the storage tank(s) to the gasoline dispenser(s);

(E) As determined in writing by the District, Office of Operations.

(2) "CARB CERTIFIED" VAPOR RECOVERY SYSTEM is any Phase I or Phase II vapor recovery system which has been certified by the California Air Resources Board as capable of recovering or processing displaced gasoline vapors to an efficiency of ninety-five (95) percent or greater. A CARB certified "Teed" Phase I system shall also be considered to meet this definition if it was in operation prior to July, 1983.

(3) GASOLINE STORAGE AND DISPENSING FACILITY means an aggregate of one or more stationary storage tanks, any of which is subject to the provisions of paragraphs (c), (d), or (e) of this rule, together with dispensers and control equipment required by the rule.

(4) GASOLINE VAPORS means the organic compounds in the displaced vapors, including any entrained liquid gasoline. Gasoline is a fuel which is any petroleum distillate or petroleum distillate/alcohol blend having a True Vapor Pressure greater than 200 mm Hg (3.9 psi) and less than 760 mm Hg (14.7 psi) at 100 degrees F, or as approved by CARB.

(5) LIQUID TIGHT means a liquid leak rate not exceeding three drops per minute.

(6) MOTOR VEHICLE is any self-propelled vehicle registered or which requires registration for use on the highway.

(7) REBUILT EQUIPMENT is any component of a vapor recovery system that has undergone repair or replacement of any or all of its internal parts.

(8) SUBMERGED FILL TUBE is any fill tube, the discharge opening of which is entirely submerged, when the liquid level above the bottom of the tank is:

(A) 15.2 cm (6 inches), for tanks filled from the top, except for flat bottom tanks which is 7.6 cm (3 in.), or

(B) 45.7 cm (18 inches) for tanks filled from the side.

(9) VAPOR TIGHT means the detection of less than 10,000 ppm hydrocarbon concentration, as determined by EPA reference Method 21, using an appropriate analyzer calibrated with methane at a distance of 1 cm from the source.

(c) Requirements

(1) Gasoline Transfer Into Stationary Storage Tanks (Phase I).

A person shall not transfer, permit the transfer or provide equipment for the transfer of gasoline from any tank truck, trailer or railroad tank car into any stationary storage tank with a capacity of 950 liters (251 gallons) or more unless all of the following conditions are met:

(A) Such tank is equipped with a permanent submerged fill tube or as defined by the applicable CARB certification.

(B) Such tank is equipped with a "CARB certified" vapor recovery system, which is maintained and operated according to the manufacturers specifications.

(C) All vapor return lines are connected between the tank truck, trailer or railroad tank car, and the stationary storage tank and all associated hoses, fittings, and couplings are maintained in a vapor-tight condition, as defined under subparagraph (b)(9).

(D) The hatch on any tank truck, trailer, or railroad tank car shall not be opened for more than three minutes for each visual inspection, provided that:

   (i) Transfer or pumping has been stopped for at least 3 minutes prior to opening; and

   (ii) The hatch is closed before transfer or pumping is resumed.

(E) Underground tank lines are gravity drained, and above-ground tanks are equipped with dry breaks, or as approved by the District, Office of Operations, such that upon line disconnect the liquid leak rate does not exceed 3 drops per minute.

(F) Equipment subject to this paragraph is operated and maintained, according to all of the following requirements:

   (i) All fill tubes are equipped with vapor-tight covers, including gaskets;

   (ii) All dry breaks are equipped with vapor-tight seals and dust covers;

   (iii) Fixed or Spring-Loaded coaxial fill tubes are operated so that there is no obstruction of vapor passage from the storage tank back to the tank truck, trailer, or railroad tank car;

   (iv) The fill tube assembly, including fill tube, fittings and gaskets, is maintained to prevent vapor leakage from any portion of the vapor recovery system;

   (v) All storage tank vapor return lines without dry breaks are equipped with vapor-tight covers, including gaskets.

(2) Gasoline Transfer Into Vehicle Fuel Tanks (Phase II).

A person shall not transfer, or permit the transfer, or provide equipment for the transfer of gasoline from a stationary storage tank into any motor vehicle fuel tank of greater than 19 liters (5 gallons) capacity unless all of the following conditions are met:

(A) The dispensing unit used to transfer the gasoline from the stationary storage tank to the motor vehicle fuel tank is equipped with a "CARB certified" vapor recovery system.

(B) The vapor recovery system and associated components are operated and maintained in a vapor-tight and liquid-tight manner in accordance with the manufacturer's specifications and the applicable CARB certification.

(C) Equipment subject to this rule is operated and maintained with none of the defects listed on Attachment A of this rule.

(3) Additional Requirements

(A) A person shall not offer for sale, sell, or install any new or rebuilt vapor recovery equipment unless the components and the parts are clearly identified or marked by the certified manufacturing company and/or the certified rebuilding company.

(B) For a breakdown (as defined in Rules 102 and 430) of the central vapor incineration or processing unit, the provisions of Rule 430 shall apply.

"End of Cycle" shall refer to the immediate 24 hours following the notification of the breakdown for the application of Rule 430 in subparagraph (c)(3)(B).

(C) A person shall not perform or permit the "pump-out" (bulk transfer) of gasoline from a storage tank subject to paragraph (c)(1); unless such bulk transfer is performed using a vapor collection and transfer system capable of returning the displaced vapors to the stationary storage tank or unless the storage tank will be removed or filled with water for testing.

(D) A person shall not store, or allow the storage of, gasoline in any stationary storage tank with a capacity of 950 liters (251 gallons) or more unless such tank:

(i) Complies with Rule 463(a); or

(ii) Is equipped with a Phase I vapor recovery system; and

(iii) Is operated and maintained with an integral vapor-tight drain valve to return spilled gasoline to the storage tank, if the tank is equipped with a spill container.

(E) The operator of any gasoline dispensing facility shall conspicuously post District-required signs specified on Attachment B of this rule in the immediate gasoline dispensing area.

(F) A dispenser that is never used to fuel motor vehicles shall have a sign posted on it to that effect.

(G) A dispenser and/or a storage tank shall be vented to the atmosphere in accordance with the applicable "CARB certified" requirements.

(H) Gasoline shall not be stored in open container(s) of any size or handled in any other manner (spillage, spraying, etc.) that permit gasoline or gasoline vapors to enter the atmosphere, contaminate the ground, or the sewer.

(I) The failure of an owner/operator to meet any requirements of subparagraphs (c)(1), (c)(2), or (c)(3) of this rule shall constitute a violation. Such equipment determined to be in violation shall be tagged "Out-of-Order."

(J) Except during repair activity, the "Out-of-Order" tag specified in subparagraph (c)(3)(I) shall not be removed and the tagged equipment shall not be used, permitted to be used, or provided for use unless all of the following conditions are satisfied:

(i) The tagged equipment has been repaired, replaced, or adjusted, as necessary;

(ii) The District, Office of Operations, has been notified of the repairs by completing and signing the form supplied by the District;

(iii) The tagged equipment has been reinspected and/or authorized for use by the District.

(d) Exemptions

The provisions of this rule shall not apply to the transfer of gasoline:

(1) Into or from any stationary tank if 75 percent of its monthly throughput is used for the fueling of implements of husbandry, such as vehicles defined in Division 16 (Section 36000, et seq.) of the California Vehicle Code, provided such a tank is equipped with a submerged fill tube.

(2) Into or from any stationary tank used exclusively for fueling agricultural wind machines.

e) Compliance Schedule

(1) The owner/operator of a new facility subject to this rule shall comply with the provisions of this rule at the time gasoline receiving and/or dispensing is initiated.

(2) The owner/operator of any altered and/or repaired facility, who was previously exempted from the provisions of this rule shall comply with the provisions of this rule at the time gasoline receiving and/or dispensing is initiated after completion of the alteration and/or repair.

(3) The owner/operator of any other existing facility, who was previously exempt from the provision of this rule, and who has not earlier been required to come into compliance, shall achieve compliance by March 4, 1990.

ATTACHMENT A

CALIFORNIA CODE OF REGULATIONS, SECTION 94006
SUBCHAPTER 8, CHAPTER 1, PART III OF TITLE 17

Section 94006. Defects Substantially Impairing the Effectiveness of Vapor Recovery Systems Used in Motor Vehicle Fueling Operations.

For the purposes of Section 41960.2 of the Health and Safety Code, the following constitute equipment defects in systems for the control of gasoline vapors resulting from motor vehicle fueling operations which substantially impair the effectiveness of the systems in reducing air contaminants:

(a) Absence or disconnection of any component required to be used in the Executive Order(s) that certified the system.

(b) A vapor hose which is crimped or flattened such that the vapor passage is blocked, or the pressure drop through the vapor hose exceeds by a factor of two or more the requirements in the system certified in the CARB Executive Order(s) applicable to the system.

(c) A nozzle boot which is torn in one or more of the following manner:
1. triangular-shaped or similar tear 1/2 inch or more to a side, or hole 1/2 inch or more in diameter or,
2. Slit 1 inch or more in length.

(d) Faceplate or flexible cone which is damaged in the following manner:
1. For balance nozzles and for nozzles for aspirator and educator assist type systems, damage shall be such that the capability to achieve a seal with a fill pipe interface is affected for 1/4 of the circumference of the faceplate (accumulated).
2. For nozzles for vacuum assist-type systems, more than 1/4 of the flexible cone missing.

(e) Nozzle shutoff mechanisms which malfunction in any manner.

(f) Vapor return lines, including such components as swivels, anti-recirculation valves and underground piping, which malfunction or are blocked, or restricted such that pressure drop through the lines exceeds by factor of two or more requirements specified in the Executive Order(s) that certified the system.

(g) Vapor processing unit which is inoperative.

(h) Vacuum producing device which is inoperative.

(i) Pressure/vacuum relief valves, vapor check valves, or dry breaks which are inoperative.

(j) - Any equipment defect which is identified in an Executive Order certifying a system pursuant to the Certification Procedures incorporated in Section 94001 of Title 17, California Code of Regulations, as substantially impairing the effectiveness of the system in reducing air contaminants.

All nozzles affected by the above defects are to be considered defective.

NOTE: Authority Cited: Sections 39600, 39601, 41960.2, Health and Safety Code.

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.

APPENDIX H.4

SAN DIEGO AIR POLLUTION CONTROL DISTRICT

RULE 61.4. TRANSFER OF VOLATILE ORGANIC COMPOUNDS INTO VEHICLE FUEL TANKS (Effect. 5/6/77: Rev. Effective 10/16/90)

(a) APPLICABILITY

Except as proved for in Section (b) - Exemptions, this rule is applicable to the transfer of volatile organic compounds (VOC's) into any motor vehicle tank with a capacity greater than 5 gallons (18.93 liters) at the following fuel dispensing facilities:

(1) Any retail service station, as defined in Rule 61.0 where VOC's are dispensed into motor vehicle tanks from any stationary storage tank with a capacity of 260 gallons (984 liters) or more, and

(2) Any facility that is not a retail service station where:

(i) VOC's are dispensed into motor vehicle tanks from any stationary storage tank with a capacity greater than 550 gallons (2080 liters), and

(ii) Where more than 2000 gallons (7570 liters) of VOC's are transferred into motor vehicle tanks in any calendar month on the parcel of land where the facility is located.

(b) EXEMPTIONS (Rev. Effective 10/16/90)

Except as provided in (b)(5) below, this rule does not apply to the dispensing of:

(1) VOC's into motor vehicle fuel tanks from any intermediate refueler provided VOC's are not sold directly from the intermediate refueler; or

(2) Natural gas or propane when not mixed with any other VOC; or

(3) VOC's into any vehicles performing emergency work necessary to restore property to a safe condition following a public calamity or work required to protect persons or property from imminent exposure to danger or damage.

(4) VOC's from any stationary storage tank that:

(i) Is used primarily in the fueling of aircraft and/or intermediate aircraft refuelers, or boats; or

(ii) Is used exclusively in the filling of tanks with a capacity of 5 gallons (18.93 liters) or less; or

(iii) Is located on a parcel of land on which not more than 2,000 gallons (7570 liters) are transferred into motor vehicles during any calendar month, provided that the facility is not a retail service station where:

(A) no stationary storage tank with a capacity of 260 gallons (984 liters) or more is added, installed or replaced at the facility after March 14, 1989; and

(B) no modification, replacement or repair of any underground liquid VOC piping from the stationary storage tank to the dispensers occurs at the facility after March 14, 1989; and

(iv) Is located at any retail service station in the Desert portion of San Diego County provided that:

(A) no stationary storage tank with a capacity of 260 gallons (984 liters) or more is added, installed or replaced at the facility after March 14, 1989; and

(B) no modification, replacement or repair of any underground liquid VOC piping from the stationary storage tank to the dispensers occurs at the facility after March 14, 1989; and

(C) the retail service station does not exceed a VOC throughput of 480,000 gallons (1817 kiloliters) in any calendar year after March 7, 1990; or

(v) is located in the Desert portion of San Diego County at any dispensing facility other than a retail service station; or

(vi) has a capacity of less than 260 gallons (984 liters).

(5) The exemptions of paragraph (4)(iii) and subparagraph (iv)(C) above shall not apply unless the operator maintains records to total VOC liquid throughputs on the parcel of land where the facility is located, and makes those records available to the District upon request. The throughput records shall be maintained as follows: (Rev. Effective 10/16/90)

(i) For exemptions associated with 2000 gallons/month or less, records shall be maintained for each calendar month and each monthly record shall be kept for at least two years.

(ii) For exemptions associated with 480,000 gallons/year or less, the records shall be maintained for each calendar year and each yearly record shall be kept for at least two years.

(c) **STANDARDS** (Rev. Effective 10/16/90)

Except as provided for in Section (b) of this rule, no person shall transfer or allow the transfer of VOC's into any motor vehicle fuel tank unless all the following requirements are met:

(1) The vapors displaced during the transfer, and displaced from any storage tank associated with the transfer, shall be controlled by a Phase II vapor recovery system certified by the State of California to be at least 95% effective, except for any Phase II vapor recovery system installed prior to July 1, 1976. Any system installed prior to July 1, 1976 shall prevent at least 95% of the vapors displaced during the transfer, and displaced from any storage tank associated with the transfer, from being released into the atmosphere.

If installed after July 1, 1976, the Phase II vapor recovery system and its components shall have been certified by the California Air Resources Board (ARB) prior to installation; unless the installation is granted written approval by both the ARB and the

District for the purpose of conducting field evaluations to determine the certification status of the system and/or any of its components.

(2) No person shall insert or allow the insertion of an object between any vehicle tank fill spout and any vapor recovery nozzle in order to prevent sealing at the vehicle-nozzle interface.

(3) The Phase II vapor recovery system and its components shall be installed, operated, and maintained so that their performance in actual use, as determined by the Air Pollution Control Officer, is:

(i) The same as the ARB certification test system associated with the applicable State Executive Order, if the system was installed on or after July 1, 1976, or

(ii) The same as when approval was granted for a Permit to Operate if the system was installed prior to July 1, 1976, and

(iii) The Phase II vapor recovery system and its components are operated in accordance with any instructions of the manufacturer(s) of the system and its components unless otherwise specified by the Air Pollution Control Officer.

(4) The Phase II vapor recovery system and its components shall not be altered from their certified or District approved configuration except as approved in advance by the Air Pollution Control Officer. Alterations include, but are not limited to:

(i) Piping and fitting changes, or installation of valves in the vapor piping; or

(ii) Substitutions of certified components with non-certified components and removal of certified components; and

(iii) Any other modifications that can affect the emissions.

(5) VOC dispensing equipment shall not be used if its associated Phase II system or any component thereof contains a defect that is determined by the Air Pollution Control Officer as being the same as, or having approximately the same emissions impact as, a defect identified in Title 17, California Code of Regulations, Section 94006. Any other defective Phase II system or component shall be replaced, repaired or adjusted within seven days in a manner that will bring the facility into compliance with the applicable District Rules and Regulations. In the latter case, the associated VOC dispensing equipment shall not be used if every violation is not eliminated within the seven day period. (Rev. Effective 10/16/90)

(6) On and after September 1, 1989, each VOC dispensing nozzle shall be equipped with a hold-open latch device in proper working order, except where prohibited by the local fire authority.

APPENDIX H.5

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;

(c) A fill nozzle with a built-in no-seal no-flow feature designed to prevent the discharge of gasoline from the nozzle unless the seal described in §705.5(b) is engaged;

(d) A fill nozzle with a built-in feature, designed to automatically shutoff the flow of gasoline when the pressure in the vehicular fuel tank exceeds ten (10) inches of water gauge;

(e) A vapor return hose equipped with a device that will automatically shutoff the flow of gasoline through the fill nozzle when gasoline circulates back from the fill nozzle through the vapor hose to the facility's gasoline storage tank(s);

(f) A vapor return hose no longer than nine (9) feet in length unless the hose is attached to a device designed to keep the hose out of the way of vehicles (when the nozzle is not in use) and to drain the hose of any collected or condensed gasoline; and

(g) A gasoline dispensing system equipped with a device designed to prevent the dispensing of gasoline at any rate greater than eight (8) gallons per minute.

705.6 The use by any person of a fill nozzle which is a part of the vapor balance system shall be prohibited unless the system is maintained in good repair, and unless proper operating practices, including, but not limited to, the following practices are followed:

(a) Draining the vapor return hose as often as is necessary, but at least once each operating day, of any collected or condensed gasoline;

(b) Waiting as long as is necessary, but at least three (3) seconds after the shut-off of the fuel, before disconnecting the nozzle from the fill neck, in order to balance the pressure between the vehicular fuel tank and the facility's gasoline storage tank(s);

(c) After each fuel delivery, placing the vapor return hose on an area where vehicles will not ride over the vapor return hose.

705.7 The transfer of gasoline to any vehicular fuel tank from any stationary storage tank shall be prohibited, unless the transfer is made through a fill nozzle designed to automatically shutoff the transfer of gasoline when the vehicular fuel tank is full or nearly full.

705.8 Any additional transfer of gasoline to any vehicular fuel tank from a stationary storage tank after the dispensing system has automatically shut-off the transfer of gasoline by virtue of the vehicular fuel tank being full or nearly full shall be prohibited.

705.9 The operator of a gasoline dispensing facility shall take the actions necessary to ensure that all parts of the system used at the facility for compliance with the section are maintained in good repair, and to ensure that any person, whether attendant, customer, or other, who uses the facility, does so in accordance with proper operating practices and otherwise in compliance with the requirements of §705.

705.10 For purposes of this section, "operator" means any person who leases, operates, manages, supervises, or controls, directly or indirectly, a gasoline dispensing facility.

705.11 The transfer of gasoline to any vehicular fuel tank from any stationary storage tank where a system for the control of gasoline vapors resulting from motor vehicle fueling operations is required shall be prohibited unless the operator posts conspicuously the operating instructions and warnings, in a form and with content duly promulgated by the Mayor, for the system in the gasoline dispensing area. The instructions shall as follows:

(a) Clearly describe how to fuel vehicles correctly with vapor recovery nozzles utilized at the station;

(b) Include a prominent display of the telephone number of the service station owner or operator for making complaints; and

(c) Include warnings that:

(1) Repeated attempts to continue dispensing, after the system has indicated that the vehicle fuel tank is full, may result in spillage or recirculation of gasoline; and

(2) Breathing gasoline vapors is hazardous to health.

705.12 All vapor control systems (and components thereof) for the control of gasoline vapors resulting from motor vehicle fueling operations, including, but not limited to, vapor balance systems and vacuum assist systems, shall meet the requirements for certification and shall be operated in accordance with the standards in effect on the effective date of the District of Columbia Air Pollution Control Act of 1984 as established by the State Fire Marshal for the State of California or the Division of Measurement Standards of the Department of Food and Agriculture of the State of California pursuant to §§41956-41958 of the Health and Safety Code of the State of California.

705.13 The requirements and standards, including those specified in §§705.5, 705.6, and 705.12 of this Subtitle, may be changed by the Mayor through the exercise of administrative rulemaking procedures under the District of Columbia Administrative Procedure Act, approved October 21, 1968 (82 Stat. 1204; D.C. Code, §§1-1501 et seq., with the Mayor affording appropriate consideration in said rulemaking to the following factors:

(a) What other States and governmental authorities have done; and

(b) The effect of proposed changes upon distributors and manufacturers of vapor recovery equipment and upon the owners and operators of stations subject to the Stage II vapor recovery requirements.

705.14 Alternate vapor recovery systems may be used to attain compliance with §705.1(b) in lieu of the specific requirements stated in that section, provided that:

(a) The alternate system(s) is demonstrated to have at least equivalent results in recovering emissions of volatile organic compounds as application of the requirements of that section; and

(b) The alternate system(s) is approved by the Mayor.

706 PETROLEUM DRY CLEANERS

706.1 Section 706 applies to petroleum solvent washers, dryers, solvent filters, settling tanks, vacuum stills, and other containers and conveyors of petroleum solvent that are used in petroleum solvent dry cleaning facilities.

706.2 Each owner or operator of a petroleum solvent dry cleaning dryer shall do one of the following:

(a) Limit emissions to the atmosphere to an average of three and one-half (3.5) pounds of volatile organic compounds per one hundred (100) pounds dry weight of articles dry cleaned; or

(b) Install and operate a solvent recovery dryer in a manner such that the dryer remains closed and the recovery phase continues until the final recovered solvent flow rate of fifty (50) milliliters per minute is attained.

H.5-3

APPENDIX H.6

MISSOURI/ST. LOUIS

safe and proper sampling and testing facilities, exclusive of instruments and sensing devices as may be necessary for proper determination of the emission of air contaminants.

10 CSR 10-5.210 Submission of Emission Information (Rescinded November 12, 1984)

10 CSR 10-5.220 Control of Petroleum Liquid Storage, Loading, and Transfer

(1) Applicability. This rule shall apply throughout St. Louis City and Jefferson, St. Charles, Franklin and St. Louis Counties.

(2) Definitions. Definitions of certain terms specified in this rule may be found in 10 CSR 10-6.020.

(3) Petroleum Storage Tanks

(A) No owner or operator of petroleum storage tanks shall cause or permit the storage in any stationary storage tank of more than forty thousand (40,000) gallons capacity of any petroleum liquid having a true vapor pressure of 1.5 pounds per square inch absolute or greater at ninety degrees Fahrenheit (90°F), unless the storage tank is a pressure tank capable of maintaining working pressures sufficient at all times to prevent volatile organic compound VOC vapor or gas loss to the atmosphere or is designed or will be built, and equipped with one (1) of the following vapor loss control devices:

1. A floating roof, consisting of a pontoon type, double-deck type, or internal floating cover or external floating cover, which shall rest on the surface to the liquid contents and is equipped with a closure seal(s), to close the space between the roof edge and tank wall. Storage tanks with external floating roofs shall meet the additional following requirements:

A. The storage tank has been fitted with—

(I) A continuous secondary seal extending from the floating roof to the tank wall (rim-mounted secondary seal); or

(II) A closure or other device which controls VOC emissions with an effectiveness equal to or greater than a seal required under part (3)(A)1.A.(I) of this section and approved by the director;

B. All seal closure devices meet the following requirements:

(I) There are no visible holes, tears, or other openings in the seal(s) or seal fabric;

(II) The seal(s) are intact and uniformly in place around the circumference of the floating roof between the floating roof and the tank wall; and

(III) For vapor mounted primary seals, the accumulated area of gaps exceeding 0.32 cm (1/8 in.) width between the secondary seal and the tank wall shall not exceed 21.2 cm_2 per meter of tank diameter (1.0 $in._2$ per ft. of tank diameter);

C. All openings in the external floating roof, except for automatic bleeder vents, rim space vents, and leg sleeves, are—

(I) Equipped with covers, seals, or lids in the closed position except when the openings are in actual use; and

(II) Equipped with projections into the tank which remain below the liquid surface at all times;

D. Automatic bleeder vents are closed at all times except when the roof is floated off or landed on the roof leg supports;

E. Rim vents are set to open when the roof is being floated off the leg supports or at the manufacturer's recommended setting; and

F. Emergency roof drains are provided with slotted membrane fabric covers or equivalent covers which cover at least ninety percent (90%) of the area of the opening;

2. A vapor recovery system with all tank gauging and sampling devices gas-tight except when gauging or sampling is taking place. The vapor disposal portion of the vapor recovery system shall consist of an adsorber system, condensation system, or equivalent vapor disposal system that processes the vapor and gases from the equipment being controlled; or

3. Other equipment or means of equal efficiency for purposes of air pollution control as may be approved by the director.

(B) Control equipment described in paragraph (3)(A)1. shall not be permitted if the gasoline or petroleum liquid stored has a true vapor pressure of 11.1 pounds per square inch absolute or greater at ninety degrees Fahrenheit (90°F.) All storage tank gauging and sampling devices shall be built so as to be gas tight except when gauging or sampling is to take place.

(C) Owners and operators of petroleum storage tanks subject to this section shall maintain written records of all maintenance (both routine and unscheduled) performed on the tanks, all repairs made to them, the results of all tests performed on them and the type and quantity of petroleum liquid stored in them. The records shall be maintained for two (2) years and available to the director upon request.

(D) This section shall not apply to petroleum storage tanks —

1. Where petroleum or condensate is stored, processed, and/or treated at a drilling and production installation prior to custody transfer; or

2. That contain a petroleum liquid with a true vapor pressure less than 27.6 kPa (4.0 psia) at ninety degrees Fahrenheit (90°F); and

A. Are of welded construction; and

B. Presently posses a metallic-type shoe seal, a liquid-mounted liquid fill type seal, or other closure device of demonstrated equivalence approved by the staff director; or,

3. Of welded construction, equipped with a metallic-type shoe primary seal and have a shoe-mounted secondary seal; or

4. Used to store waxy, heavy pour crude oil.

(E) Any owner or operator of a petroleum liquid storage tank who must install a secondary seal or equivalent in order to achieve compliance, shall meet the applicable increments of progress contained in the following schedule:

1. Submit final plans for the emission control system before December 15, 1980;

2. Award contrasts for the emission control system before February 1, 1981;

3. Initiate onsite construction or installation of the emission control equipment before April 15, 1981;

4. Complete onsite construction or installation of the emission control equipment before August 15, 1981; and

5. Achieve final compliance before October 1, 1981.

(4) Gasoline Loading.

(A) No owner or operator of a gasoline loading installation or delivery vessel shall cause or permit the loading of gasoline into any delivery vessel from any loading installation unless the loading installation is equipped with a vapor recovery system or its equivalent approved by the director and the delivery vessel is in compliance with subsection (7)(A) of this rule.

H.6-2

(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-

H.6-3

ery system unless such modifications have been inspected and approved by the director.

9. Compliance with this rule does not relieve the necessity for any owner or operator to comply with other applicable state, county and local ordinances, codes and requirements.

10. Section (6) shall not apply to any stationary tank used primarily for the fueling of agricultural implements or implements of husbandry. For purposes of this section, agricultural implements and implements of husbandry shall refer to vehicles exempted from licensing requirements by the Missouri Department of Revenue.

(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.*

3. The system shall not be prone to malperformance so that the purpose or requirements of this rule are defeated. The director may suspend or revoke further certification of a vapor recovery system due to repeated incidents of malperformance by that system or its components. An owner or operator subject to section (6) who has previously operated, installed, begun installation, purchased or irrevocably committed to purchase a vapor recovery system previously certified by the director shall not be considered in noncompliance with this rule if certification of that system is subsequently revoked by the director and the owner or operator's vapor recovery equipment has not been marked out of order by the director.

(7) Gasoline Delivery Vessels

(A) No owner or operator of a gasoline delivery vessel shall operate or use a gasoline delivery vessel which is loaded or unloaded at an installation subject to secation (4) or section (5) unless the delivery vessel—

1. Is annually tested to demonstrate that it will sustain a pressure change of no more than seven hundred fifty (750) pascals (3 in. of H_2O) in five (5) minutes when pressured to a gauge pressure of four thousand five hundred (4500) pascals (18 in. of H_2O) or evacuated to a gauge pressure of fifteen hundred (1500) pascals (6 in. of H_2O). Testing shall take place after April 1 and before July 1 of each year, and shall be in accordance with the test procedure specified at CSR 10-6.030 (13)(B). Upon successful completion of the leak test, the owner or operator shall obtain the completed test results signed by a representative of the testing facility. Blank forms for the test results will be provided to the testing facilities by the director. The owner or operator shall send a copy of the signed successful test results to the director. The director shall issue, upon receipt of acceptable test results, an official sticker to the owner or operator. This sticker shall be placed on the upper left portion of the back end of the vessel. An owner or operator of a gasoline delivery vessel who can demonstrate to the satisfaction of the director that the vessel has passed a current annual leak test in another state, shall be deemed to have satisfied the requirements of this paragraph, where the other state's leak test program must be subject to the same gauge pressure requirements and test procedures as specified in this paragraph;

2. Is repaired by the owner or operator and retested within fifteen (15) days of testing if it does not meet the leak test criteria of subsection (7)(A) of this rule; and

3. Owners or operators of gasoline delivery vessels shall keep records of all tests and maintenance performed on the vessels for not less than two (2) years, and these records shall be made available to the director upon request.

(B) Any owner or operator of a delivery vessel subject to this rule shall be in compliance by January 1, 1981, with the exception of the annual testing certification and recordkeeping requirements in subsection (7)(A), which shall be met by July 2, 1990

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

(8) The owner or operator of a vapor recovery system subject to this rule shall:

(A) Design and operate the vapor recovery system and the gasoline loading equipment in a manner that prevents:

1. Gauge pressure from exceeding four thousand five hundred (4,500) pascals (18 in. of H_2O) in the delivery vessel;

2. A reading equal to or greater than one hundred percent (100%) of the lower explosive limit (LEL, measured as propane) at two and one half (2.5) centimeters from all points on the perimeter of a potential leak source when measured by the method referenced in subsection (13)(E) of 10 CSR during loading or transfer operations; and

3. Visible liquid leaks during loading or transfer operations; and

(B) Within fifteen (15) days, repair and retest a vapor recovery system that exceeds the limits in subsection (8)(A) of this rule.

(C) Keep records of routine and unscheduled maintenance and repairs and of all results of tests conducted. Records shall be kept for two (2) years and shall be made available to the director upon request.

(9) The director may, at any time, monitor a delivery vessel, vapor recovery system or gasoline loading equipment by the methods referenced in subsection (10)(A) to confirm continuing compliance with sections (7) or (8) of this rule.

(10) Testing and Monitoring Procedures and Reporting

(A) Testing and monitoring procedures to determine compliance with section (7) and confirm the continuing existence of lead tight conditions shall be as described in 10 CSR 10-6.030, subsection (13)(B).

(B) Testing procedures to determine compliance with paragraph (4)(B)1. shall be as described in 10 CSR 10-6.030, subsection (13)(A).

(11) Compliance

(A) Compliance with this rule by each affected gasoline loading installation with an average monthly throughput of gasoline greater than 600,000 gallons, when averaged over the most recent calendar year, shall be achieved according to the following schedule:

1. By February 1, 1977 — submit to the director the final control plan;

2. By February 1, 1978 — initiate onsite construction or installation of control equipment; and

3. By July 1, 1978 — achieve final compliance.

(B) Compliance with this rule by each affected gasoline loading installation with an average monthly throughput equal to or greater than 120,000 and equal to or less than 600,000 gallons of gasoline, when averaged over the most recent calendar year, shall be achieved according to the following schedule

1. By September 12, 1985 — submit to the director the final control plan;
2. By March 12, 1986 — initiate on-site construction or installation of control equipment; and
3. By August 12, 1986 — achieve final compliance.

(C) Compliance with this rule by each facility affected by section (6) shall be achieved according to the following schedule:
1. By not later than October 1, 1986 submit to the director the vapor recovery system specifications and general installations details. These will include the system name, model, type, size, the contractor and schedule for installation of the system.
2. Notification of installation will be submitted no later than sixty (60) days prior to installation.
3. Achieve final compliance by December 31, 1987.

APPENDIX H.7

NEW JERSEY

sions of VOS to the outdoor atmosphere by no less than 95 percent by weight.

iii. Effective February 28, 1991, any marine delivery vessel receiving gasoline at a facility subject to the provisions of (e) 4i or ii above shall have vapor collection piping and connections which route displaced vapors to the control apparatus.

5. For facilities subject to (e)4i or ii above, by January 19, 1990, the applicant shall submit to the Department a completed application for a "Permit to Construct, Install, or Alter Control Apparatus or Equipment" pursuant to the provisions of N.J.A.C. 7:27-8. This application shall demonstrate the equipment's ability to reduce the total emissions of VOS to the outdoor atmosphere by no less than 95 percent by weight.

(f) Unless in compliance with (g), (h), (r), (s), (t), and (u) below, no person shall cause, suffer, allow, or permit the transfer of gasoline into any gasoline vapor laden vehicular fuel tank unless the transfer is made using a vapor control system that is approved by the Department and that is designed, operated, and maintained so as:

1. To prevent VOS emissions to the outdoor atmosphere by no less than 95 percent by weight at all gasoline dispensing facilities except those facilities exempted in (g) below, and

2. To prevent overfilling and spillage.

(g) The provisions of (f) above shall not apply to a gasoline dispensing facility with an average monthly throughput of 10,000 gallons (37,850 liters) or less or to any gasoline dispensing devices at a marina used exclusively for refueling of marine vehicles.

(h) Any person subject to the provisions of (f) above shall comply with the following provisions:

1. The average monthly throughput shall be based on the average of the monthly throughputs between September 1, 1986 and August 31, 1987; and

2. Documentation of the monthly throughput shall be made available upon request by the Department.

(i) No person shall cause, suffer, allow, or permit any delivery vessel having a maximum total capacity of 2,000 gallons (7,570 liters) or greater to contain gasoline unless such delivery vessel:

1. Sustains a pressure change of less than 3 inches of water (6 millimeters of mercury) in 5 minutes when pressurized to 18 inches of water (34 millimeters of mercury) and evacuated to 6 inches of water (11 millimeters of mercury), as tested at least once in every 12-month period for leaks in accordance with test procedures specified by the Department, and

2. Has a certification affixed to the vessel in a prominent location which indicates the identification number of the vessel and the date the vessel last passed the pressure and vacuum tests; and

3. Has a record of certification which shall be kept with the delivery vessel at all times and made available upon request by the Department. The record of certification shall include the test title, delivery vessel owner and address, delivery vessel identification number, testing location, date of test, testers' name and signature, and test results. The provision of this paragraph shall become operative December 31, 1986.

(j) No person shall cause, suffer, allow, or permit a transfer of gasoline subject to the provisions of (c), (d), and (e) above if the delivery vessel being loaded is under a pressure in excess of 18 inches of water (34 millimeters of mercury) gauge or the delivery vessel being unloaded is under a vacuum in excess of 6 inches of water (11 millimeters of mercury) gauge.

(k) No person shall cause, suffer, allow, or permit VOS to be emitted into the outdoor atmosphere during a transfer of gasoline, subject to the provisions of (c), (d), (e), and (f) above, from leaking components of gasoline vapor control systems or delivery vessels being loaded or unloaded if:

1. The concentration of the emissions to the outdoor atmosphere is greater than or equal to 100% of the lower explosive limit of propane when measured at a distance of 1.0 inch (2.54 centimeters) from the source, or

2. The emissions are in the liquid state.

(l) The provisions of subsection (d) of this Section shall not apply to delivery vessels used for less than one month for the purpose of holding gasoline from a storage tank during a period in which the storage tank is undergoing repair or maintenance.

(m) No person shall cause, suffer, allow or permit the transport of any VOS in a delivery vessel of 2,000 gallons (7570 liters) or greater total capacity unless such vessel is vapor-tight at all times while containing VOS except:

1. Under emergency conditions; or

2. While gauging; or

3. While venting through a vapor control system approved by the Department.

(n) The provisions of (c) above shall not apply to a storage tank during construction ballast.

(o) Any delivery vessel subject to the provisions of (i) above found in violation of (k) or (m) above shall be repaired within 15 days and shall be recertified.

(p) Any person subject to the provisions of (e)1 above and loading 4,000 gallons (15,140 liters) of gasoline or less per day shall comply with the following schedule:

1. By January 1, 1987, the applicant, pursuant to N.J.A.C. 7:27-8, shall submit a completed application for a "Permit to Construct, Install, or alter Control Apparatus or Equipment" to the Department. This application shall demonstrate compliance with the requirements of (3)1 above.

2. By May 1, 1987, construction of equipment and control apparatus in accordance with the approved "Permit to Construct, Install, or Alter Control Apparatus or Equipment" shall commence.

3. By November 1, 1987, compliance shall be achieved.

(q) Any person subject to the provisions of (e)4 above shall submit yearly documentation of the annual throughput of each gasoline loading facility to the Department by June 1 of the calendar year following the year for which the documentation is valid. The annual throughput of gasoline shall be based on the period January 1 through December 31.

(r) Any person subject to the provisions of (f) above and having an average monthly throughput of 40,000 gallons (151,400 liters) or greater shall comply with the following schedules:

1. By March 21, 1988, the applicant, pursuant to the provisions of N.J.A.C. 7:27-8, shall submit a completed application for a "Permit to Construct, Install, or Alter Control Apparatus or Equipment" to the Department which meets the requirements of (f) above;

2. By June 21, 1988, construction of equipment and control apparatus in accordance with the approved "Permit to Construct, Install, or Alter Control Apparatus or Equipment" shall commence; and

3. By December 30, 1988, compliance with (f) above shall be achieved.

(s) Any person subject to the provisions of (f) above and having an average monthly throughput of less than 40,000 gallons (151,400 liters) shall comply with the following schedules:

1. By November 1, 1988, the applicant, pursuant to the provisions of N.J.A.C. 7:27-8, shall submit a completed application for a "Permit to Construct, Install, or Alter Control Apparatus or Equipment" to the Department which meets the requirements of (f) above;

2. By March 1, 1989, construction of equipment and control apparatus in accordance with the approved "Permit to

Construct, Install or Alter Control Apparatus or Equipment" shall commence; and

3. By December 29, 1989, compliance with (f) shall be achieved.

(t) Notwithstanding the provisions of (r) above, any existing gasoline dispensing facility with an average monthly throughput of greater than 10,000 gallons replacing an underground gasoline storage tank after the operative date of this subsection shall, prior to using that tank for dispensing gasoline, install equipment meeting the requirements of (f) above.

(u) Notwithstanding the provisions of (r) above, any new gasoline dispensing facility which begins the installation of an underground gasoline storage tank after the operative date of this subsection shall install equipment meeting the requirements of (f) above prior to the use of that tank for dispensing gasoline.

APPENDIX H.8

NEW YORK

PART 230
GASOLINE DISPENSING SITES AND TRANSPORT VEHICLES

(Effective April 12, 1985; June 28, 1987; March 1, 1988)

Section 230.1 Definitions.

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

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

(1) Equivalent control. The use of alternate operational and/or equipment controls for the reduction of gasoline vapor emissions, that have been approved by the commissioner, such that the aggregate emissions of gasoline vapor from the facility do not exceed those from the application of defined reasonbly available control technology.

(2) Gasoline. Any petroleum distillate having a Reid vapor pressure of four pounds per square inch (28 kilopascals) or higher, used as a motor fuel.

H.8-2

(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 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

APPENDIX H.9

DADE COUNTY, FLORIDA

Agenda Item No. 2(d)
12-4-90

ORDINANCE NO. 90-136

ORDINANCE AMENDING SECTION 24-3 OF THE CODE OF METROPOLITAN DADE COUNTY, FLORIDA, PROVIDING DEFINITIONS; AMENDING SECTION 24-20 OF THE CODE OF METROPOLITAN DADE COUNTY, FLORIDA, REGULATING EMISSIONS OF AIR CONTAMINANTS FROM MOTOR VEHICLE REFUELING FACILITIES AND FROM FACILITIES THAT STORE PETROLEUM PRODUCTS BY REQUIRING VAPOR CONTROL SYSTEMS; REPEALING SECTION 24-25 OF THE CODE OF METROPOLITAN DADE COUNTY, FLORIDA, REGULATING GASOLINE HANDLING; AMENDING SECTION 24-35.1 OF THE CODE OF METROPOLITAN DADE COUNTY, FLORIDA, REQUIRING OPERATING PERMITS FOR LOADING FACILITIES AND VAPOR CONTROL SYSTEMS; PROVIDING SEVERABILITY, INCLUSION IN THE CODE, AND AN EFFECTIVE DATE

BE IT ORDAINED BY THE BOARD OF COUNTY COMMISSIONERS OF DADE COUNTY, FLORIDA:

Section 1. Section 24-3 of the Code of Metropolitan Dade County, Florida, is hereby amended to read as follows:[1/]

Sec. 24-3. Definitions.

* * *

( ) "Motor vehicle fuel delivery vessel" shall mean a tank truck or trailer equipped with a storage tank used for the transportation of gasoline or gasohol from sources of supply to stationary storage tanks at motor vehicle fuel service stations.

( ) "Loading facility" shall mean a gasoline, gasohol or petroleum distillates storage and distribution facility with an average daily throughput (calculated over a 30-day

---

1/ Words stricken through shall be deleted. Underscored words constitute the amendment proposed. Remaining provisions are now in effect and remain unchanged.

period) equal to or greater than 20,000 gallons of gasoline, gasohol or petroleum distillates.

( ) "Motor vehicle fuel service station" shall mean any site where gasoline or gasohol is dispensed to motor vehicle fuel tanks from underground storage tanks.

( ) "Balanced system" shall mean a gasoline or gasohol vapor recovery system that draws such vapor through a nozzle boot to an underground storage tank by means of the pressure differential created as the volume of gasoline or gasohol in the underground storage tank is reduced and the volume of gasoline or gasohol in the motor vehicle fuel tank is increased during motor vehicle refueling.

( ) "Vacuum assist system" shall mean a gasoline or gasohol vapor recovery system that uses a vacuum generating device to create a vacuum in the vapor return line from the nozzle boot to the underground storage tank during motor vehicle refueling.

Section 2. Section 24-20 of the Code of Metropolitan Dade County, Florida, is hereby amended to read as follows:

Sec. 24-20. Storage and Handling of Petroleum Products.

~~No-person-shall-place,-store-or-hold-in any-stationary-tank,-reservoir-or-other container-of-more-than-40,000-gallons capacity-any-gasoline-or-any-petroleum distillate-having-a-vapor-pressure-of-1.5 pounds-per-square-inch-absolute-or-greater under-actual-storage-conditions,-unless-such tank,-reservoir-or-other-container-is-a pressure-tank-maintaining-working-pressures sufficient-at-all-times-to-prevent hydrocarbon-vapor-or-gas-loss-to-the atmosphere,-or-is-designed-and-equipped-with one-of-the-following-vapor-loss-control devices,-properly-installed,-in-good-working order-and-in-operation:~~

(A) The provisions of this section shall apply to the owners and operators of all loading facilities, motor vehicle fuel delivery vessels and motor vehicle fuel service stations dispensing, distributing or storing gasoline, gasohol or other petroleum distillates having a Reid vapor pressure of 1.5 pounds per square inch absolute or greater under actual storage conditions. For the purpose of this section, any petroleum distillate having a Reid vapor pressure of 4.0 pounds per square inch or greater shall be included in the term "gasoline".

(B) It shall be unlawful for any person to place, store or hold in any stationary tank, reservoir or other container of more than 40,000 gallons capacity any gasoline, gasohol or any petroleum distillate unless such stationary tank, reservoir, or other container is a pressure tank maintaining working pressures sufficient at all times to prevent hydrocarbon vapor or gas loss to the atmosphere, or is designed and equipped with one of the following vapor loss control devices, properly installed, in good working order and in operation:

(1) A floating roof, consisting of a pontoon type or double-deck type roof, resting on the surface of the liquid contents and equipped with a closure seal, or seals, to close the space between the roof edge and tank wall. The control equipment provided for in this paragraph shall not be used if the gasoline, gasohol or petroleum distillate has a Reid vapor pressure of 11.0 pounds per square inch absolute or greater under actual storage conditions. All tank gauging and sampling ~~devices~~ ports shall be ~~gas~~ vapor-tight except when gauging or sampling is taking place.

(2) A vapor recovery system~~, consisting of a vapor gathering system~~ capable of collecting and processing the

hydrocarbon vapors and gases produced ~~discharged-and-a-vapor disposal-system-capable-of processing-such-hydrocarbon-vapors and-gases-so-as~~ in order to prevent their emission to the atmosphere. ~~and-with-all~~ All tank gauging and sampling ~~devices~~ ports shall be maintained in a ~~gas~~ vapor-tight condition except when gauging or sampling is taking place.

(3) Other equipment of ~~equal~~ equivalent efficiency, provided that plans for such equipment are submitted to and approved by the ~~pollution-control officer~~ director of the department of environmental resources management or his designee.

(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:

<u>(1)</u> <u>A vapor-liquid absorption system with a minimum recovery efficiency of ninety per cent (90%) by weight of all the hydrocarbon vapors and gases entering into such collection system.</u>

<u>(2)</u> <u>A variable vapor space tank, compressor, and fuel gas system of sufficient capacity to receive all hydrocarbon vapors and gases entering into such collection system or displaced from the motor vehicle fuel delivery vessel.</u>

<u>(3)</u> <u>Another system of equivalent efficiency to the vapor collection systems described in (1) and (2) above, provided that plans for such systems are submitted to and approved by the director of the department of environmental resources management or his designee.</u>

<u>(D)</u> <u>It shall be unlawful for any person to construct or operate, or to permit, cause, allow, let or suffer the construction or operation of a motor vehicle fuel service station after the effective date of this ordinance without said station being completely equipped with balanced or vacuum assist systems or equivalent systems approved by the director of the department of environmental resources management or his designee, with a minimum design efficiency of a 90% recovery rate.</u>

<u>(E)</u> <u>It shall be unlawful for any person to operate, or to permit, cause, allow, let or suffer the operation of a motor vehicle fuel service station utilizing a balanced or vacuum assist system or approved equivalent system for the control of gasoline or gasohol vapors resulting from motor vehicle fueling operations without conspicuously posting operating instructions for the system in the motor vehicle fuel dispensing area. The instructions shall clearly describe the correct method to dispense fuel to</u>

motor vehicles with the vapor recovery nozzles utilized at the station.

(F) It shall be unlawful for any person to utilize, or to permit, cause, allow, let or suffer the utilization of any vapor recovery system not operating in accordance with plans approved by the director of the department of environmental resources management or his designee.

(G) Notwithstanding the foregoing provisions of this ordinance, the following persons shall not be required to comply with the requirements of this ordinance until two (2) years from the effective date of this ordinance:

(1) Any person who is operating a motor vehicle fuel service station with all the required operating permits pursuant to Section 24-35.1 of the Code of Metropolitan Dade County, Florida on the effective date of this ordinance.

(2) Any person who has obtained, on or before the effective date of this ordinance, the written approval of the director of the department of environmental resources management or his designee for the construction of a new motor vehicle fuel service station.

Section 3. Section 24-25 of the Code of Metropolitan Dade County, Florida, is hereby repealed as follows:

Sec. 24-25. ~~Gasoline-Handling~~ Reserved.

~~No-person-shall-load-gasoline-into-any-tank truck-or-trailer-from-any-loading-facility unless-such-loading-facility-is-equipped-with a-vapor-collection-and-disposal-system-or-its equivalent,-properly-installed,-in-good working-order-and-in-operation.--When-loading is-effected-through-the-hatches-of-a-tank truck-or-trailer-with-a-loading-arm-equipped with-a-vapor-collecting-adapter,-a-pneumatic,~~

~~hydraulic-or-other-mechanical-means-shall-be provided-to-force-a-vapor-tight-seal-between the-adapter-and-the-hatch.--A-means-shall-be provided-to-prevent-liquid-gasoline-drainage from-the-loading-device-when-it-is-removed from-the-hatch-of-any-tank-truck-or-trailer, or-to-accomplish-complete-drainage-before such-removal.--When-loading-is-effected through-means-other-than-hatches,-all-loading and-vapor-lines-shall-be-equipped-with fittings-which-make-vapor-tight-connections and-which-close-automatically-when disconnected.~~

~~The-vapor-disposal-portion-of-the-system shall-consist-of-one-of-the-following:~~

~~(1)--A-vapor-liquid-absorber-system-with-a minimum-recovery-efficiency-of-ninety per-cent-(90%)-by-weight-of-all-the hydrocarbon-vapors-and-gases-entering such-disposal-system.~~

~~(2)--A-variable-vapor-space-tank,-compressor, and-fuel-gas-system-of-sufficient capacity-to-receive-all-hydrocarbon vapors-and-gases-entering-such-disposal system.~~

~~(3)--A-variable-vapor-space-tank,-compressor, and-fuel-gas-system-of-sufficient capacity-to-receive-all-hydrocarbon vapors-and-gases-displaced-from-the-tank trucks-and-trailers-being-loaded.~~

~~(4)--Other-equipment-of-equal-efficiency, provided-such-equipment-is-submitted-to and-approved-by-the-director, environmental-resources-management.~~

~~This-rule-shall-not-apply-to-the-loading-of gasoline-into-tank-trucks-and-trailers-from any-loading-facility-from-which-not-more-than 20,000-gallons-of-gasoline-are-loaded-in-any one-day.~~

~~For-the-purposes-of-this-rule,-any-petroleum distillate-having-a-Reid-vapor-pressure-of four-pounds-or-greater-shall-be-included-by the-term-"gasoline".~~

~~For the purpose of this rule, "loading facility" means any aggregation or combination of gasoline loading equipment which is both (1) possessed by one person, and (2) located so that all the gasoline loading outlets for such aggregation or combination of loading equipment can be encompassed within any circle of 300 feet in diameter.~~

Section 4. Section 24-35.1 of the Code of Metropolitan Dade County, Florida, is hereby amended to read as follows:

Sec. 24-35.1 Operating Permits.

* * *

(14) Loading facilities

(15) Balanced systems utilized by motor vehicle fuel service stations

(16) Vacuum assist systems utilized by motor vehicle fuel service stations

* * *

Section 5. If any section, subsection, sentence, clause or provision of this ordinance is held invalid, the remainder of this ordinance shall not be affected by such invalidity.

Section 6. It is the intention of the Board of County Commissioners, and it is hereby ordained that the provisions of this ordinance shall become and be made a part of the Code of Metropolitan Dade County, Florida. The sections of this ordinance may be renumbered or relettered to accomplish such intention, and the word "ordinance" may be changed to "section," "article," or other appropriate word.

<u>Section 7.</u> This ordinance shall become effective ten (10) days after the date of enactment.

PASSED AND ADOPTED:

Approved by County Attorney as
to form and legal sufficiency.

Prepared by:

APPENDIX H.10

MASSACHUSETTS

7.23: [Reserved]

7.24: U Organic Material Storage and Distribution

(1) Bulk Plants & Terminals Handling Organic Material

(a) Any person owning, leasing or controlling a stationary tank reservoir with a capacity equal to or greater than 40,000 gallons in which organic material having a true vapor pressure in the range of 1.5 to 11.0 psi at 60 degrees fahrenheit, inclusive, is placed, stored or held shall equip such stationary tank reservoir with a submerged fill pipe and one of the following emission control devices:

1. a floating roof cover consisting of a pontoon type, double deck type roof, or internal floating roof resting on the surface of the liquid contents equipped with a closure seal, or seals, to close the space between the roof edge and tank wall and, in addition, all tank gauging and sampling devices shall be gas tight except when in use, or

2. a pressure tank system maintaining a pressure at all times so as to prevent organic material loss to the atmosphere, or

3. a vapor recovery system capable of collecting the organic materials emitted from the tank and of disposing of these materials without release to the atmosphere and, in addition, all tank gauging and sampling devices shall be gas-tight except when in use, or

4. other equipment equal to or greater in efficiency than the devices listed above, and approved by the Department.

5. In addition to above requirements, if the tank is of an external floating roof design, on and after November 1, 1984, the tank shall be fitted with a continuous secondary seal extending from the floating roof to the tank wall (rim-mounted secondary seal); or a closure or other device which controls emissions with an effectiveness equal to or greater than a secondary seal and which is approved by the Department.

a. All seal closure devices shall meet the following requirements: there shall be no visible holes, tears, or other openings in the seal(s) or seal fabric; the seal(s) shall be intact and uniformly in place around the circumference of the floating roof between the floating roof and the tank wall; an for vapor mounted primary seals, the accumulated area of gaps exceeding 1/8 inch in width between secondary seal and the tank wall shall not exceed 1.0in² per foot of tank diameter.

b. The owner or operator of a petroleum liquid storage vessel with an external floating roof containing a petroleum liquid with a true vapor pressure of greater than 1.0 psi and less than 1.5 shall maintain records consistent with the requirements of 40 CFR 60.505 including but not limited to: average monthly storage temperature, type of liquid and maximum true vapor pressure for each liquid, records of monthly leak inspections, transfers made and a record of maintenance of the vapor processing system.

(b) Any person owning, leasing, or controlling a stationary tank reservoir with a capacity equal to or greater than 40,000 gallons in which organic material having a true vapor pressure greater than 11 psi at 60°F. is placed, stored, or held shall equip such a stationary tank reservoir with one of the following devices which shall attain a minimum of 90% capture of total emissions as determined by the Department:

1. a pressure tank system maintaining a pressure at all times so as to prevent organic material loss to the atmosphere, or

2. a vapor recovery system capable of collecting the organic materials without release to the atmosphere and, in addition, all tank gauging and sampling devices shall be gas-tight except when in use, or

3. other equipment equal to or greater in efficiency than the devices listed above and approved by the Department.

(c) 310 CMR 7.24(1)(a)5. does not apply to petroleum liquid storage vessels which are used to store waxy, heavy pour crude oil, or have a capacity less than 416,000 gallons and are used to store produced crude oil and condensate prior to lease custody transfer.

(d) Any person owning, leasing or controlling a loading rack with an average daily throughput (1/300 of the actual annual throughput) equal to or greater than 20,000 gallons which transfers organic material with a true vapor pressure of 1.5 psi or greater at 60°F into tank trucks, trailers, or other contrivances shall transfer by means of submerged fill and install a vapor recovery system which shall attain a minimum of 90% capture of total emissions as determined by the Department, that has been approved by the Department in writing in accordance with the provisions of 310 CMR 7.02(2). The provisions of 310 CMR 7.24(1)(d) shall not apply to the loading of motor vehicle fuel tanks.

(e) CM, MB, MV, PV, SM. On and after July 1, 1980, any person owning, leasing, or controlling a facility with an average daily throughput (1/300 of the actual annual throughput) less than 20,000 gallons which stores and transfers organic material with a true vapor pressure of 1.5 psi or greater at 60°F, into tank trucks, trailers, or other contrivances shall transfer by means of submerged fill, and shall install a system, which shall attain a minimum of 90% capture of total emissions as determined by the Department from storage and transfer operations, that has been approved by the Department in accordance with the provisions of 310 CMR 7.02(2). The provisions of this section shall not apply to (1) the loading of motor vehicle fuel tanks and (2) Dukes and Nantucket Counties.

(2) Distribution of Motor Vehicle Fuel

(a) Any person owning, leasing or controlling a stationary tank having a capacity greater than 250 gallons but less than 40,000 gallons into which motor vehicle fuel with a true vapor pressure of greater than 1.5 psi at 60°F is transferred from tank truck, trailer or other contrivances shall be equipped with a system for submerged fill.

(b) CM, MB, MV, PV, SM. On or after July 1, 1980 no person shall cause, suffer, allow or permit the transfer of motor vehicle fuel having a true vapor pressure equal to or greater than 1.5 psi at 60°F from any delivery vessel to a fuel handling facility having a stationary tank capacity equal to or greater than 2000 gallons unless the displaced vapors are processed by a system that prevents release to the atmosphere of no less than 90 percent by weight of organic materials in said vapors. The provisions of 310 CMR 7.24(2) shall not apply to:

1. stationary tanks having a capacity less than 550 gallons equipped with submerged fill lines, used exclusively for the fueling of implements of husbandry.

2. stationary tanks equipped with floating roof or their equivalent.

(c) On or after April 1, 1993, no person shall cause suffer allow or permit the transfer of motor vehicle fuel having a true vapor pressure of greater than 1.5 psi at 60°F from any delivery vessel to a fuel handling facility having a total stationary tank capacity equal to or greater than 2000 gallons unless the displaced vapors are processed by a system which prevents the release to the atmosphere of no less than 90 percent by weight of organic materials in said vapors. The provisions of 310 CMR 7.24(2) shall not apply to:

a. stationary tanks having a capacity of less than 550 gallons equipped with submerged fill lines, used exclusively for the fueling of implements of husbandry.

b. stationary tanks equipped with floating roofs or their equivalent.

(3) Motor Vehicle Fuel Tank Trucks.

(a) On and after July 1, 1985, no person owning, leasing or controlling a tank truck that carries motor vehicle fuel with a true vapor pressure of greater than 1.5 psi at 60°F and receives the fuel from a facility subject to 310 CMR 7.24(1)(d) or (e) or delivers the fuel to a facility subject to the requirements of 310 CMR 7.24(2)(b) shall allow the tank truck to be loaded or unloaded unless the tank truck:

1. is tested annually during the months of January through June;

2. sustains a pressure change of no more than 3 in. of H_2O in five minutes when pressurized to a gauge pressure of 18 in. of H_2O or when evacuated to a guage pressure of 6 in. of H_2O during the testing;

3. is repaired by the owner or operator and retested within 15 days of testing if it does not meet the criteria of 310 CMR 7.24(3)(a)2.;

4. displays a marking in two inch high letters near the Department of Transportation Certification plate required by 49 CFR 178.340-10b, which

a. shows the initials "DEP" and the date the tank truck last passed the test ("DEP date"); and

b. shall expire July 1 of the year following the test.

(b) The owner or operator of a vapor recovery system or tank truck subject to 310 CMR 7.24(1)(d), 7.24(1)(e), 7.24(2)(b) or 7.24(3)(a) shall design and operate the vapor recovery system and the loading equipment in a manner that prevents:

1. gauge pressure from exceeding 18 in. of H_2O and vacuum from exceeding 6 in. of H_2O in the tank truck;

2. a reading equal to or greater than 100 percent of the lower explosive limit (LEL, measured as propane) at one inch from all points of the perimeter of a potential leak source during loading or unloading operations at the loading rack or stationary tank;

3. avoidable visible liquid leaks during loading at the loading rack or unloading at the stationary tank.

(c) The owner or operator of a tank truck subject to 310 CMR 7.24(3) must:

1. notify the Department in writing of the date and location of a certification test at least two days before the anticipated test date; and

2. within 15 days, repair and retest a vapor recovery system or tank truck that exceeds the limits in 310 CMR 7.24(3)(a) or (b).

(d) The Department may, at any time, measure emissions or back pressure from a tank truck, or vapor recovery system to determine compliance with the requirements of 310 CMR 7.24(3)(a) or (b).

(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 throughout, 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-

H.10-4

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.

APPENDIX H.11

PHILADELPHIA

Section V. ORGANIC MATERIAL LOADING

A. No person shall load any organic material having a Reid vapor pressure of 4.0 pounds or greater into any tank truck, tank car, or trailer from any loading facility from which 20,000 gallons or more of such organic material are loaded in any one day from this facility unless this facility is equipped with a vapor recovery system properly installed, well maintained, in operation, and approved by the Department. Such a vapor recovery system shall be capable of collecting the organic materials emitted from the filling operation and disposing of these emissions so as to prevent their release to the atmosphere. All loading connections in the system shall be equipped with fittings which shall be vapor tight and will automatically and immediately close upon disconnection so as to prevent organic material emissions from these fittings. This Section shall not apply to the loading of fuel tanks of motor vehicles as defined by the Pennsylvania Department of Transportation.

B. No person shall load or permit the loading of any organic material having a Reid vapor pressure of 4.0 pounds or greater from any tank truck, tank car, or trailer into any stationary storage container with a capacity of 250 gallons or more unless such container is equipped with a permanent submerged fill pipe and unless the organic vapors displaced during the filling of the stationary storage container are controlled by a system that prevents release to the atmosphere, at the transfer location, of at least 90 percent by weight of the displaced organic vapors. Such installations shall be made in accordance with applicable provisions of Title 5 of the Philadelphia Code. All vapor line and liquid-fill line connections and fittings shall be vapor tight and positive closure devices shall be employed to prevent vapors from being emitted at ground level.

In addition to the above requirements, if the vapor control system incorporates vapor return to the delivery vessel, the following provisions shall apply:

1. The vapor return system shall consist of a vapor tight return line from the storage container to the delivery vessel and a system to ensure that the vapor return line is connected between the delivery vessel and storage container before material can be transferred to the storage container.

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

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.

Section XXIV. EFFECTIVE DATE

Except as otherwise provided, these Regulations shall become effective upon adoption. The owner of any source of emission, in existence or under construction at the time of adoption, shall notify the Department within six months from the effective date, by an approved compliance schedule filed, of his intent to discontinue any operations or activities which cause any emissions that result in an emission in violation of these Regulations or to control such emission to the extent required by these Regulations, or that the emission is in compliance. Within a period of eighteen months from the effective date, compliance shall be obtained at all sources of emission within the scope of this Regulation.

APPENDIX H.12

WASHINGTON STATE

Effective Date of Rule: Thirty-one days after filing.

July 2, 1991
Fred Olson
Deputy Director

Chapter 173-491 WAC
EMISSION STANDARDS AND CONTROLS FOR SOURCES EMITTING GASOLINE VAPORS

NEW SECTION

WAC 173-491-010 POLICY AND PURPOSE. (1) It is the policy of the department of ecology (ecology) under the authority vested in it by chapters 43.21A and 70.94 RCW to provide for the systematic control of air pollution from air contaminant sources and for the proper development of the state's natural resources.

(2) It is the purpose of this chapter to establish standards for the control of air contaminants emitted from gasoline marketing sources.

NEW SECTION

WAC 173-491-015 APPLICABILITY. This chapter shall apply to gasoline marketing operations, including the storage, transport, and transfer of gasoline, including the transfer from storage tanks into transport tanks, and from storage tanks into motor vehicles. The requirements of this chapter supersede any less restrictive requirements of chapter 173-490 WAC, Emission standards and controls for sources emitting volatile organic compounds (VOC).

NEW SECTION

WAC 173-491-020 DEFINITIONS. The definitions of terms contained in chapter 173-400 WAC are by this reference incorporated into this chapter. Unless a different meaning is clearly required by context, the following words and phrases, as used in this chapter, shall have the following meanings:

(1) "Bottom loading" means the filling of a tank through a line entering the bottom of the tank.

(2) "Bulk gasoline plant" means a gasoline storage and transfer facility that receives more than ninety percent of its annual gasoline throughput by transport tank, and reloads gasoline into transport tanks.

(3) "Certified vapor recovery system" means a vapor recovery system which has been certified by the department of ecology. Only Stage II vapor recovery systems with a single coaxial hose can be certified. The department may certify vapor recovery systems certified by the California Air Resources Board as of the effective date of the regulation.

(4) "Gasoline" means a petroleum distillate which is a liquid at standard conditions and has a true vapor pressure greater than four pounds per square inch absolute at twenty degrees C, and is used as a fuel for internal combustion engines. Also any liquid sold as a vehicle fuel with a true vapor pressure greater than four pounds per square inch absolute at twenty degrees C shall be considered "gasoline" for purpose of this regulation.

(5) "Gasoline dispensing facility" means any site dispensing gasoline into motor vehicle fuel tanks from stationary storage tanks.

(6) "Gasoline loading terminal" means a gasoline transfer facility that receives more than ten percent of its annual gasoline throughput solely or in combination by pipeline, ship or barge, and loads gasoline into transport tanks.

(7) "Leak free" means a liquid leak of less than four drops per minute.

(8) "Stage I" means gasoline vapor recovery during all gasoline marketing transfer operations except motor vehicle refueling.

(9) "Stage II" means gasoline vapor recovery during motor vehicle refueling operations from stationary tanks.

(10) "Submerged fill line" means any discharge pipe or nozzle which meets either of the following conditions:

- where the tank is filled from the top, the end of the discharge pipe or nozzle must be totally submerged when the liquid level is six inches from the bottom of the tank, or:
- where the tank is filled from the side, the discharge pipe or nozzle must be totally submerged when the liquid level is eighteen inches from the bottom of the tank.

(11) "Submerged loading" means the filling of a tank with a submerged fill line.

(12) "Suitable cover" means a door, hatch, cover, lid, pipe cap, pipe blind, valve, or similar device that prevents the accidental spilling or emitting of gasoline. Pressure relief valves, aspirator vents, or other devices specifically required for safety and fire protection are not included.

(13) "Throughput" means the amount of material passing through a facility.

(14) "Top off" means to attempt to dispense gasoline to a motor vehicle fuel tank after a vapor recovery dispensing nozzle has shut off automatically.

(15) "Transport tank" means a container used for shipping gasoline over roadways.

(16) "True vapor pressure" means the equilibrium partial pressure of a petroleum liquid as determined by methods described in American Petroleum Institute Bulletin 2517, 1980.

(17) "Upgraded" means the modification of a gasoline storage tank or piping to add cathodic protection, tank lining or spill and overfill protection that involved removal of ground or ground cover above a portion of the product piping.

(18) "Vapor balance system" means a system consisting of the transport tank, gasoline vapor transfer lines, storage tank, and all tank vents designed to route displaced gasoline vapors from a tank being filled with liquid gasoline.

(19) "Vapor collection system" means a closed system to conduct vapors displaced from a tank being filled into the tank being emptied, a vapor holding tank, or a vapor control system.

(20) "Vapor control system" means a system designed and operated to reduce or limit the emission of gasoline vapors emission into the ambient air.

(21) "Vapor-mounted seal" means a primary seal mounted so there is an annular vapor space underneath

the seal. The annular vapor space is bounded by the bottom of the primary seal, the tank wall, the liquid surface, and the floating roof.

(22) "Vapor tight" means a leak of less than one hundred percent of the lower explosive limit on a combustible gas detector measured at a distance of one inch from the source or no visible evidence of air entrainment in the sight glasses of liquid delivery hoses.

(23) "Western Washington counties" means the following counties: Clallam, Clark, Cowlitz, Grays Harbor, Island, Jefferson, King, Kitsap, Lewis, Mason, Pacific, Pierce, San Juan, Skagit, Skamania, Snohomish, Thurston, Wahkiakum, and Whatcom.

NEW SECTION

WAC 173-491-030 REGISTRATION. (1) The owner or operator of a gasoline loading terminal, bulk gasoline plant, or gasoline dispensing facility subject to the provisions of WAC 173-491-040 (2) through (5) shall register annually the facility with ecology or local air authority. Annual registration shall be made by the owner or operator on a form provided by ecology or local air authority within sixty days of receipt of the form. Such registration form shall require information relevant to determining whether the facility is in compliance with the requirements of this chapter and be accompanied by the following fee: Gasoline loading terminals five hundred dollars, bulk gasoline plants two hundred dollars, gasoline dispensing facilities one hundred dollars, or a greater amount duly adopted by a local air pollution authority. The amount of the fees collected shall only be used to administer the registration program for facilities subject to this chapter.

(2) Administration of the registration program shall include:

(a) Initial registration and annual or other periodic reports from the source owner providing information directly related to air pollution registration.

(b) On-site inspections necessary to verify compliance with registration requirements.

(c) Data storage and retrieval systems necessary for support of the registration program.

(d) Emission inventory reports and emission reduction credits computed from information provided by sources pursuant to registration.

(e) Staff review, including engineering analysis for accuracy and currentness, of information provided by sources pursuant to registration program requirements.

(f) Clerical and other office support provided in direct furtherance of the registration program.

(g) Administrative support provided in directly carrying out the registration program.

(3) Ecology or local air authority will provide a written verification of registration to owners or operators of facilities subject to the provisions of WAC 173-491-040 (2) through (5). Such verification shall be available for inspection by ecology or local air authority personnel during normal business hours.

(4) The owner or operator of a gasoline loading terminal or a gasoline dispensing facility shall maintain total annual gasoline throughput records for the most recent two calendar years. Such records shall be available for inspection by ecology or local air authority personnel during normal business hours.

NEW SECTION

WAC 173-491-040 GASOLINE VAPOR CONTROL REQUIREMENTS. (1) Fixed-roof gasoline storage tanks.

(a) All fixed-roof gasoline storage tanks having a nominal capacity greater than forty thousand gallons shall comply with one of the following:

(i) Meet the equipment specifications and maintenance requirements of the federal standards of performance for new stationary sources - Storage Vessels for Petroleum Liquids (40 CFR 60, subpart K).

(ii) Be retrofitted with a floating roof or internal floating cover using a metallic seal or a nonmetallic resilient seal at least meeting the equipment specifications of the federal standards referred to in (a)(i) of this subsection or its equivalent.

(iii) Be fitted with a floating roof or internal floating cover meeting the manufacturer's equipment specifications in effect when it was installed.

(b) All seals used in (a)(ii) and (iii) of this subsection are to be maintained in good operating condition and the seal fabric shall contain no visible holes, tears, or other openings.

(c) All openings not related to safety are to be sealed with suitable closures.

(d) Tanks used for the storage of gasoline in bulk gasoline plants and equipped with vapor balance systems as required in subsection (3)(b) of this section shall be exempt from the requirements of subsection (1) of this section.

(2) Gasoline loading terminals.

(a) This chapter shall apply to all gasoline loading terminals with an average annual gasoline throughput greater than 7.2 million gallons according to the schedule of compliance in WAC 173-491-050.

(b) Loading facilities. Facilities for the purpose of loading gasoline into any transport tank shall be equipped with a vapor control system (VCS) as described in (c) of this subsection and comply with the following conditions:

(i) The loading facility shall employ submerged or bottom loading for all transport tanks.

(ii) The VCS shall be connected during the entire loading of all transport tanks.

(iii) The loading of all transport tanks shall be performed such that the transfer is at all times vapor tight. Emissions from pressure relief valves shall not be included in the controlled emissions when the back pressure in the VRS collection lines is lower than the relief pressure setting of the transport tank's relief valves.

(iv) All loading lines and vapor lines shall be equipped to close automatically when disconnected. The point of closure shall be on the tank side of any hose or intermediate connecting line.

(c) Vapor control system (VCS). The VCS shall be designed and built according to accepted industrial practices and meet the following conditions:

(i) The VCS shall not allow organic vapors emitted to the ambient air to exceed thirty-five milligrams per liter (three hundred twenty-two milligrams per gallon) of gasoline loaded.

(ii) The VCS shall be equipped with a device to monitor the system while the VCS is in operation.

(iii) The back pressure in the VCS collection lines shall not exceed the transport tank's pressure relief settings.

(3) Bulk gasoline plants.

(a) This section shall apply to all bulk gasoline plants with an average annual gasoline throughput greater than 7.2 million gallons according to the schedule of compliance in WAC 173-491-050.

(b) Deliveries to bulk gasoline plant storage tanks.

(i) The owner or operator of a bulk gasoline plant shall not permit the loading of gasoline into a storage tank equipped with vapor balance fittings unless the vapor balance system is attached to the transport tank and operated properly. The vapor balance system shall prevent at least ninety percent of the displaced gasoline vapors from entering the ambient air. A vapor balance system that is designed, built, and operated according to accepted industrial practices will satisfy this requirement.

(ii) Storage tank requirements. All storage tanks with a nominal capacity greater than five hundred fifty gallons and used for the storage of gasoline shall comply with the following conditions:

(A) Each storage tank shall be equipped with a submerged fill line.

(B) Each storage tank shall be equipped for vapor balancing of gasoline vapors with transport tanks during gasoline transfer operations.

(C) The vapor line fittings on the storage tank side of break points with the transport tank vapor connection pipe or hose shall be equipped to close automatically when disconnected.

(D) The pressure relief valves on storage tanks shall be set at the highest possible pressure consistent with local and state codes for fire and safety but in no case greater than ninety percent of the tank's safe working pressure.

(iii) Transport tank requirements. All transport tanks transferring gasoline to storage tanks in a bulk gasoline plant shall comply with the following conditions:

(A) The transport tank shall be equipped with the proper attachment fittings to make vapor tight connections for vapor balancing with storage tanks.

(B) The vapor line fittings on the transport tank side of break points with the storage tank connection pipe or hose shall be equipped to close automatically when disconnected.

(C) The pressure relief valves on transport tanks shall be set at the highest possible pressure consistent with local and state codes for fire and safety.

(c) Gasoline transfer operations.

(i) No owner or operator of a bulk gasoline plant or transport tank shall allow the transfer of gasoline between a stationary storage tank and a transport tank except when the following conditions exist:

(A) The transport tanks are being submerged filled or bottom loaded.

(B) The loading of all transport tanks, except those exempted under (c)(ii) of this subsection are being performed using a vapor balance system.

(C) The transport tanks are equipped to balance vapors and maintained in a leak tight condition in accordance with subsection (6) of this section.

(D) The vapor return lines are connected between the transport tank and the stationary storage tank and the vapor balance system is operated properly.

(ii) Transport tanks used for gasoline and meeting all of the following conditions shall be exempt from the requirement to be equipped with any attachment fitting for vapor balance lines if:

(A) The transport tank is used exclusively for the delivery of gasoline into storage tanks of a facility exempt from the vapor balance requirements of subsection (4) of this section; and

(B) The transport tank has a total nominal capacity less than four thousand gallons and is constructed so that it would require the installation of four or more separate vapor balance fittings.

(4) Gasoline dispensing facilities (Stage I).

(a) This section shall apply to the delivery of gasoline to gasoline dispensing facilities with an annual gasoline throughput greater than three hundred sixty thousand gallons in accordance with the schedule of compliance in WAC 173-491-050 and all new gasoline dispensing facilities with a total gasoline nominal storage capacity greater than ten thousand gallons.

(b) All gasoline storage tanks of the facilities defined in (a) of this subsection shall be equipped with submerged or bottom fill lines and fittings to vapor balance gasoline vapors with the delivery transport tank.

(c) Gasoline storage tanks with offset fill lines shall be exempt from the requirement of (b) of this subsection if installed prior to January 1, 1979.

(d) The owner or operator of a gasoline dispensing facility shall not permit the loading of gasoline into a storage tank equipped with vapor balance fittings unless the vapor balance system is attached to the transport tank and operated satisfactorily.

(5) Gasoline dispensing facilities (Stage II).

(a) This section shall apply to the refueling of motor vehicles from stationary tanks at all gasoline dispensing facilities located in western Washington counties with an annual gasoline throughput greater than eight hundred forty thousand gallons with the exception of Clark, King, Pierce, and Snohomish counties where this section shall apply to gasoline dispensing facilities with an annual gasoline throughput greater than six hundred thousand gallons in accordance with the schedule of compliance in WAC 173-491-050 and all new gasoline dispensing facilities with greater than ten thousand gallons gasoline nominal storage capacity in western Washington counties.

(b) All gasoline dispensing facilities subject to this section shall be equipped with a certified Stage II vapor recovery system.

(c) The owner or operator of a gasoline dispensing facility subject to this section shall not transfer or allow the transfer of gasoline from stationary tanks into motor vehicle fuel tanks unless a certified Stage II vapor recovery system is used.

(d) All Stage II vapor recovery equipment shall be installed in accordance with the system's certification requirements and shall be maintained to be leak free, vapor tight, and in good working order.

(e) Whenever a Stage II vapor recovery system component is determined to be defective, the owner or operator shall take the system out of service until it has been repaired, replaced, or adjusted, as necessary.

(f) The owner or operator of each gasoline dispensing facility utilizing a Stage 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 using the vapor recovery nozzles and include a warning against topping off. Additionally, the instructions shall include a prominent display of ecology's toll free telephone number for complaints regarding the operation and condition of the vapor recovery nozzles.

(6) Equipment or systems failures.

(a) Specific applicability. This section shall apply to all gasoline transport tanks equipped for gasoline vapor collection and all vapor collection systems at gasoline loading terminals, bulk gasoline plants, and gasoline dispensing facilities as described in subsections (2) through (5) of this section.

During the months of May, June, July, August, and September any failure of a vapor collection system at a bulk gasoline plant or gasoline loading terminal to comply with this section requires the discontinuation of gasoline transfer operations for the failed part of the system. Other transfer points that can continue to operate in compliance may be used. The loading or unloading of the transport tank connected to the failed part of the vapor collection system may be completed during the other months of the year.

(b) Provisions for specific processes.

(i) The owner or operator of a gasoline loading terminal or bulk gasoline plant shall only allow the transfer of gasoline between the facility and a transport tank if a current leak test certification for the transport tank is on file with the facility or a valid inspection sticker is displayed on the vehicle. Certification is required annually.

(ii) The owner or operator of a transport tank shall not make any connection to the tank for the purpose of loading or unloading gasoline, except in the case of an emergency, unless the gasoline transport tank has successfully completed the annual certification testing requirements in (c) of this subsection, and such certification is confirmed either by:

(A) Have on file with each gasoline loading or unloading facility at which gasoline is transferred a current leak test certification for the transport tank; or

(B) Display a sticker near the department of transportation certification plate required by 49 CFR 178.340-10b which:

(I) Shows the date that the gasoline tank truck last passed the test required in (c) of this subsection;

(II) Shows the identification number of the gasoline tank truck tank; and

(III) Expires not more than one year from the date of the leak tight test.

(iii) The owner or operator of a vapor collection system shall:

(A) Operate the vapor collection system and the gasoline loading equipment during all loadings and unloadings of transport tanks equipped for emission control such that:

(I) The tank pressure will not exceed a pressure of eighteen inches of water or a vacuum of six inches of water;

(II) The concentration of gasoline vapors is below the lower explosive limit (LEL, measured as propane) at all points a distance of one inch from potential leak sources; and

(III) There are no visible liquid leaks except for a liquid leak of less than four drops per minute at the product loading connection during delivery.

(IV) Upon disconnecting transfer fittings, liquid leaks do not exceed ten milliliters (0.34 fluid ounces) per disconnect averaged over three disconnects.

(B) Repair and retest a vapor collection system that exceeds the limits of (b)(iii)(A) of this subsection within fifteen days.

(iv) The department or local air authority may, at any time, monitor a gasoline transport tank and vapor collection system during loading or unloading operations by the procedure in (c) of this subsection to confirm continuing compliance with this section.

(c) Testing and monitoring.

(i) The owner or operator of a gasoline transport tank or vapor collection system shall, at his own expense, demonstrate compliance with (a) and (b) of this subsection, respectively. All tests shall be made by, or under the direction of, a person qualified to perform the tests and approved by the department.

(ii) Testing to determine compliance with this section shall use procedures approved by the department.

(iii) Monitoring to confirm continuing leak tight conditions shall use procedures approved by the department.

(d) Recordkeeping.

(i) The owner or operator of a gasoline transport tank or vapor collection system shall maintain records of all certification tests and repairs for at least two years after the test or repair is completed.

(ii) The records of certification tests required by this section shall, as a minimum, contain:

(A) The transport tank identification number;

(B) The initial test pressure and the time of the reading;

(C) The final test pressure and the time of the reading;

(D) The initial test vacuum and the time of the reading;

(E) The final test vacuum and the time of the reading;

(F) At the top of each report page the company name, date, and location of the tests on that page; and

(G) Name and title of the person conducting the test.

(iii) The owner or operator of a gasoline transport tank shall annually certify that the transport tank passed the required tests.

(iv) Copies of all records required under this section shall immediately be made available to the department, upon written request, at any reasonable time.

(e) Preventing evaporation. All persons shall take reasonable measures to prevent the spilling, discarding in sewers, storing in open containers, or handling of gasoline in a manner that will result in evaporation to the ambient air.

NEW SECTION

WAC 173-491-050 COMPLIANCE SCHEDULES. (1) Fixed-roof gasoline storage tanks. All fixed roof gasoline storage tanks subject to WAC 173-491-040(1) shall comply no later than December 31, 1993.

(2) Gasoline loading terminals. All gasoline loading terminals subject to WAC 173-491-040(2) shall comply no later than December 31, 1993.

(3) Bulk gasoline plants. All bulk gasoline plants subject to the requirements of WAC 173-491-040(3) shall comply no later than December 31, 1993.

(4) Gasoline dispensing facilities – Stage I. All gasoline dispensing facilities subject to the requirements of WAC 173-491-040(4) shall comply no later than December 31, 1993, or whenever the facility is upgraded.

(5) Gasoline dispensing facilities – Stage II. All gasoline dispensing facilities subject to the requirements of WAC 173-491-040(5) shall comply:

(a) When upgraded except any gasoline dispensing facility upgraded or with new tank(s) installed after the effective date of this regulation but before May 1, 1992, need not comply earlier than May 1, 1992.

(b) According to the following schedule:

(i) At least fifty percent of the gasoline dispensing facilities with an annual throughput greater than 1.2 million gallons owned by a business which owns ten or more gasoline dispensing facilities in the state of Washington must comply not later than May 1, 1993. In meeting this requirement, businesses that lease some facilities and operate others must ensure that the percentage of facilities owned and operated which are required to comply with this provision at least equals the percentage of leased facilities required to comply with this provision.

(ii) All gasoline dispensing facilities with an annual throughput greater than 1.2 million gallons not previously required to comply must comply not later than May 1, 1994.

(iii) All gasoline dispensing facilities with an annual throughput greater than six hundred thousand gallons not previously required to comply must comply not later than December 31, 1998.

APPENDIX I
PERMITTING INFORMATION

Permits are a tool that air pollution control agencies can use in getting Stage II vapor recovery control systems installed properly. The permits and permit conditions should be clearly written to avoid confusion on the part of the owner/operator of the facility and to enhance enforcement efforts. This appendix contains permit forms from several agencies as well as example permits. Specifically, this appendix contains the following information:

Section I.1	Example permits from the San Diego District
Section I.2	Example permits from South Coast District
Section I.3	Bay Area District Permitting Procedure
Section I.4	New Jersey Permit Application
Section I.5	New York Permit Application
Section I.6	Dade County, FL Permit Application
Section I.7	Massachusetts Registration and Classification Application and Permit Application with Instructions

timing as gasoline is being dispensed, no test method is included in this appendix.

Specifically, this appendix contains:

Section J.1	Bay Area ST-30 Leak Test Procedure
Section J.2	Bay Area ST-27 Dynamic Back Pressure
Section J.3	Bay Area Liquid Removal Devices (Draft Method)
Section J.4	San Diego Test Procedure TP-91-2 Pressure Drop vs Flow/Liquid Blockage Test Procedure
Section J.5	San Diego Test Procedure TP-92-1 Pressure Decay/Leak Test Procedure

APPENDIX I.1

APPLICATION FOR AIR POLLUTION CONTROL DISTRICT AUTHORITY TO CONSTRUCT (A/C) AND/OR PERMIT TO OPERATE (P/O), SELL OR RENT SAN DIEGO AIR POLLUTION CONTROL DISTRICT

APPLICATION INSTRUCTIONS

GENERAL

1. The owner or his designated agent must complete and sign this multiple copy form and file it with one copy of all attachments, supplementary forms, drawings, and the appropriate fee.

2. The appropriate permit fee (Payable to "County of San Diego APCD") shall be forwarded with this application for an Authority to Construct (A/C) and/or Permit to Operate (P/O), a new installation or an addition to an existing installation. Application processing will not begin until the full required fee has been received. Excess fees will be refunded. If you do not know the appropriate fee, please contact the Enforcement Division at (619) 694-3340.

3. Applicants may contact the APCD Engineering Division prior to submitting this application to discuss the information required.

SPECIFIC TO APPLICANT

I. CONTACT INFORMATION

Items I.1 through I.7 are self-explanatory.

Item I.8. Nature of Business. The Air Pollution Control District needs this information to assist in processing your application; therefore, it is essential that it be carefully completed. A few examples would be: Production of sand and aggregate, gasoline service station, electronic manufacturing, etc.

II. NATURE OF APPLICATION - Check the most appropriate box that describes what you are applying for.

III. DESCRIPTION OF OPERATION - The following information is required (use additional sheets as necessary):

1. Normal Equipment Operating Hours - self explanatory.

2. General Description of Production and Air Pollution Control Equipment:

   (a) DESCRIBE BASIC PRODUCTION OR PROCESS AND EMISSION CONTROL EQUIPMENT by name, make, model, size, type, serial number and company number designation, if any, for either the entire unit or major parts. Structural details are not required unless they may affect the quality, nature or quantity of air contaminants. If a burner is used, the make, model, type, size, fuel and maximum capacity of each should be specified. For gasoline systems, list each product, size of each tank, number of nozzles per product and accessory equipment (e.g., flow control valves, P/V valves, nozzle and make and model, etc.), monthly output and make and model number of Phase II vapor recovery equipment.

   (b) DRAWINGS OR SCHEMATICS of basic production or process equipment and related emission control equipment must be submitted showing design of the equipment. These drawings or schematics should include:

   - details of all features; or

   - for gasoline storage/dispensing facilities, layout of and distances between storage tanks, nozzles and control equipment, piping sizes and layout, vent line termination point, slope and low point of vapor return lines (location of swing check valve if applicable).

   (c) DESCRIBE PROCESS or operations to be carried out in the system; include flow diagram if necessary for clarity. Describe air pollution control procedures in sufficient detail to show degree of expected air contaminant control. If fuels are used, specify types used, rates of use, and sulfur content, by weight, if liquid or solid fuel.

   (d) PROCESS RATE. Type and weight or volume of each material processed by the equipment. Use maximum pounds or tons per hour, gallons per month or other specified unit of time. Liquid or gaseous fuels should be excluded from determination of process weight.

   (e) MANUFACTURER'S CATALOG OR BROCHURE showing specific equipment may be acceptable for parts of the above items. Required information not shown on manufacturer's literature must be submitted by the applicant. For air pollution control equipment, include manufacturer's emission control guarantee, if applicable.

   (f) EQUIPMENT LOCATION - Include census block map showing exact location of site (property lines) and the location of the equipment you are applying for.

3. Estimated Start and Completion of Construction - self-explanatory.

4. Supplementary Forms have been prepared for many equipment types. A form index and forms are available, upon request, from the District. The applicable form must be submitted as part of your application.

YOUR APPLICATION WILL NOT BE CONSIDERED COMPLETE UNTIL ALL NECESSARY DATA, SPECIFICATIONS AND FEES HAVE BEEN RECEIVED. FINAL ACTION ON YOUR APPLICATION CANNOT BE TAKEN UNTIL ALL FEES REQUIRED PER DISTRICT RULE 40 ARE RECEIVED.

APPL NO. 900979
SECTOR/ID NO. A 03858A
PERMIT/OPERATE
SIC CODE
(APCD USE ONLY)

SAN DIEGO AIR POLLUTION CONTROL DISTRICT
9150 CHESAPEAKE DRIVE
SAN DIEGO CA 92123-1095
(619) 694-3307

APPLICATION FOR AIR POLLUTION CONTROL DISTRICT AUTHORITY TO CONSTRUCT (A/C) AND/OR PERMIT TO OPERATE (P/O), SELL OR RENT

ATTENTION: PLEASE READ INSTRUCTIONS ON THE REVERSE SIDE OF THIS FORM PRIOR TO COMPLETING. ALL SECTIONS MUST BE COMPLETED. (Please PRINT or TYPE.)

FILING THIS APPLICATION DOES NOT GRANT PERMISSION TO CONSTRUCT OR TO OPERATE EQUIPMENT

I. APPLICANT INFORMATION

1. Firm Name (DBA/Mil. Command/Govt Entity): ______
2. Legal owner, if different from DBA: ______
3. Equipment address: ______ City ______ Zip ______
   (For Portable Equipment use Home Base Address)
4. A/C Contact/Title: ______ Phone ( ) ______ - ______
   Mailing Address: ______ City ______ State ______ Zip ______
   (If different from equipment address)
5. Permit Recipient/Title: SAME Phone ( ) ______ - ______
   Mailing Address: ______ City ______ State ______ Zip ______
6. Site Contact/Title: ______ Site Phone ______ - ______
7. Nature of Ownership: ___ Govt. ___ Utility ___ Corp. ___ Dealership ___ Individual ___ Partnership
8. Nature of Business: RETAIL GASOLINE SALES

II. NATURE OF APPLICATION

1. ___ New equipment to be installed or constructed. (Original application)
2. ___ Prefabricated (off-the-shelf) equipment not requiring construction.
3. ___ Amendment to a completed APPL. or existing A/C.
4. ___ Modification of existing permitted equipment.
5. ___ Inactive status permit.
6. ___ Change of Permit Ownership.
7. ___ Condition Change.
8. _X_ Change of Equipment Location.
9. ___ Banking.
10. ___ Other (Explain) ______

Reference Application/Permit Nos.
Appl. # ______
P/O # ______
P/O # ______
P/O # ______

III. DESCRIPTION OF OPERATION

1. Normal Equipment Operating Hours/Day: 16 Days/Week: 7 Weeks/Year: 52
2. General Description of Process Equipment & Air Pollution Control Equipment: [Add attachments per instructions on reverse side and complete items (a) through (f) if applicable.]
   MOVE EXISTING FUEL PUMPS
3. Estimated Start of Construction Date: ______ Est. Completion Date: ______

IV. SIGNATURE OF AUTHORIZED PERSON: ______ Date: ______

Print Name/Title: ______ Company: ______

DO NOT WRITE BELOW (APCD Use Only)

Receipt # ______ Date ______ Amt. Rec'd $ ______ Fee Code(s) MHL

Add'l Fee Receipt # ______ Date ______ Amt. Rec'd $ ______ Fee Code(s) ______

Refund Claim # ______ Date ______ Amt. $ ______

APCD-16 Rev 01/90 Rev due,

SAN DIEGO AIR POLLUTION CONTROL DISTRICT
9150 CHESAPEAKE DRIVE
SAN DIEGO, CA 92123-1095
(619) 694-3307

SUPPLEMENTAL APPLICATION INFORMATION
FEE SCHEDULES 26A, B, C, D
NON-BULK VOLATILE ORGANIC COMPOUND
DISPENSING FACILITIES SUBJECT TO RULES 61.0 THROUGH 61.6

DBA: ______________________ Appl. No. ____________

Address: ______________________ Date: ____________

1. VAPOR CONTROL EQUIPMENT TO BE INSTALLED OR MODIFIED

New	Exist		Equipment Name	ARB Executive Order
☐	☒	Phase I	OPW Two Point	G-70- 92 - A
☐	☒	Phase II	Emco Wheaton	G-70- 52 - AD

Dispenser Arrangement According to Exhibit: ____ of G-70- 52 - AE

Vapor Return Hose Internal Diameter: ______ inches; or Co-Axial ☒

Vapor Return Nozzle Mfr: ______________________ ; Model: ____________

Vacuum Assist Systems:

Hasstech VCP-2	☐,	or	VCP-2A	☐
Healy Jet Pump	☐,	or	Multi-Jet	☐
Hirt VCS-200-1	☐,	or	VCS-200-2	☐

	Premium	Regular	Unleaded	Other*
No. of Existing Nozzles:	8	8	8	
No. of Nozzles to be Added or Removed:				
New Total Number of Nozzles:				

2. STORAGE TANKS TO BE INSTALLED OR MODIFIED

Tank Capacity for Each Storage Tank (Gallons)

New	Exist	Remove	Premium	Regular	Unleaded	Other*
☐	☒	☐	6000			
☐	☒	☐		4000	2,000	
☐	☒	☐		4000		
Monthly Throughput (Gallons):						

Include a site plan of all tanks, dispensers and underground piping. Also identify all vapor return piping material, diameter, length and slope.

* *Do not list nozzles or tanks used exclusively for diesel fuel.*

Name of Preparer: ______________________ Date: ____________

BEFORE ACTING ON AN APPLICATION FOR AUTHORITY TO CONSTRUCT, PERMIT TO OPERATE, OR PERMIT TO SELL OR RENT, THE DISTRICT MAY REQUIRE FURTHER INFORMATION, PLANS, OR SPECIFICATIONS.

11/16/88

APCD 32 REV 11/86

63U28

CONTROL NO.

COUNTY OF SAN DIEGO
AIR POLLUTION CONTROL DISTRICT
9150 CHESAPEAKE DRIVE SAN DIEGO, CA 92123-1095
(619) 694-3307

PERMIT TO OPERATE

PERMIT NO.

EXPIRES

THE FOLLOWING IS HEREBY GRANTED A PERMIT TO OPERATE THE ARTICLE MACHINE EQUIPMENT OR CONTRIVANCE DESCRIBED BELOW. THIS PERMIT IS NOT TRANSFERABLE TO A NEW OWNER NOR IS IT VALID FOR OPERATION OF THE EQUIPMENT AT ANOTHER LOCATION EXCEPT FOR PORTABLE EQUIPMENT.

EQUIPMENT ADDRESS

OWNER:

CA

CA

EQUIPMENT DESCRIPTION

REVISED COPY FEE PAID

GASOLINE SERVICE SITE (24 EMCO WHEATON A3005 COAXIAL NOZZLES)
PHASE II VRS: EMCO WHEATON BALANCE PER ARB EO G-70-17-AB;
COAXIAL HOSES AND HIGH-RETRACTORS PER ARB EO G-70-52-AI, EXHIBIT 8;
PHASE I VRS: TWO POINT, PER ARB EO G-70-97-A;
TANKS: 2-4,000; 1-6,000 & 1-12,000 GALLON.

(WJG) 1188

A 03858A 006619 0670C 26A24 880215

THIS PERMIT HAS BEEN ISSUED SUBJECT TO THE FOLLOWING CONDITIONS. FAILURE TO COMPLY WITH THESE CONDITIONS IS A MISDEMEANOR.

1. PERMITTEE SHALL PROVIDE ACCESS, FACILITIES, UTILITIES AND ANY NECESSARY SAFETY EQUIPMENT FOR SOURCE TESTING AND INSPECTION UPON REQUEST OF THE AIR POLLUTION CONTROL DISTRICT.
2. PERMITTEE SHALL MAINTAIN THE PHASE I VAPOR CONTROL SYSTEM, INCLUDING ALL GASKETS, SEALS, AND O-RINGS OF THE FILL AND VAPOR RETURN ADAPTORS AND ASSOCIATED CAPS, IN GOOD WORKING CONDITION.
3. PERMITTEE SHALL BE RESPONSIBLE FOR MAKING CERTAIN THAT FILL PIPE AND DRY-BREAK CAPS ARE SECURELY REPLACED FOLLOWING EACH TRANSFER OF GASOLINE.
4. ANY CHANGE, OTHER THAN IDENTICAL REPLACEMENT, IN THE BASIC OR CONTROL EQUIPMENT DESCRIBED ABOVE MUST HAVE PRIOR DISTRICT APPROVAL.
5. THE PHASE II VAPOR CONTROL SYSTEM SHALL BE PROPERLY MAINTAINED AND OPERATED IN ACCORDANCE WITH DISTRICT RULES 61.4 AND 61.7, THE ARB EXECUTIVE ORDERS SPECIFIED ABOVE, AND THE MANUFACTURER'S VAPOR RECOVERY NOZZLE INSTRUCTION BOOK (LATEST VERSION).
6. VAPOR RECOVERY HOSES, SWIVELS, NOZZLES, BELLOWS, AND FACEPLATES SHALL BE CHECKED AT LEAST DAILY AND REPAIRED OR REPLACED IMMEDIATELY IF FOUND DEFECTIVE. ALL VAPOR RECOVERY HOSES SHALL BE MAINTAINED IN A MANNER WHICH ALLOWS SELF-DRAINAGE OF RETAINED LIQUID DURING NORMAL DISPENSING.
7. THE PHASE I AND PHASE II VAPOR CONTROL SYSTEMS SHALL NOT CONTAIN DEFECTS SET FORTH IN THE CALIFORNIA ADMINISTRATIVE CODE, TITLE 17, PART 3, CHAPTER 1, SUBCHAPTER 8, SECTION 94006 WHICH SUBSTANTIALLY IMPAIRS THE EFFECTIVENESS OF THE SYSTEMS IN REDUCING AIR CONTAMINANTS. "SUCH DEFECTS ARE DEFINED ON THE ATTACHMENT ACCOMPANYING THIS PERMIT."
8. OPERATION MUST BE IN COMPLIANCE WITH ALL INFORMATION INCLUDED IN APPLICATIONS FOR THIS PERMIT TO OPERATE AS APPROVED BY THE DISTRICT AND THE PERFORMANCE CONDITIONS LISTED ABOVE.

WITHIN 10 DAYS AFTER RECEIPT OF THIS PERMIT, THE APPLICANT MAY PETITION THE HEARING BOARD TO REVIEW ANY CONDITION THAT HAS BEEN MODIFIED OR ADDED TO THE PERMIT. (RULE 25 AND REGULATION V)

IN ACCORDANCE WITH RULE 10C THIS PERMIT TO OPERATE OR A COPY MUST BE POSTED ON OR WITHIN 25 FEET OF THE EQUIPMENT, OR MAINTAINED READILY AVAILABLE AT ALL TIMES ON THE OPERATING PREMISES.

ANY AND ALL CONDITIONS WHICH HAVE BEEN APPLIED TO THIS ... SHALL REMAIN IN FULL FORCE AND EFFECT UNLESS EXPRESSLY MODIFIED BY THE ... ION CONTROL DISTRICT.

THIS AIR POLLUTION CONTROL DISTRICT PERMIT DOES NOT RE... PERMITS OR AUTHORIZATIONS WHICH MAY BE REQ...

R.J. Sommerville

APCD 32A REV. 2/88

02710

CONTROL NO.

COUNTY OF SAN DIEGO
AIR POLLUTION CONTROL DISTRICT
9150 CHESAPEAKE DRIVE SAN DIEGO, CA 92123-1095
(619) 694-3307

PERMIT TO OPERATE

PERMIT NO.
006619
EXPIRES
FEBRUARY 1, 1990

THIS PERMIT IS NOT VALID UNTIL REQUIRED FEES ARE RECEIVED BY THE DISTRICT.

THE FOLLOWING IS HEREBY GRANTED A PERMIT TO OPERATE THE ARTICLE, MACHINE, EQUIPMENT OR CONTRIVANCE DESCRIBED BELOW THIS PERMIT IS NOT TRANSFERABLE TO A NEW OWNER, NOR IS IT VALID FOR OPERATION OF THE EQUIPMENT AT ANOTHER LOCATION, EXCEPT FOR PORTABLE EQUIPMENT.

006619

EQUIPMENT ADDRESS

OWNER:

EQUIPMENT DESCRIPTION

RENEWAL FEE PAID $1,200.00

GASOLINE SERVICE SITE (24 EMCO WHEATON A3005 COAXIAL NOZZLES)
PHASE II VRS: EMCO WHEATON BALANCE PER ARB EO G-70-17-AB;
COAXIAL HOSES AND HIGH-RETRACTORS PER ARB EO G-70-52-AI, EXHIBIT 8;
PHASE I VRS: TWO POINT, PER ARB EO G-70-97-A;
TANKS: 2-4,000; 1-6,000 & 1-12,000 GALLON. (WJG) 1188

880215

A 03858A 006619 0670C 26A24

IN ACCORDANCE WITH RULE 10C THIS PERMIT ATTACHED TO YOUR CURRENT PERMIT WHICH INCLUDES THE OPERATING CONDITIONS OR A COPY MUST BE POSTED ON OR WITHIN 25 FEET OF THE EQUIPMENT, OR MAINTAINED READILY AVAILABLE AT ALL TIMES ON THE OPERATING PREMISES

ANY AND ALL CONDITIONS WHICH HAVE BEEN APPLIED TO THIS EQUIPMENT SHALL REMAIN IN FULL FORCE AND EFFECT UNLESS EXPRESSLY MODIFIED BY THE AIR POLLUTION CONTROL DISTRICT

THIS AIR POLLUTION CONTROL DISTRICT PERMIT DOES NOT RELIEVE THE HOLDER FROM OBTAINING PERMITS OR AUTHORIZATIONS WHICH MAY BE REQUIRED BY OTHER GOVERNMENTAL AGENCIES

R. J. Sommerville
AIR POLLUTION CONTROL OFFICER

F-3858A
Sector ID

SAN DI. COUNTY AIR POLLUTION CONTROL 'TRICT
9150 Chesapeake Drive
San Diego, CA 92123

Application Number

670C
SEC)

STARTUP AUTHORIZATION

Date of issuance

(NAME AND ADDRESS OF OPERATOR OR OWNER)

may operate a gasoline storage and dispensing facility consisting of four underground storage tank(s) with 24 dispensing nozzle(s) and OPW System A Type 5 Phase I and Emco-Wheaton Balance Phase II vapor controls.
(DESCRIPTION OF FACILITY OR EQUIPMENT)

located at
(ADDRESS)

until pursuant to Rule 21 of the Rules and Regulations of the Air Pollution Control District, subject to the following conditions:

1. A copy of this authorization shall be posted on or near the equipment for which operation is authorized.
☐ The undersigned APCD representative shall be notified as soon as the equipment is fully operational.

2. Permittee shall be responsible for making certain that fill pipe and dry-break caps are securely replaced following each bulk delivery.

3. Permittee shall maintain the Phase I vapor control system including all gaskets, seals and O-rings of the fill and vapor return adapters and associated caps, in good working order.

4. The Phase II vapor control system shall be properly maintained and operated in accordance with District Rules 61.4 and 61.7, the applicable ARB Executive Orders and Emco-Wheaton "A3000 Series Vapor Recovery Nozzle Instruction Book" (latest version).

Operation is authorized only for the purpose of:
☐ Shaking down, testing and evaluating the equipment named above.
☒ For the purpose of allowing operation until an APCD Permit to Operate has been issued.

THIS IS NOT AN AUTHORIZATION TO EXCEED ANY APPLICABLE EMISSION STANDARD. THIS AUTHORIZATION IS SUBJECT TO CANCELLATION IF ANY EMISSION STANDARD OR CONDITION IS VIOLATED. IF THERE ARE ANY QUESTIONS ABOUT THIS AUTHORIZATION, PLEASE CONTACT THE UNDERSIGNED AT 565-5419.

Signed:

APPENDIX I.2

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

I.2-2

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

PERMIT to OPERATE

9150 FLAIR DRIVE, EL MONTE, CALIFORNIA 91731

PERMIT NO.

Operation under this permit must be conducted in compliance with all information included with the initial application and the initial permit conditions. The equipment must be properly maintained and kept in good operating condition at all times. In accordance with Rule 206, this Permit to Operate or copy must be posted on or within 8 meters of equipment.

APPL. # CO. ID.

SECTOR 02

LEGAL OWNER OR OPERATOR:

EQUIPMENT LOCATED AT: LONG BEACH, CA 90805

EQUIPMENT DESCRIPTION AND CONDITIONS:

R461 GASOLINE FUELING & DISPENSING FACILITY CONSISTING OF :

1. 02 GASOLINE STORAGE TANKS
2. 10 GAS DISPENSING NOZZLES
3. VAPOR RECOVERY SYSTEM - BALANCE 03

PERMIT CONDITION:

PHASE I AND PHASE II VAPOR RECOVERY SYSTEMS MUST BE IN FULL OPERATION, WHENEVER THIS FACILITY IS IN USE. SUCH SYSTEMS MUST BE INSTALLED, OPERATED AND MAINTAINED TO MEET ALL CARB CERTIFICATION REQUIREMENTS.

This initial permit must be renewed by 9/16 ANNUALLY unless the equipment is moved, or changes ownership. If billing for annual operating fee is not received by expiration date, contact office above.

This permit does not authorize the emission of air contaminants in excess of those allowed by Division 26 of the Health and Safety Code of the State of California or the Rules of the Air Quality Management District. This permit cannot be considered as permission to violate existing laws, ordinances, regulations or statutes of other government agencies.

EXECUTIVE OFFICER

BY PRINCIPAL PERMIT PROCESSING CLERK

DATE

76P234M - 6/82

APPENDIX I.3

BAY AREA DISTRICT PERMITTING PROCEDURE

GASOLINE DISPENSING FACILITIES

1. DESCRIPTION

This chapter covers the permitting of Gasoline Dispensing Facilities (GDF's). All GDF's must have a Permit to Operate from the District, including those exempt from the vapor recovery standards in Regulation 8 Rule 7. Any projects involving the vapor recovery system at GDF's must be authorized by the District **prior** to construction. This includes the replacement or installation of tanks and/or vapor recovery lines, dispenser modifications and the addition of nozzles to a facility. Piping plans illustrating a California Air Resources Board (CARB) certified system are required.

2. APPLICATION CONTENTS

A. Data Forms

Data Form P-101G must be completed and returned by the applicant and must contain the following:

1. Equipment address
2. Authority to Construct mailing address
3. Violation Notice number if applicable
4. Date of equipment installation. For existing GDF's this date may determine if the GDF is exempt from vapor recovery
5. Facility type and Description
6. CARB Certified Vapor Recovery Equipment List
7. Project Description including number of applicable California Air Resources Board executive order.

An example of a completed P-101G Data Form is attached (see Exhibit I).

B. Additional Information/Forms

Construction drawings showing tank and dispenser locations, dispenser island configuration, product, vapor recovery and tank vent piping and construction specifications.

3. COMPLETENESS

The following information is needed to make this determination:

A. Application must be filled out completely and accurately and include all information pertinent to the project (see Exhibit I).

B. If construction of underground tank or piping is planned (including vapor recovery piping), vapor recovery construction drawings must be submitted that clearly demonstrates a current California Air Resources Board (CARB) certified vapor recovery configuration. Drawings must include tank and dispenser locations, dispenser island configuration, vapor recovery piping diameters, piping manifolds (if any) and piping slope.

C. CARB Certified Vapor Recovery Equipment List. This shall include the model numbers for dispensers, nozzles, hoses, swivels, as well as breakaways, overhead retractors, liquid pickups, remote vapor check valves, blending valves, and splash bucket drain valves (if applicable).

D. All authority to construct and/or permit to operate fees must be paid.

4. REGULATIONS

Gasoline Dispensing Facilities are subject to the California Health and Safety Code and the following District regulations:

Regulation 2, Rule 1: Permit Regulation
Regulation 3: Fees
Regulation 8, Rule 7: Gasoline Dispensing Facilities
The CARB G-70 Series of Executive Orders are part of Regulation 8, Rule 7 by reference.
Regulation 8, Rule 40: Removal of Underground Storage Tanks.

5. ABATEMENT EQUIPMENT

Gasoline Dispensing Facilities (GDF's) are a source of Volatile Organic Compounds (VOC's) in the form of gasoline vapors. The abatement equipment used for capture of these emissions is designated as Phase I and Phase II vapor recovery equipment. Phase I is the designation for equipment that captures vapors that would be emitted during delivery of gasoline to the GDF. Phase II is the designation for equipment that captures vapors that would be emitted during fueling of vehicles at the GDF.

Phase I and Phase II vapor recovery systems must be installed at all new or modified GDF's in the District which are not specifically exempted. Such systems are considered abatement devices since the utilization of such equipment decreases the amount of gasoline vapor emitted into the atmosphere. A list of exemptions from vapor recovery, but not from permits, is in Sections 8-7-111 and 8-7-112 of Regulation 8, Rule 7 (GDF's installed after March 4, 1987 are not eligible for the low throughput exemptions). All Phase I and Phase II equipment and systems to be installed must be currently certified by the California Air Resources Board (CARB).

The CARB certification program is a procedural process which includes evaluation of a system, a 90 day operational test of prototype equipment at a test site, an efficiency test to determine 95% efficiency of a system (which includes a dynamic back pressure test and a vapor leak test) and the approval of three other state agencies (State Fire Marshall, Division of Measurement Standards of the Department of Food and Agriculture, and the Division of Occupational Safety and Health). Conformance with CARB Certification is demonstrated through piping configuration, equipment list and District source test procedures ST-27 and ST-30.

6. STANDARDS

A. Standards that must be met before a permit can be issued:

1. The design and equipment installed at the site must be currently certified by the California Air Resources Board (CARB).

2. The applicable requirements of BAAQMD Regulation 8, Rule 7, Sections 301 through 312, must be met.

3. Within twenty (20) days of completion of equipment installation (start-up) compliance with all Authority to Construct conditions shall be demonstrated by the applicant.

4. Signed "As-Built" construction drawings shall be submitted within twenty (20) days of start-up.

B. Toxics

A GDF with vapor recovery equipment that is in compliance with CARB requirements <u>and</u> has an annual throughput of less than 2.5MM gallons/year is in compliance with the District's risk management procedure. All GDF's with an annual throughput of greater than 2.5MM gallons/year are subject to a Toxics Review. (A year is defined to be any consecutive 12 month period.)

7. EMISSIONS

According to CARB, uncontrolled emissions due to tank filling, vehicle fueling, and minor spillage are approximately 21.2 pounds of VOC per 1000 gallons of gasoline dispensed. The uncontrolled baseline emissions for each station shall be calculated by multiplying the annual throughput by the 21.2 pounds of VOC per 1000 gallons of gasoline.

The controlled baseline emissions shall be estimated by multiplying the uncontrolled baseline emissions by the percent of the emissions which would not normally be controlled by a fully functional Phase II system. The equation used to calculate these emissions is as follows:

$$\text{Controlled Baseline} = \text{Annual Throughput} \times \frac{\text{21.2 lbs VOC}}{\text{1000 Gallons}} \times (1.00-0.95)$$

8. CONDITIONS

Authority to Construct conditions ensure that vapor recovery systems are built to operate efficiently and in compliance with District regulations and CARB certification orders. For GDF's, the conditions are based on the type of vapor recovery equipment used, the throughput, and the configuration of the station. A Permit to Operate will not be issued until all conditions listed in the Authority to Construct have been met.

All performance tests required by the Authority to Construct shall be performed within ten (10) days of system start-up and will be submitted on the District reporting form for the applicable test procedure within twenty (20) days of start-up. Failure to complete performance tests may result in enforcement action.

The results of all performance tests required by the Authority to Construct shall demonstrate compliance with the appropriate standards or limits.

A "start-up" inspection of the site shall be performed by the District's Inspection Section. The results of this inspection shall demonstrate compliance with all Authority to Construct conditions, BAAQMD Regulations, and the appropriate CARB requirements. Performance tests required by the Authority to Construct may be duplicated at this time.

The applicant, whose signature appears on the P-101G Form, accepts responsibility to ensure that all Authority to Construct conditions are met. If conditions are not met within twenty (20) days of start-up, enforcement action will be taken. If the Authority to Construct is not used within two years, it shall be cancelled.

The following are standard conditions for standard configurations.

A. **Sample 1:** Two point Phase I Systems

1. The Phase I equipment shall be installed in accordance with California Air Resources Board (CARB) Executive Order ___ [cite order number that applies]. The nominal inside diameter of the vapor side of the two-point system shall be no less than four(4) inches anywhere between the storage tank and the vapor poppet. [Copies of all CARB Executive Orders applicable to GDF's are available through the District's Permit Services Division.]

B. **Sample 2:** Coaxial Phase I Systems

1. The Phase I equipment shall be installed in accordance with California Air Resources Board (CARB) Executive Order ___ [cite order number that applies]. The nominal inside diameter of the outer tube shall be no less than four(4) inches. [Copies of all CARB Executive Orders applicable to GDF's are available through the District's Permit Services Division.]

C. **Sample 3:** Phase II Balance Systems

1. All vapor recovery system components shall be installed in accordance with CARB Executive Order G-70-52-A__ [most current update] and CARB Executive Order ___ [cite order number that applies]. [Copies of all CARB Executive Orders applicable to GDF's are available through the District's Permit Services Division.]

2. Vapor recovery nozzles which contain a built-in vapor check valve may not be used in conjunction with any remote vapor check valve.

   Vapor recovery nozzles which do not contain a built-in check valve must be used in conjunction with a remote vapor check valve.

3. Within ten(10) days of start-up, a Leak Test on all new and/or modified nozzle systems shall be performed in accordance with the District's Manual of Procedures Source Test Procedure ST-30 [most current revision available through the District's Permit Services Division]. If the tank size is 500 gallons or less, the test shall be performed on an empty tank.

4. Within ten (10) days of start-up, a Dynamic Back Pressure Test on all new and/or modified nozzle systems shall be performed in accordance with BAAQMD's Source Test Procedure ST-27 [most current revision available through the District's Permit Services Division]. The Test shall be conducted at nitrogen flowrates of 20, 60, and 100 CFH per hour. If remote vapor check valves are used, the test shall be conducted using Alternate Method II or III.

5. Submit all test results on the District reporting form for the applicable test procedure within twenty (20) days of start-up.

6. All vapor recovery piping shall be a minimum of 3 inch (nominal) diameter after the manifolding of the dispenser lines. All vapor recovery piping shall slope down towards the lowest octane, or leaded grade tank. A minimum drop of 1/8 inch for every linear foot is required [unless otherwise specified by the appropriate CARB Executive order].

   or

   Vapors from the blended product shall be returned via vapor recovery piping to each tank from which the blend stock is drawn. The vapor recovery piping shall be manifolded at the tanks or at the dispenser. A minimum drop of 1/8 inch for every linear foot is required [unless otherwise specified by the appropriate CARB Executive order].

   or

   Each grade of gasoline shall have separate ___ inch diameter (minimum) vapor recovery piping and shall slope back to the tank a minimum of 1/8 inch per linear foot (minimum).

   "Modified nozzle systems" include any nozzle system that is connected to vapor recovery piping that has been modified in any way.

D. **Sample 4:** Phase II Hirt Systems

Hirt Systems shall conform to Conditions 1 through 6 above. In addition, Hirt Systems shall conform to the following conditions:

7. A center-zero, 0-1 inch water column differential pressure gauge shall be permanently installed inside the dispenser farthest from the Hirt processor.

8. Permanent access to the Hirt Processor shall be provided for the purpose of inspection and/or testing.

E. **Sample 5:** Phase II Hasstech Systems

1. All vapor recovery system components shall be installed in accordance with CARB Executive Order G-70-7-A_ [most current update]. [Copies of all CARB Executive Orders applicable to GDF's are available through the District's Permit Services Division.]

2. Within ten(10) days of start-up, a Leak Test on all new and/or modified nozzle systems shall be performed in accordance with the District's Manual of Procedures Source Test Procedure ST-30 [most current revision available through the District's Permit Services Division]. If the tank size is 500 gallons or less, the test shall be performed on an empty tank.

3. Within ten (10) days of start-up, a Dynamic Back Pressure Test on all new and/or modified nozzle systems shall be performed to determine the dynamic back pressure from the ITT Valve to the storage tank with the dry breaks open. This test shall be conducted in accordance with Source Test Procedure ST-27 [most current revision available through the District's Permit Services Division], Alternate Method 2, at a flowrate of 60 CFH. The resulting dynamic back pressure shall not exceed 0.45 inches of water column.

4. Submit all test results on the District reporting form for the applicable test procedure within twenty (20) days of start-up.

5. Permanent access to the Hasstech Processor and vacuum pump shall be provided for the purpose of inspection and/or testing.

6. A Remote Status Panel and tank correction gauge shall be installed as per manufacturer's recommendations.

"Modified nozzle systems" include any nozzle system that is connected to vapor recovery piping that has been modified in any way.

F. **Sample 6:** Phase II Healy Systems

1. All vapor recovery system components shall be installed in accordance with CARB Executive Order G-70-70-A_ [most current update]. [Copies of all CARB Executive Orders applicable to GDF's are available through the District's Permit Services Division.]

2. Within ten(10) days of start-up, a Leak Test on all new and/or modified nozzle systems shall be performed in accordance with the District's Manual of Procedures Source Test Procedure ST-30 [most current revision available through the District's Permit Services Division]. If the tank size is 500 gallons or less, the test shall be performed on an empty tank.

3. Permanent access to the vacuum assist equipment shall be provided for the purpose of inspection and/or testing.

4. Submit all test results on the District reporting form for the applicable test procedure within twenty (20) days of start-up.

"Modified nozzle systems" include any nozzle system that is connected to vapor recovery piping that has been modified in any way.

G. **Sample 7:** Phase II Conversions from a Red Jacket to a Balance System

Conversions from a Red Jacket to a Balance System are subject to the conditions applicable to the balance system. In addition, they are subject to the following conditions:

7. The Red Jacket aspirator, modulating valve, vapor screen, and vapor check valve shall be removed prior to installation of the balance system components.

8. The riser shall be at least 3/4 inch O.D. in diameter inside the dispenser.

H. **Sample 8:** Aboveground Tanks-Phase I and II

For newly installed aboveground tanks, the following conditions will be imposed:

1. All vapor recovery system components shall be installed in accordance with CARB Executive Order_____ [cite order number that applies]. [Copies of all CARB Executive Orders applicable to GDF's are available through the District's Permit Services Division.]

2. Within ten(10) days of start-up, a Leak Test on all new and/or modified nozzle systems shall be performed in accordance with the District's Manual of Procedures Source Test Procedure ST-30 [most current revision available through the District's Permit Services Division]. If the tank size is 500 gallons or less, the test shall be performed on an empty tank.

3. Submit all test results on the District reporting form for the applicable test procedure within twenty(20) days of start-up.

4. Operator shall accept deliveries only from delivery trucks which are equipped with vapor return connectors compatible with tank fittings. Operator shall ensure that Phase I vapor recovery equipment is utilized during these deliveries.

The following condition may also be imposed:

5. The tank shall be located in an area shaded from 10 AM to 3 PM in all seasons.

If an aboveground tank has a remote dispenser, the following condition will also be imposed:

6. After construction of underground piping, including connections to tanks, and before filling in and paving over underground piping, applicant must notify the District for a piping inspection. Applicant shall call ____, the GDF enforcement team supervisor, at (415) 771-6000 ext. 262. Applicant must give at least three (3) days notice before filling in and paving over piping and connections.

I. **Sample 9:** Remote Fill Phase I

If tanks using a remote fill and vapor recovery openings were being installed, the following conditions will be imposed:

1. ____ [Name of company] must notify the District in writing at least five (5) working days prior to the commencement of the installation of the remote product and vapor fill pipes.

2. Only the remote fill and remote vapor pipes shall be used to transfer gasoline into the stationary tanks at this facility.

3. The original product fill pipe on all the underground storage tanks shall remain accessible for tank gauging purposes.

4. The original Phase I vapor pipe on the underground storage tanks shall be capped and taken out of service.

J. **Sample 10:** Other Phase II Vapor Recovery Systems

For all other vapor recovery systems, the following condition will be imposed:

1. All vapor recovery system components shall be installed in accordance with the CARB Executive Order_____ [Cite order number that applies]. [Copies of all CARB Executive Orders applicable to GDF's are available through the District's Permit Services Division.]

K. **Sample 11:** Facilities Claiming Exemptions

For facilities claiming exemption under Regulation 8, Section 8-7-111 and/or Section 8-7-112 one or more of the following conditions may be imposed:

1. Exempt - Low throughput conditions. Facility shall not exceed throughput of 60,000 gallons in any consecutive 12 month period.

2. To maintain exemption, fueling of tanks over five(5) gallons shall not be allowed.

3. Facility shall only fuel vehicles whose fill neck configuration does not allow for Phase II vapor recovery.

L. **Sample 12:** Unique Systems that require CARB Certification

For vapor recovery systems not currently CARB certified the following condition will be imposed (the deadline for certification is mentioned in the system description on the Authority to Construct):

1. This Authority to Construct is issued with an extended Start-up period to allow for CARB certification of the Phase I and II Vapor Recovery. The Permit to Operate shall not be issued until certification is completed. In case the system cannot be certified because the vapor recovery rate is less than 95%, the GDF shall be closed within 60 days.

M. **Sample 13:** For any vapor recovery system the following conditions may be added to ensure compliance with District Regulations.

1. Applicant shall call ______________, in Permit Services Division at (415) 771-6000 ext. 384 at least seven(7) days before the source tests are performed. A representative from the District shall be present during testing to check the performance of the in-place piping.

2. All vapor recovery piping shall be a minimum of 3 inch (nominal) diameter after the manifolding of the dispenser lines. All vapor recovery piping shall slope down towards the lowest octane, or leaded grade tank. A minimum drop of 1/8 inch for every linear foot is required [unless otherwise specified by the appropriate CARB Executive order].

3. Vapors from the blended product shall be returned via vapor recovery piping to each tank from which the blend stock is drawn. The vapor recovery piping shall be manifolded at the tanks or at the dispenser. A minimum drop of 1/8 inch for every linear foot is required [unless otherwise specified by the appropriate CARB Executive order].

4. Each grade of gasoline shall have separate ___ inch diameter (minimum) vapor recovery piping and shall slope back to the tank a minimum of 1/8 inch per linear foot (minimum).

5. This facility shall not exceed a maximum throughput of 2.5 million gallons of gasoline in any consecutive 12 month period. Monthly usage records shall be retained for at least two years from the date of entry. This log shall be kept on site and made available to district staff on request.

9. ENFORCEMENT

Permit conditions are enforced by the inspection staff of the enforcement division during the start-up inspection, on-going inspections, and through record keeping by the applicant. The inspector compares the actual operation of the source to the conditions required in the permit, and to applicable regulations.

10. FEES

Per Regulation 3 the following fees are required. Please note that fees are subject to change. These fees are to serve as examples only.

State and local agencies, except publicly owned utilities, were exempt from paying fees until July 12th, 1989.

A. **Filing Fee:** $165.00 for each application.

B. **Schedule D:** Gasoline transfer at GDF's

1. Initial Fee: $51.97 per nozzle that is "new" (unpermitted) or "additional" (for modified, existing facilities)

2. Permit to Operate fee: $19.05 per nozzle that is "new" (unpermitted) or "additional" (for modified, existing facilities)

3. Late fees: These are in effect if a facility installs vapor recovery equipment without applying with the District prior to construction (the late fee shall be equal to 100% of the initial fee as above. Facilities not required to pay an initial fee shall pay a late fee equal to 100% of the filing fee. See Regulation 3, Rule 310).

4. Retroactive Fees: Retroactive Permit to Operate fees may be collected for up to four years from GDF's operating without a valid Permit to Operate.

   Note: For facilities which were exempt from fees at the time of installation, filing fees, Initial fees, and Late fees shall not be collected.

C. Sample Fee Calculation

1. For a facility that is planning to install a new service station that would have a total of 12 nozzles in operation, the applicable fees for the Authority to Construct would be:

Filing Fee	$165.00
Initial Fee ($51.97 x 12 nozzles)	623.64
Permit to Operate Fee ($19.05 x 12 nozzles)	228.60
Total Fees	$1017.00

   (The Total Fee will be rounded up to the nearest dollar for 51 cents and above, and rounded down to the nearest dollar for amounts of 50 cents and below.)

2. If a facility (also with 12 nozzles) installed the equipment without an Authority to Construct the applicable fees would be:

Filing Fee	$165.00
Initial Fee ($51.97 x 12 nozzles)	623.64
Permit to Operate Fee ($19.05 x 12 nozzles)	228.60
Late Fees (100% the initial fee)	623.64
Total Fees	$1641.00

   (The Total Fee will be rounded up to the nearest dollar for 51 cents and above, and rounded down to the nearest dollar for amounts of 50 cents and below.)

3. For an existing facility (with one gasoline dispensing nozzle) that had been in operation for four or more years without a Permit to Operate, the applicable fees would be:

Filing Fee	$165.00
Initial Fee	$51.97
Late Fee (100% the initial fee)	$51.97
Permit to Operate Fee	$19.05

   (For the 12 month period from the month the application was processed to the next calender year. For example, if the application was received in October, 1992, then the current permitting period should go from October, 1992 to October 1993.)

Retroactive Fees	<u>76.20</u>

(Retroactive fees for four years of operation: $17.32 x four years).

Total Fees	$364.00

(The Total Fee will be rounded up to the nearest dollar for 51 cents and above, and rounded down to the nearest dollar for amounts of 50 cents and below.)

11. TOXICS

Any GDF with a throughput of less than 2.5MM gallons/year that is in compliance with the vapor recovery requirements in Regulation 8, Rule 7, is in compliance with the Air Toxic Screening Policy. The exception is whenever a new GDF is proposed at a location that is within 1000 feet of a school. In this case, the applicant must comply with the provisions of Regulation 2, Rule 1, Section 412: Public Notice, Schools.

If the GDF has an annual throughput of greater than 2.5MM gallons/year, the GDF shall be subject to a Toxics Review. In this case, the applicant will be requested to submit data with respect to possible receptors near his facility. If the facility does not pass the risk screen, the applicant must install a vapor recovery system which reduces emissions to levels deemed acceptable by the Toxics Review. (A year is defined to be any consecutive 12 month period.)

APPENDIX I.4

APPLICATIONS FOR AIR POLLUTION CONTROL PERMIT TO CONSTRUCT, INSTALL OR ALTER CONTROL APPARATUS OR EQUIPMENT AND CERTIFICATE
TO OPERATE CONTROL APPARATUS OR EQUIPMENT FOR STORAGE AND TRANSFER OF SERVICE STATION FUELS
N.J. DEPARTMENT OF ENVIRONMENTAL PROTECTION - DIVISION OF ENVIRONMENTAL QUALITY, AIR POLLUTION PROGRAM

VEM-032
8/89

N.J. Dept. of Environmental Protection — Division of Environmental Quality
Air Pollution Control Program

Application for Air Pollution Control Permit to Construct, Install or Alter Control Apparatus or Equipment and Certificate to Operate Control Apparatus or Equipment for Storage and Transfer of Service Station Fuels

INSTRUCTIONS:

- *Print or type all information carefully - one character per block.*
- *Illegible applications will be returned.*
- *Do not write in areas designated for office use only.*
- *Complete both sides of the application and be sure to sign it.*
- *This application will not be processed unless a proper fee is submitted.*
- *For assistance or more forms call 1-800-441-0065.*

RETURN TO: *NJDEP, Bureau of New Source Review, CN 027, Trenton, N.J. 08625*

OFFICE USE ONLY

	Trans. Code	APC Plant I.D.	Type of Ownership
A 1			

SECTION A

Full Legal Business Name

Mailing Address

City State Zip Code -

Station's Local Name

Station Location

Municipality County

SECTION B — REASON FOR APPLICATION *(Check One)*

☐ New Equipment ($250 Fee)
☐ Modification to Existing Equipment ($250 Fee)
☐ Five Year Renewal Certificate # ____________ ($75 Fee)
☐ Amendment (Transfer of Ownership) Certificate # ____________ ($50 Fee) Name of Previous Owner ____________

TYPE *(Check One)*

☐ Retail
☐ Non-Retail

NJDEP APC Plant I.D. (if known) ____________

Estimated Starting Date of Construction ____________ Date Equipment to be Put in Use ____________

Plant Contact ____________ ____________ Tele. #
Name (Print or Type) *Title*

The information supplied on this application VEM-032, including the data in supplements, is to the best of my knowledge true and correct.

____________ ____________ ____________ ____________
Name of Authorized Officer (Print or Type) *Title* *Signature* *Date*

OFFICE USE ONLY

Plant on File	Saroad County	Saroad Mun.	SIC Code	Plant Elev.	UTM Co-ord. Horizontal	Vertical
☐ Yes ☐ No						

Source Cat.	Source Size	Overall Plant Compliance	Insp. Mo.	Cycle	Plant Contact

NESHAPS	NSPS Code	PSD	BOP	TVOS	Fee	Log No.	Eval.

SECTION C

1. TANK DATA - List maximum capacity and grade of gasoline. List each tank separately.

2. CONTROL DEVICES - Use the following code to designate any Air Pollution Control devices on the tanks.

   A. NO CONTROL
   B. CONSERVATION VENT (pressure vacuum valve or ¼" orifice)
   C. FLOATING ROOF
   D. VAPOR RETURN LOOP
   E. INCINERATION
   F. APPROVED EQUIVALENT OF ANY ABOVE (Supply details below)
   G. SUBMERGED FILL PIPE (Bottom load, drop tube, etc.)
   H. WHITE PAINT, IF THE TANK IS ABOVE GROUND EXPOSED TO THE RAYS OF THE SUN

3. GALLONS PER MINUTE FROM TRUCK – Flow rate in gallons per minute from delivery truck

4. YEARLY GASOLINE THRU-PUT - Number of gallons which passes thru each tank per year

1 TANK DATA (List Separately)		2 CONTROL DEVICES	3 GALLONS PER MINUTE FROM TRUCK	4 YEARLY GASOLINE THRU-PUT
CAPACITY (gal.)	GRADE			

DETAILS ____

____

____

____

____

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 Througnput ______________________ gallons

2. Please cneck 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)

____Chevron (G-70-53-AA)

____Emco Wheaton (G-70-17-AA)

____Exxon (G-70-23-AA)

____Hasstech (G-70-7-AB)

____Healy (G-70-70-AA)

____Hirt (G-70-33-AB)

____Mobil (G-70-48-AA)

____OPW (G-70-36-AA)

____Red Jacket (G-70-14-AA)

____Texaco (G-70-38-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
Fee ________ Eval. ________

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 ____ Application is Illegible ____ No Certified Controls ____ 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.

Form VEM-017

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF ENVIRONMENTAL QUALITY
AIR POLLUTION CONTROL PROGRAM

All Correspondence must indicate your APC PLANT ID NUMBER

Certificate Number 063936 LOG NUMBER 830996A APC PLANT ID 81581

(Mailing Address)

EXXON COMPANY USA
4550 DACOMA - 3RD FLOOR
HOUSTON TX 77092

(Plant Location)

Applicant's Designation of Equipment EXXON G-70-23-AA
N.J. Stack No. 002 No. of Stacks 001 No. of Sources 01
Approval 03/21/88 Effective 03/21/88 Expiration 03/21/93

PERMIT TO CONSTRUCT, INSTALL OR ALTER CONTROL APPARATUS OR EQUIPMENT
AND
CERTIFICATE TO OPERATE CONTROL APPARATUS OR EQUIPMENT

* CONDITIONAL FIVE YEAR DIRECT *

THIS PERMIT AND CONDITIONAL FIVE YEAR CERTIFICATE IS BEING ISSUED UNDER THE AUTHORITY OF CHAPTER 106, P.L. 1967 (N.J.S.A. 26:2C-9.2) WITHOUT A FIELD INSPECTION. HOWEVER, FIELD INSPECTIONS ARE SCHEDULED FOR THE FUTURE AND APPROPRIATE ACTIONS WILL BE TAKEN IF SUCH INSPECTIONS DISCLOSE DEVIATIONS FROM YOUR APPROVED PERMIT.

IN ACCORDANCE WITH N.J.S.A. 54:4-3.56 TO 3.58, YOU MAY BE ENTITLED TO AN EXEMPTION OF TAXATION IF YOUR EQUIPMENT IS TAXED AND IS CONSIDERED TO BE AN AIR POLLUTION CONTROL DEVICE. A TAX EXEMPTION APPLICATION MAY BE OBTAINED FROM THE BUREAU OF NEW SOURCE REVIEW. (SEE OTHER SIDE)

IF IT IS NECESSARY TO AMEND YOUR EMERGENCY STANDBY PLANS, PLEASE CONSULT WITH THE APPROPRIATE REGIONAL OFFICE. (SEE OTHER SIDE)

IN ACCORDANCE WITH N.J.A.C. 7:27-8.3(D), THIS PERMIT AND CERTIFICATE MUST BE READILY AVAILABLE FOR INSPECTION ON THE OPERATING PREMISES.

THE FOLLOWING CONDITION(S) APPLY TO THIS PERMIT AND CERTIFICATE:

(SEE ATTACHED)

N.J. Department of Environmental Protection
Division of Environmental Quality
CN-027, 401 East State Street
Trenton, New Jersey 08625

Approved by: ______________________

CRO - MIDDLESEX COUNTY DEPT. OF HEALTH 07/25/88-53

APPENDIX I.5

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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
/ /	/ /		

P☐ 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.

76-19-11 (5/88)—10

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF AIR RESOURCES

Instructions and Application

PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

Gasoline Storage and Transfer

All gasoline stations in Nassau, Rockland, Suffolk and Westchester Counties plus the five Boroughs of New York City must complete this form to comply with Part 230 of the New York State Department of Environmental Conservation Law. This completed form should be accompanied by site plans which include drawings of the Stage II underground piping system from the dispensers to the tanks, and piping to the vents. In addition, all completed forms must be submitted to your local DEC Regional Office with the application fee accompanying it. Part 230 is designed to limit the emission of gasoline vapors into the atmosphere. The inventory portion of this form will be used to determine how much gasoline vapor is emitted to the atmosphere from gasoline dispensing sites.

Air pollution control devices are required on certain gasoline storage tanks and dispensing pumps. Most tanks must be equipped with submerged fill and a vapor balance and return system during loading operations. Some gasoline dispensing stations require a Stage II vapor collection system which captures the vapors from the motor vehicle fuel tank and transfers them to the underground tanks.

Copies of Part 230, booklets on Stage II containing descriptions of DEC approved systems, and assistance in completing this form may be obtained from any DEC Regional Office.

All applicants must complete Sections A and B. Please note that each line in Section B contains information for each individual tank. One line should be filled out for each tank at the service station.

SECTION A

Name and Address of Owner of Tanks	Legal owner of the storage tanks.
Facility Name, Operator and Address	Facility name and operator of service station, this should be the person in charge at the facility.
Owners Representatives Title	Person who is completing this form, such as the distributor or field representative.
Annual Throughput	Total number of gallons of gasoline, (excluding diesel), pumped into storage tanks between January 1 and December 31 of the previous year.
Number of Nozzles	Total number of gasoline nozzles, (excluding diesel), used for vehicle refueling.

SECTION B **STAGE I**

Tank I.D. Number	Use the tank I.D. number system used at the facility.
Date Tank Installed	Specify the date of completed construction and installation of the tank.
Capacity	Enter the total design or maximum capacity of tank.
Contents	Specify normal type or grade of gasoline stored in tank, L for leaded, U for regular unleaded, S for super unleaded, M for miscelleaneous, D for diesel. Diesel fuel is not a gasoline under provisions of Part 230 but should be included on this portion of the form.
Submerged Fill	Does this tank have a drop tube to discharge liquid within six inches of bottom of tank?. Specify Y for yes, N for no.
Stage I	Does tank have a vapor collection system with a vapor-tight return from tank to the gasoline transport vehicle or equivalent? Specify Y for yes, N for no.

SECTION C **STAGE II**

To be completed by any new or modified facility, and any facility with an annual gasoline throughput exceeding 250,000 gallons.

DEC Approved Stage II System I.D.	Enter DEC approved Stage II system number.

A publication containing a description of DEC approved Stage II systems can be obtained at any DEC Regional Office.

IMPORTANT: The yellow copy of this form should be kept at the facility to assist operator and air pollution personnel during inspection.

APPENDIX I.6

CLEAN AIR PROGRAM - STAGE II VAPOR RECOVERY SYSTEM
METROPOLITAN DADE COUNTY, FLORIDA

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

APPENDIX I.7

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

Instructions for
Motor Vehicle Fuel Dispensing Facility
Registration and Classification Form

A motor vehicle fuel dispensing facility is any facility where motor vehicle fuel is dispensed into motor vehicle fuel tanks or portable containers from a storage tank with a capacity of 250 gallons or more.

1. FACILITY OWNER: Fill in the name of the individual or corporation which owns the facility, the business telephone number, and the complete mailing address.

2. FACILITY OPERATOR/LESSEE: Fill in the name of the individual who manages the facility, the business telephone number, and the complete mailing address. If the manager also owns the facility (i.e., #1 and #2 are the same), write in "SAME."

3. FACILITY INFORMATION: Fill in the name of the facility, the telephone number of the facility, and the street address of the facility. In addition, check only one of the boxes designating whether the facility is limited to dispensing fuel, or includes repair work as well as dispensing fuel.

4. SUBSTANTIAL MODIFICATION means a modification of an existing motor vehicle fuel dispensing facility which involves the addition of one or more new motor vehicle fuel storage tanks or the repair, replacement or reconditioning of any motor vehicle fuel storage tank in existence prior to November 1, 1989. If a modification has begun on the facility or it has been newly constructed since November 1, 1989, check "yes."

5. THROUGHPUT INFORMATION:

   a. Provide the actual total annual (yearly) amount, in gallons, of all gasolines and gasohols (not including diesel) dispensed at the facility for either 1988 or 1989, whichever is higher. Do NOT average between the two years. If the facility has been newly constructed since November 1, 1989, skip to item #6.

   b. Provide the total monthly amount, in gallons, of all gasolines and gasohols (not including diesel) dispensed at the facility for the month with the highest throughput for the period 1988 through 1989. Do NOT provide an average of the months for the two years, but rather, the actual monthly throughput. Again, if the facility has been newly constructed since November 1, 1989, skip to item #6.

6. STATEMENT OF CERTIFICATION should be signed and completed by the legally responsible person. For example, in the case of an independently owned station, the station owner should sign. In the case of a company owned station, you should check with your district manager, as he may need to sign.

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 Environmen[illegible] Protection, Division of Air Quality Control Stage II Program, One [illegible] 8th Floor, Boston, MA 02108

Instructions for Stage II Facility Installation and Compliance Form

PHASE 1. The following items must be completed and submitted no later than 30 days prior to installation of vapor collection and recovery equipment:

1. **Facility Owner:** Fill in the name of the individual or corporation which owns the facility, the business telephone number, and the complete mailing address.

2. **Facility Operator/Lessee:** Fill in the name of the individual who manages the facility, the business telephone number, and the complete mailing address. If the manager also owns the facility (i.e., #1 and #2 are the same), write in "SAME."

3. **Facility Information:** Fill in the name of the facility, the telephone number at the facility, and the street address of the facility.

4. **Type of Vapor Collection and Control System:** Check the box which most accurately describes the type of vapor collection and control system you intend to install at your facility, If you intend to install a combination of vapor balance and vacuum assist systems, check "Other," and explain briefly.

5. **Vapor Collection and Control Equipment Information:** Provide the number of nozzles, hoses, and dispensers you plan to install, and for each piece of equipment you must provide the manufacture's name, model number, and CARB (California Air Resources Board) number. Only equipment which has already been approved by CARB is acceptable. If you are uncertain as to the CARB number, ask the installer or distributer of your equipment. Please do not call the Department for this information. Use a separate piece of paper, if necessary.

6. **Anticipated Dates of Completed Installation:** Provide the dates you intend to have your equipment installed. If it has already been installed, please provide the actual date(s). If only one date is actual, circle that date and check the box. If both dates are actual, circle both dates and check the box.

7. **Statement of Notification** should be signed and completed by the legally responsible person. For example, in the case of an independently owned station, the station owner should sign. In the case of a company-owned station, check with your district manager, as he may need to sign. **AFTER COMPLETION OF ITEM #7, RETURN THE WHITE COPY TO THE DEP.**

PHASE 2. Within 30 days of installation and operation of equipment the following item must be completed, and the YELLOW copy submitted to DEP:

8. **Statement of Certification:** The same person who signed item #7 should sign item #8 on the yellow copy of the form and return it to the DEP within 30 days of installation and operation of equipment. If there have been any changes regarding the number, type, and/or model of the equipment you planned to install versus the equipment actually installed, please provide the updated information (as required in item #5) on a separate piece of paper.

Note that your signatures on the forms are CERTIFICATIONS that your facility is operating in compliance with the provisions of 310 CMR 7.24(6). Be advised that failure to comply with the regulation may result in administrative penalties of up to $25,000 per day, per violation.

See other side for additional instructions.

Questions and Answers and Instructions for Stage II Facility Installation and Compliance Form

Is completion of this form required?

Yes. Completion of the Stage II Facility Installation and Compliance Form is required under Department of Environmental Protection (DEP) regulation 310 CMR 7.24(6). Failure to accurately complete and return this form may subject you to administrative penalties.

Who is required to complete this form?

The form must be completed by all motor vehicle fuel dispensing facilities subject to the regulation. A motor vehicle fuel dispensing facility is any facility where motor vehicle fuel is dispensed into motor vehicle fuel tanks or portable containers from a storage tank with a capacity of 250 gallons or more. If you are uncertain as to whether your facility is subject to the regulation, call the DEP Stage II Office at 617-556-1035.

How should this form be completed and submitted?

This form must be completed in two (2) phases as follows:

Phase 1. As soon as possible, but no later than 30 days PRIOR to the anticipated date of installation of the above ground equipment, you must complete items #1-7 and return the WHITE (top) copy to the DEP. (In cases where vapor collection and control equipment has already been installed, fill out and send in the white copy as soon as possible.)

Phase 2. No later than 30 days AFTER activation of vapor collection and control equipment, you must complete item #8 on the remaining pages of the form and return the YELLOW copy to the DEP. You should retain the PINK copy for your records.

What if there have been changes to my original plans after I have submitted the white copy to DEP? How do I submit updated information to DEP?

If there are any changes as to the type of vapor collection and control equipment described on the white copy of the form, and that which is finally operational, please provide the specifics required in item #5 on a separate piece of paper, along with any other additional changes that may be necessary to update any other information provided on the form. Any information submitted on a separate sheet must clearly describe the information required, as well as indicate precisely what information is being updated. All attachments must be signed by the legally responsible person and submitted with the YELLOW copy of the form.

Where do I return the forms?

Return the forms to: Department of Environmental Protection
Division of Air Quality Control - Stage II
One Winter Street, 8th Floor
Boston, MA 02108

ALL INFORMATION YOU PROVIDE SHOULD BE PRINTED CLEARLY OR TYPED. IF YOU HAVE ANY QUESTIONS, CALL THE STAGE II OFFICE AT 617-556-1035.

Please Turn Over the Page for Step-by-Step Instructions for Completion of the Form.

9/90

APPENDIX J
STAGE II INSTALLATION TEST METHODS

While efficiency testing is not practical for each service station, there are tests that indicate improper installation of underground Stage II vapor piping. These tests are the pressure decay/leak test, the dynamic back-pressure test, and the liquid blockage test. Testing requirements are usually included as a permit condition. After a brief description of the test methods, various test methods from San Diego and Bay Area Districts of California are contained in this appendix. There are five tests discussed in Chapter 6.

1. Pressure Decay/Leak Test. This test procedure is also sometimes called simply the leak test. Example test procedures are contained in sections J.1 and J.5 of this appendix.

2. Dynamic Pressure Drop Test. This test method is also referred to as the pressure vs. flow test, and sometimes the "dry" pressure drop test. Copies of this test method are contained in section J.2 and J.4 of this appendix.

3. Liquid Blockage Test. The test methods for the dynamic pressure drop test are used to test for liquid blockage. This is also sometimes referred to as the "wet" pressure drop test. The methods in J.2 and J.4 discuss this variation of the test method.

4. Liquid Removal Device Test. This test method is contained in section J.3.

5. Flow rate determination. This test procedure is discussed in Chapter 6. However, since this only involves timing as gasoline is being dispensed, no test method is

included in this appendix.

Specifically, this appendix contains:

APPENDIX J.1

BAY AREA ST-30 LEAK TEST PROCEDURE

Source Test Procedure ST-30

GASOLINE DISPENSING FACILITY

LEAK TEST PROCEDURE

REF: Regulation 8-7-301, 302

1. Applicability

1.1 This Test Procedure is used to quantify the vapor tightness of any vapor recovery system installed at a gasoline dispensing facility (GDF). Leaks in a balance system may cause excessive vapor emissions. Leaks in a vacuum assist system may decrease the efficiency of the vapor collection or processing system.

2. Principle

2.1 The entire vapor recovery system is pressurized to ten (10) inches of water column and then allowed to decay for five (5) minutes. The acceptability of the final pressure is based upon the vapor system volume or ullage space.

3. Range

3.1 The minimum and maximum full-scale ranges of the pressure gauge are 0-10 and 0-20 inches of water column, respectively. Maximum incremental graduations of the pressure gauge shall be one-tenth of an inch water column.

4. Interferences

4.1 On vacuum assist systems the processor must be isolated and the vapor system capped. On a balance system the vent pipes must be capped or plugged. Any leakage at these points will show up as a system component leak.

5. Apparatus

5.1 Nitrogen. Use commercial grade nitrogen in a high pressure cylinder, equipped with a two-stage pressure regulator and a one psig pressure relief valve.

5.2 Pressure Gauge or Water Manometer. Use a 0-10 inch water column pressure gauge, or water manometer, to measure the pressure decay in the vapor recovery system. The pressure gauge shall be readable to the nearest tenth of an inch (0.1) water column.

5.3 Vent Cap Assembly. See Figure 30-1 for example.

5.4 "T" Connector Assembly. See Figure 30-2 for example.

5.5 Stopwatch. Use a stopwatch accurate to within 0.2 seconds.

6. Pre-Test Procedures

6.1 Dispensing shall not take place during the test. There shall have been no bulk drops into the storage tanks within the three hours prior to the test.

6.2 Measure the gasoline gallonage in each underground storage tank. Determine the actual capacity of each storage tank. Calculate the ullage space for each tank by subtracting the gasoline gallonage present from the actual tank capacity. The minimum ullage during the test shall be 30 percent of the tank capacity or 500 gallons, whichever is greater. The vent pipes may be manifolded during the test to achieve the required ullage.

6.3 Insure that all Phase I couplers are equipped with a locking dust cap. Replace the manhole covers as a safety precaution.

6.4 Disconnect the dispenser end of one vapor recovery hose and install the "T" connector assembly (see Figure 30-2). Connect the nitrogen gas supply (do not use air), and the pressure gauge to "T" connector.

6.4.1 For those Phase II systems utilizing a remote vapor check valve, the "T" connector assembly shall be installed on the vapor riser side of the check valve unless the remote check valve is disabled by removing the poppet on the fuel side.

6.5 Install the vent cap assembly(s) (see Figure 30-1). For manifolded systems all storage tank vent pipes shall be capped during the test.

6.6 If the storage tank vent pipe is open, and easily accessible, a modified version of the "T" connector may be installed at the vent pipe (see Figure 30-3). This will allow the test to be conducted without any dispenser modifications. This is advantageous at certain facilities using coaxial Phase II systems.

7. Testing

7.1 Open the nitrogen gas supply valve, regulate the delivery pressure to 5 psig, and pressurize the vapor system (or subsystem for individual vapor return line systems) to or slightly above 10 inches H_2O initial pressure. It is critical to maintain the nitrogen flow until both flow and pressure stabilize, indicating temperature and vapor pressure stabilization in the tanks. Check the vent cap assembly(s) and "T" connector assembly using leak detecting solution to verify that the test equipment is leak tight.

7.2 Close the nitrogen supply valve and start the stopwatch when the pressure decreases to the initial starting pressure of 10 inches of water column.

7.3 After each minute record the system pressure. After five minutes, record the final system pressure. See Table 30-I to determine the acceptability of the final system pressure results.

7.4 If the system failed to meet the criteria set forth in Table I repressurize the system and check all accessible vapor connections using leak detector solution or a combustible gas detector. If vapor leaks in the system are encountered, repair or replace the defective component and repeat the test.

7.5 Carefully remove the vent cap assembly(s). Allow any remaining pressure to be relieved through vent pipe(s). Keep all potential ignition sources away from the vent pipe(s).

7.6 After the pressure is relieved, remove the "T" connector assembly and reconnect the vapor recovery hose. If the fuel poppet was removed from a remote vapor check valve to conduct this test, carefully replace the poppet and reconnect the vapor hose.

7.7 If the vapor recovery system utilizes individual vapor return lines, repeat the leak test for each of the other gasoline grades. Avoid leaving any vapor return line open longer than is necessary to install or remove the "T" connector assembly.

8. Reporting

8.1 The calculated ullage and system pressures for each five minute vapor recovery system test shall be reported as shown in Figure 30-4.

TABLE 30-I

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

"head"

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.

FIGURE 30 - 1

VENT CAP ASSEMBLY

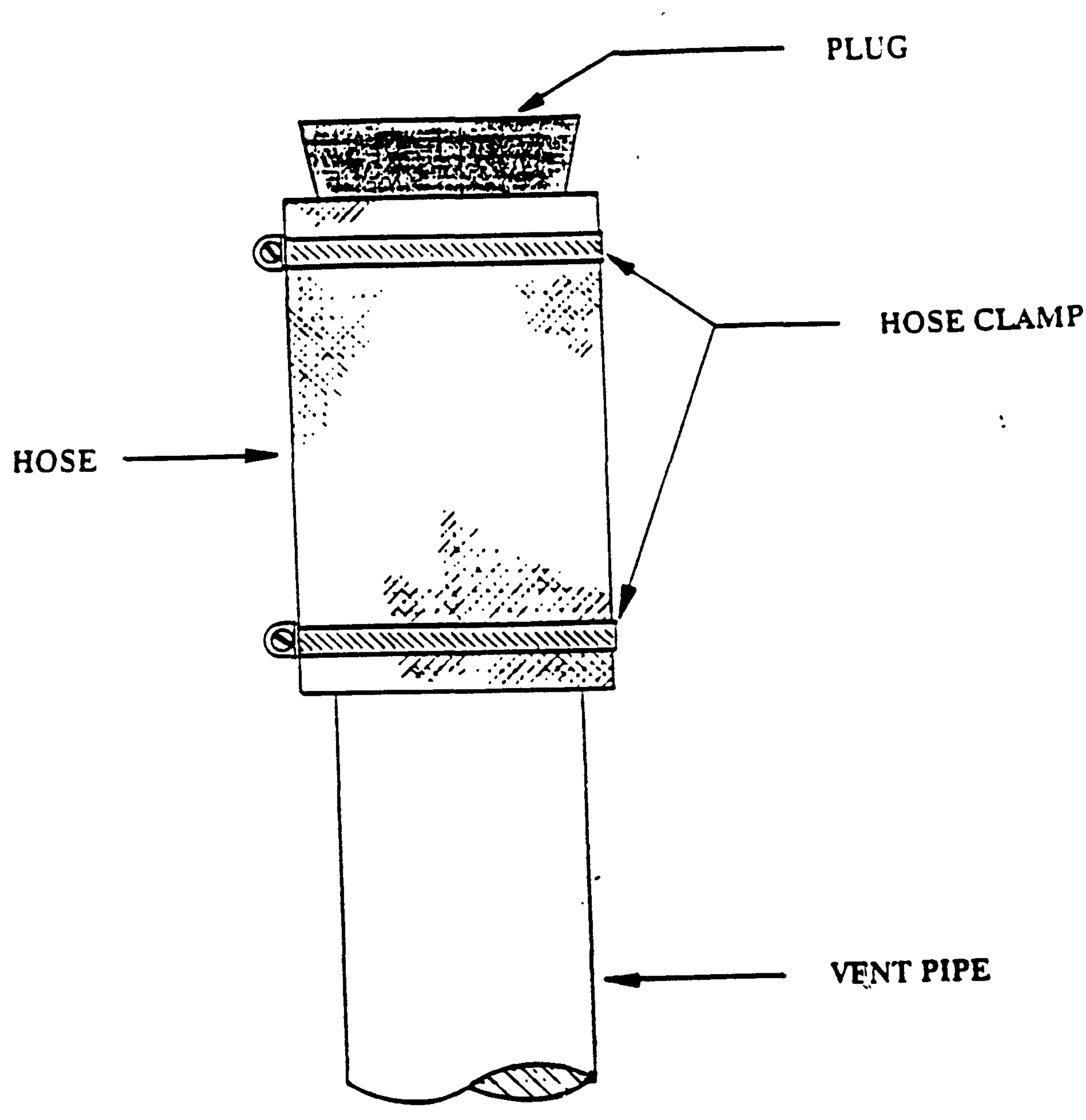


FIGURE 30 - 2

"T" CONNECTOR ASSEMBLY

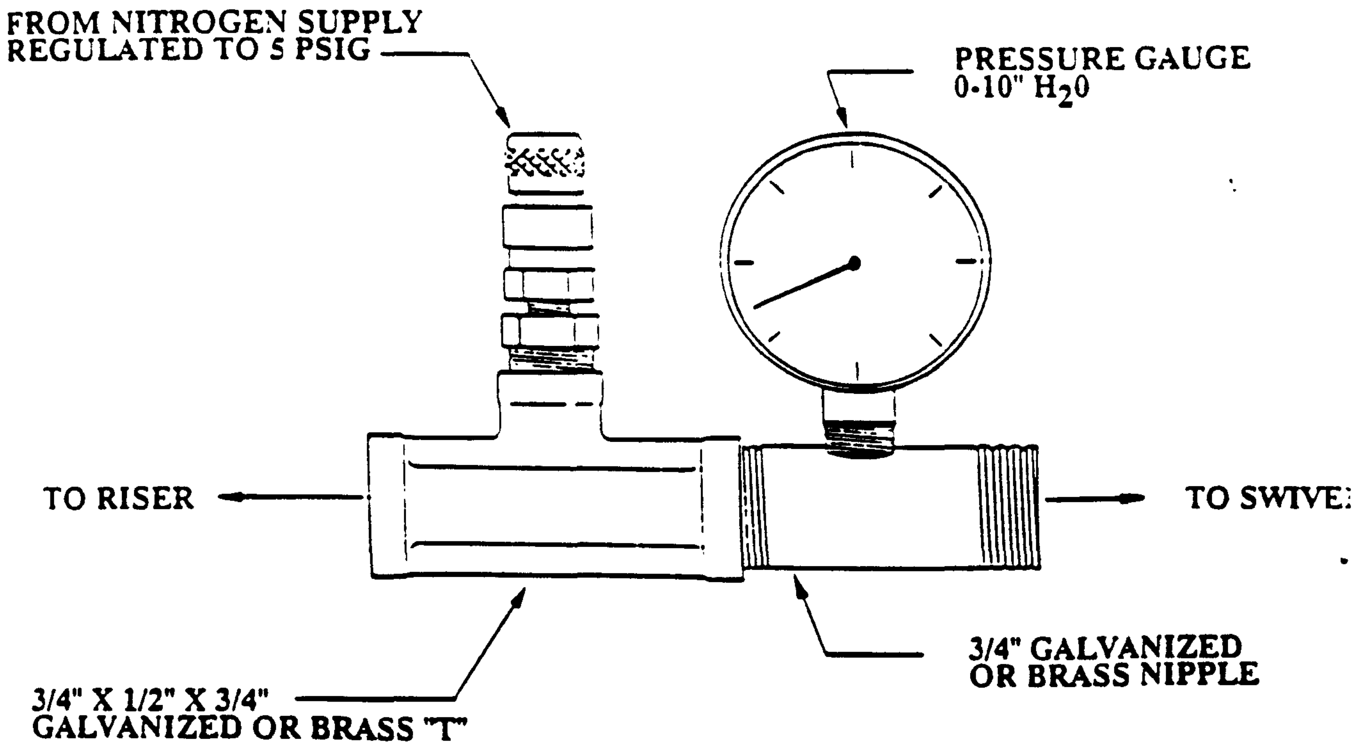


FIGURE 30 - 3

ALTERNATE VENT CAP ASSEMBLY

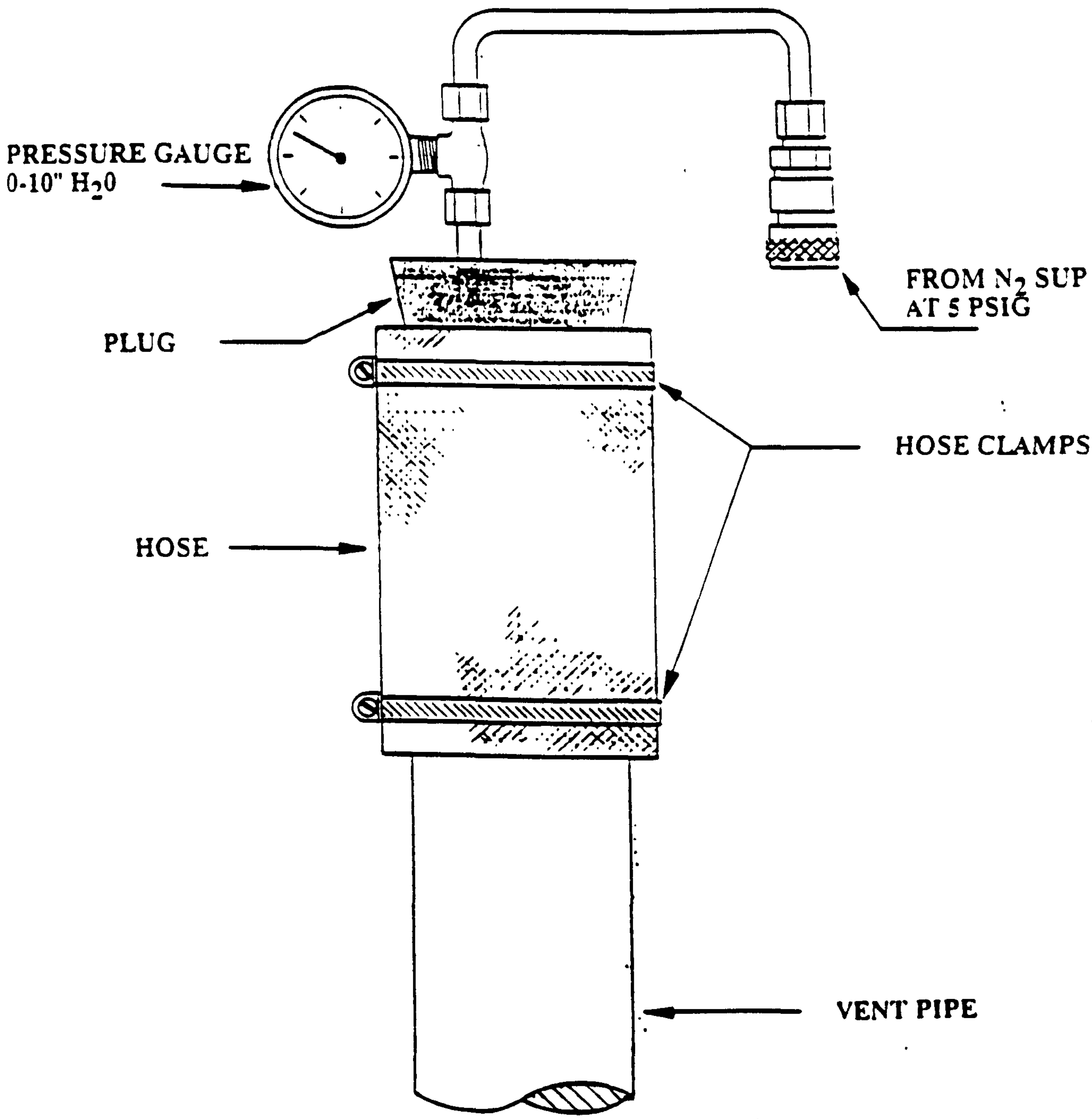


FIGURE 30 - 4

SUMMARY OF SOURCE TEST RESULTS

Report No. ____________

Test Date: ____________

Test Times:

Run A: ____________

Run B: ____________

Run C: ____________

SOURCE INFORMATION		FACILITY PARAMETERS
Firm Name and Address	Firm Representative and Title Phone No.	PHASE II SYSTEM TYPE (Check One) Balance ______ Hirt ______ Red Jacket ______ Hasstech ______ Healy ______ Manifolded?(Y or N) ______
Permit Conditions	Source: Vapor Recovery System Plant No. Permit No. Operates hr/day & 365 days/yr	

Operating Parameters:

Tank #	Capacity	Gallons Present
1	______	______
2	______	______
3	______	______

Applicable Regulations:

VN Recommended:

Source Test Results and Comments:

Tank #:	1	2	3
Product Grade:	______	______	______
Actual Tank Capacity, gallons	______	______	______
Gasoline Volume, gallons	______	______	______
Ullage, gallons	______	______	______
Initial Pressure, inches H_2O	______	______	______
Pressure After 1 Minute, inches H_2O	______	______	______
Pressure After 2 Minutes, inches H_2O	______	______	______
Pressure After 3 Minutes, inches H_20	______	______	______
Pressure After 4 Minutes, inches H_20	______	______	______
Final Pressure After 5 Minutes, inches H_20	______	______	______

NO COMMERCIAL USE OF THESE RESULTS IS AUTHORIZED.

Test Conducted by	Test Company	Date of Test

Form: Summary of Source Test Results

PBSTB: oct 16 July 6

APPENDIX J.2

BAY AREA ST-27 DYNAMIC BACK PRESSURE

SOURCE TEST PROCEDURE ST-27

GASOLINE DISPENSING FACILITY

DYNAMIC BACK PRESSURE

REF: Regulation 8-7-302

1. Applicability

1.1 This procedure is used to quantify the dynamic back pressure in the vapor path leading from the dispensing nozzle to the underground tank, inclusively. It is applicable in all cases where vapor balance or Hirt vacuum assist Phase II systems are utilized.

2. Principle

2.1 The dynamic back pressure during refueling is simulated by passing nitrogen through the Phase II recovery system at a constant rate. The resultant dynamic back pressure is measured using a pressure gauge. Alternate Methods 1 and 2 are also included for those Phase II systems which utilize a remote vapor check valve.

3. Range

3.1 The minimum and maximum dynamic back pressures that can be measured are dependent upon available pressure gauges. Recommended gauge ranges are 0-.5 inches H_2O and 0-2 inches H_2O for Alternate Methods 1 and 3. Recommended ranges for Alternate Method 2 are 0-.50 inches H_20 and 0-1 inch H_20.

4. Interferences

4.1 Any leaks in the nozzle vapor path, vapor hose, or underground vapor return piping will result in erroneously low dynamic back pressure measurements.

5. Apparatus

5.1 Nitrogen High Pressure Cylinder with Pressure Regulator. Use a high pressure nitrogen cylinder capable of maintaining a pressure of 2000 psig and equipped with a compatible two-stage pressure regulator.

5.2 Rotameter. Use a calibrated rotameter capable of accurately measuring nitrogen flowrates of 20, 60, and 100 CFH and equipped with a flow control valve.

5.3 Pressure gauges. Use two Magnehelic differential pressure gauges, or equivalent with appropriate ranges , and equipped with toggle valves connected to the high pressure inlets.

5.4 Automobile fill pipe. Use a fill neck known to be compatible with all vapor recovery nozzles and equipped with a pressure tap.

5.5 Nitrogen. Use commercial grade nitrogen.

5.6 Hand Pump. Use a gasoline compatible hand pump to drain condensate pots.

6. Pre-Test Procedures

6.1 For those Phase II systems which **do not** utilize a remote vapor check valve, assemble the apparatus as shown in Figure 27-1, ensuring that the riser shut-off valve on the test equipment is closed. If a Hirt Phase II system is used, the vacuum producing device should be turned off during this test.

6.2 The test equipment must be leak-checked prior to use. Plug the nozzle end of the auto fill pipe, open the nitrogen cylinder and the toggle valves on the magnehelic gauges. Adjust the flow meter control valve until a pressure of 50 percent of full scale is indicated on the high range pressure gauge. Close the nitrogen cylinder valve and toggle valves. A pressure decay of 0.2 inches H_2O, in five minutes, is considered acceptable.

6.3 Perform an initial visual examination for vapor leaks at the nozzle and hose of the Phase II system to be tested.

6.4 Disconnect and drain the vapor hose for all dispensers to be tested. Pour two (2) gallons of gasoline into each vapor return riser. Reconnect vapor hose. Allow fifteen (15) minutes for liquid in the vapor return piping to drain. For Phase II systems which do not employ a remote vapor check valve, the 2 gallons of gasoline may be introduced through the vapor passage in the nozzle.

6.5 Completely drain all gasoline from the spout and bellows.

6.6 For those vapor piping configurations which utilize a condensate pot, drain the pot prior to testing.

6.7 For Alternate Methods 1, 2, and 3 the Phase I vapor poppet shall be propped open in such a manner that the valve is not damaged.

7. Testing

7.1 **Alternate Method 1.** Phase II systems which **do not** utilize a remote vapor check valve may be tested using the following methodology. Insert the nozzle into the fill pipe of the pressure drop test unit, ensuring that a tight seal at the fillpipe/nozzle interface is achieved. Ensure that the riser shut-off valve on the test equipment is closed.

7.2 Close both toggle valves and connect the nitrogen supply.

7.3 Open the nitrogen supply, set the delivery pressure to 10 psig, and use the flowmeter control valve to adjust the flowrate to 20 CFH.

7.4 Open the toggle valve on the 0-.5 inches H_2O gauge. If the pressure is greater than 0.5 inches H_2O, close this valve and use the 0-2 inches H_2O gauge.

7.5 A pulsating gauge needle indicates nitrogen passing through a liquid obstruction in the vapor return system. If this occurs, close the flowmeter control valve, disengage the nozzle and redrain the nozzle and hose assembly. Re-engage the nozzle, open the flowmeter control valve and repeat the test.

7.6 Repeat Sections 7.3 through 7.5 for nitrogen flowrates of 60 and 100 CFH.

7.7 The following information should be recorded on the field data sheet shown in Figure 27-2:

Pump Number and Product Grade
Nozzle make and model
Nitrogen flowrate, CFH
Dynamic back pressure, inches H_2O

7.8 Close and replace the dust cover on the Phase I poppet.

7.9 Alternate Method 2. Phase II systems which utilize a remote vapor check valv may be tested using the following methodology.

7.9.1 Disconnect the vapor recovery hose from the remote vapor valve. Test th nozzle/hose assembly pursuant to Sections 7.1 through 7.8 and record the results.

7.9.2 Disconnect the vapor check valve from the riser and connect a compatibl pipe fitting to the riser as shown in Figure 27-1.

7.9.3 Plug the nozzle end of the fill pipe on the pressure drop test unit and ope the riser shut-off valve on the test equipment.

7.9.4 Repeat Sections 7.2 through 7.8. In addition to the information required i Section 7.7, record the make and model of the remote vapor check valve.

7.9.5 Record on the field data sheet the pressure drop across the remote vapo check valve. This data is available from the manufacturer.

7.9.6 Add the dynamic back pressures, for each nitrogen flowrate, obtained fron Sections 7.9.1, 7.9.4 and 7.9.5.

7.10 Alternate Method 3. Phase II balance and Hirt systems which use those model of remote vapor check valves which can be disabled by removing the poppet on the fuel sid may be tested using the following methodology. The Emco-Wheaton A-228 remote vapo check valve <u>cannot</u> be tested using this method.

7.10.1 Carefully open the fuel side of the remote vapor check valve and remov the fuel poppet. Carefully replace the threaded plug on the fuel side of the valve.

7.10.2 Test the Phase II system pursuant to Sections 7.1 through 7.8, recordin the data on the field data sheet shown in Figure 27-2.

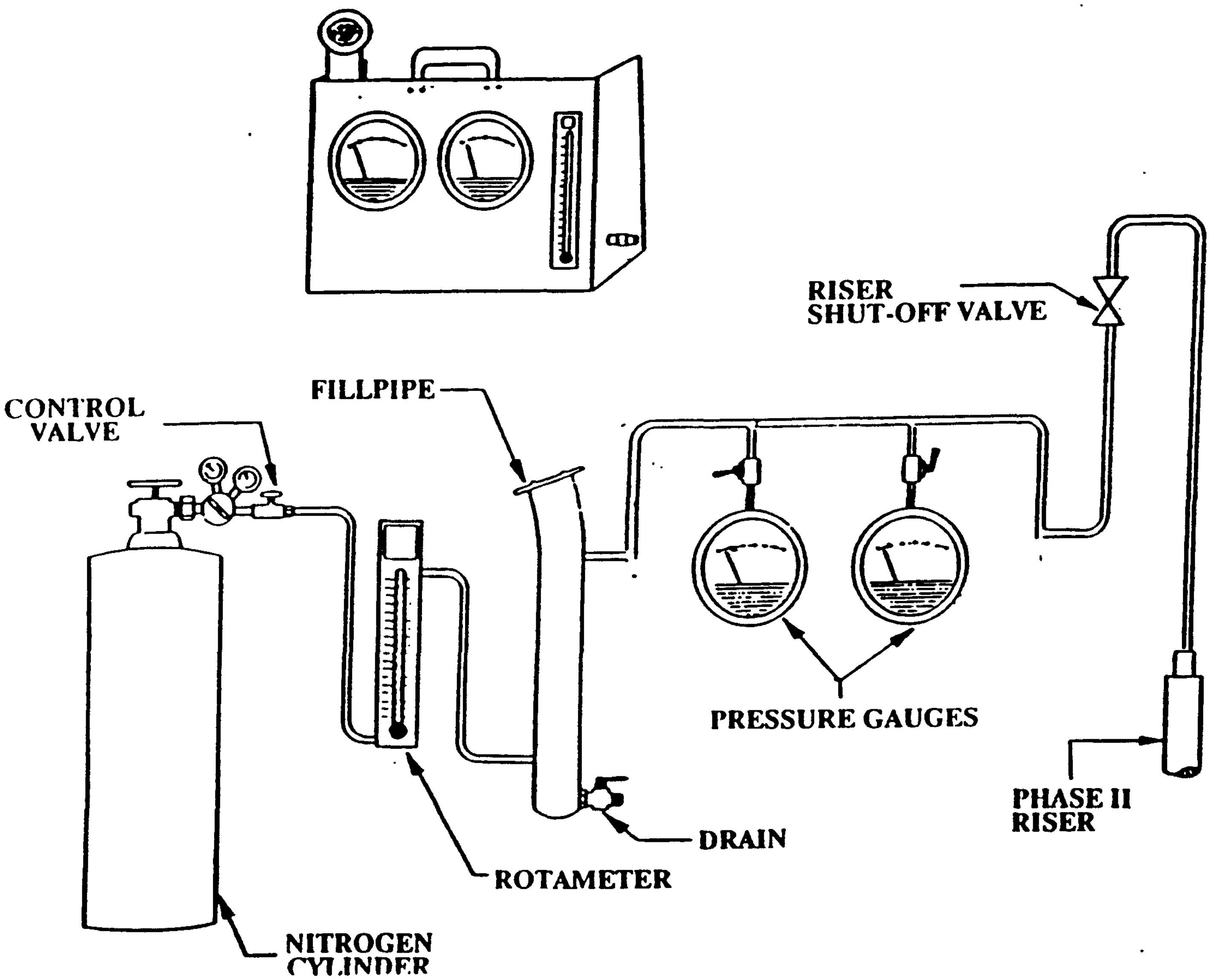
7.10.3 Carefully reassemble the remote vapor check valve by removing the plu on the fuel side and reinserting the fuel poppet. Replace the threaded fuel plug.

8. Reporting

8.1 Results from Alternate Methods 1 or 3 shall be reported as shown in Figure 27-2 Results from Alternate Method 2 shall be reported as shown in Figure 27-3. The maximun allowable system dynamic back pressures, with the dry brakes open, are as follows:

NITROGEN FLOWRATE, CFH	**DYNAMIC BACK PRESSURE, INCHES H_2O**
20	**0.15**
60	**0.45**
100	**0.95**

Figure 27 - 1
PRESSURE DROP TEST UNIT



SUMMARY OF SOURCE TEST RESULTS

Firm Name and Address

____

____

____

Testing Company Name and Address

____

____

____

PUMP #	GASOLINE GRADE	NOZZLE MFG.& MODEL NUMBER	DYNAMIC BACK PRESSURE, INS. W.C. 20 CFH	60 CFH	100 CFH	COMMENTS

Test Conducted By ______________________

Date ____________

Company Name ____________ Address ____________ City ____________ Phone ____________

Test Date ____________ Test Company ____________ Address ____________ City ____________

SUMMARY OF SOURCE TEST RESULTS

PUMP #	GAS GRADE	NOZZLE MODEL	NITROGEN FLOW,CFH	VAPOR VALVE MODEL	DYNAMIC BACK PRESSURE, INCHES OF WATER COLUMN			
					NOZZLE/HOSE ASSEMBLE	RISER TO U.G TANK	VAPOR VALVE	TOTAL Δ P,IN H_2O

Figure 27 - 3

APPENDIX J.3

BAY AREA LIQUID REMOVAL DEVICES (DRAFT METHOD)

SOURCE TEST PROCEDURE ST-37

GASOLINE DISPENSING FACILITY

LIQUID REMOVAL DEVICES

REF: 8-7-302

1. Applicability

1.1 This procedure is used to quantify the removal of liquid gasoline from the vapor passage of coaxial hoses equipped with a liquid removal device. It is applicable in all cases where a liquid removal system is installed in conjunction with a Phase II balance system.

2. Principle

2.1 A dynamic back pressure baseline is established pursuant to Source Test Procedure ST-27. Sufficient liquid gasoline is introduced into the vapor passage of the coaxial hose to produce a dynamic back pressure between 2.0 and 6.0 inches water column at a nitrogen flowrate of 60 CFH. After ten gallons of gasoline are dispensed the dynamic back pressure is measured and compared to the baseline value. The total liquid volume removed is also considered.

3. Range

3.1 The minimum and maximum dynamic back pressures that can be measured are dependent upon available pressure gauges. Recommended gauge ranges are 0-.5 inches H_2O and 0-10 inches H_2O.

4. Interferences

4.1 Any leaks in the nozzle vapor path or hose vapor path will result in erroneous results.

4.2 Alteration of the hose and loop configuration between the prefueling test and the post refueling test can result in erroneous results.

4.3 If the hose connection. at the dispenser, is sufficiently low to allow the 100 CFH nitrogen flow to displace liquid gasoline into the underground Phase II piping, this test procedure shall not be used.

5. Apparatus

5.1 Delta P Test Unit. Use a test unit, as shown in Figure 37-1. This test assembly shall be equipped with two pressure gauges of appropriate ranges, a compatible automobile fillpipe, and a 0-100 CFH flowmeter equipped with a flow control valve. The test unit shall be securely mounted on a stand such that the height, above grade, to the fillpipe opening is 30 inches.

5.2 Stopwatch. Use a stopwatch accurate to within 0.2 seconds.

5.3 Nitrogen High Pressure Cylinder with Regulator. Use a high pressure supply of commercial grade nitrogen in a cylinder capable of withstanding a pressure of 2,500 psig. The cylinder shall be equipped with a compatible two-stage regulator and a high pressure delivery hose.

5.4 Graduated Cylinder. Use a shatterproof 0-300 milliliter cylinder which is compatible for use with gasoline.

5.5 Pressure Gauge. Use a 0-30 psig pressure gauge to measure the gasoline delivery pressure.

6. Pre-Test Procedures

6.1 Use a stopwatch to accurately measure the gasoline dispensing rates at high, medium, and low nozzle hold-open clip settings. For those nozzles without hold-open latches. use wedges to simulate the three latch positions. Record this data on the Liquid Removal Field Data Sheet shown in Figure 37-2.

6.2 Use the 0-30 psig pressure gauge to quantify the gasoline delivery pressure. If possible, this pressure shall be measured with only one nozzle is dispensing the given gasoline grade. Record this pressure on the Liquid Removal Field Data Sheet.

6.3 Position the Delta P Test Unit 48 inches from the face of the dispenser in order to represent a typical refueling configurations.

6.4 Completely drain all liquid from the vapor passage of the coaxial hose. Sufficient time shall be allocated for this pre-test procedure, especially if the hose has internal convolutions.

6.5 Use the graduated cylinder to pour 150 milliliters of gasoline into the vapor passage of the hose.

6.6 Completely drain the gasoline from the vapor passage back into the graduated cylinder. Subtract this quantity from the original 150 milliliters. This value represents the volume of gasoline lost due to surface adhesion to the hose wall.

6.7 With no dispensing activity occurring at the gasoline dispensing facility, conduct the dynamic back pressure tests at nitrogen flowrates of 20, 60, and 100 CFH, in accordance with Source Test Procedure ST-27. Record the results on the Liquid Removal Field Data Sheet. This establishes the dry baseline values for dynamic back pressures.

7. Testing

7.1 Use the graduated cylinder to pour 150 milliliters of gasoline into the vapor passage of the hose.

7.2 With no dispensing activity occurring at the gasoline dispensing facility, conduct the dynamic back pressure test, in accordance with Source Test Procedure ST-27, at nitrogen flowrates of 20, 60, and 100 CFH. Record this data on the Liquid Removal Field Data Sheet. This establishes the wet baseline values for dynamic back pressures. Ensure that the dynamic back pressure, at 60 CFH, does not exceed six (6) inches H_2O. This will preclude the possibility of premature nozzle shutoff while dispensing fuel. If the wet baseline value is less than two (2) inches H_2O, use the graduated cylinder to add sufficient gasoline to raise the dynamic back pressure to a minimum of two (2) inches H_2O.

7.3 Move the Delta P Test Unit and position a vehicle such that the fillpipe inlet is in approximately (+/- six inches) the same location previously occupied by the Delta P Test Unit fillpipe.

7.4 Using the low hold-open clip setting, dispense 10.0 gallons into the vehicle gas tank. Record the exact gallonage on the Liquid Removal Field Data Sheet.

7.5 Move the vehicle and return the Delta P Test Unit to it's original position, using the traced outline of the base to verify it's position.

7.6 Conduct the dynamic back pressure test, in accordance with Source Test Procedure ST-27, at nitrogen flowrates of 20, 60, and 100 CFH. Record this data on the Liquid Removal Field Data Sheet. These values represent the post-refueling dynamic back pressures.

7.7 Carefully drain any gasoline present in the vapor passage of the hose into the graduated cylinder. Record this data on the Liquid Removal Field Data Sheet.

7.8 Repeat Sections 6.3 through 6.7 and Sections 7.1 through 7.7 with the hold-open clip in both the medium and high positions. Record this data on the Liquid Removal Field Data Sheet.

8. Calculations

8.1 The volume of liquid gasoline removed from the hose vapor passage per gallon of gasoline dispensed is calculated as follows:

$$V_R = \frac{(V_I - V_W) - V_F}{G}$$

Where:

V_R = Gasoline removed per gallon dispensed, milliliters/gallon
V_I = Total initial volume poured into hose vapor passage, milliliters
V_W = The liquid lost due to wall adhesion, from Section 6.6, milliliters
V_F = The volume of gasoline remaining in the hose vapor passage after dispensing, from Section 7.7, milliliters
G = The total gallons dispensed, from Section 7.3, gallons

8.2 The percent increase in dynamic back pressure, from dry baseline to post refueling conditions, is calculated as follows:

$$P_I = \frac{P_{PR} - P_{DB}}{P_{DB}} \times 100$$

Where:

P_I = The percent increase in dynamic back pressure from dry baseline to post refueling conditions, percent
P_{PR} = The post refueling dynamic back pressure, inches H_2O
P_{DB} = The dry baseline dynamic back pressure, inches H_2O
100 = Conversion factor from decimal fraction to percent

9. Reporting

9.1 The results shall be reported as shown in Figure 37.3.

APPENDIX J.4

SAN DIEGO TEST PROCEDURE TP-91-2 PRESSURE DROP VS FLOW/LIQUID BLOCKAGE TEST PROCEDURE

SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT
TEST PROCEDURE TP-91-2*

PRESSURE DROP VS FLOW/LIQUID BLOCKAGE TEST PROCEDURE PHASE II BALANCE SYSTEM INSTALLATIONS

1.0 INTRODUCTION

This procedure is used to determine compliance with District Rules 61.4 and 61.8; Chapter 3, Article 5, California State Health & Safety Code (H&SC); and Title 17, Section 94006, California Code of Regulations (CCR). Back pressures due to flow resistances in the vapor return nozzles, hoses, dispensers, and piping was found, over years of testing, to be the primary cause of vapor losses from the balance vapor recovery systems. Therefore, various sections of Rule 61.4, the State Health & Safety Code, and Section 94006 of the CCR deal directly or indirectly with this potentially serious problem. All the applicable California State Air Resources Board (ARB) Executives Orders specify specific flow resistance limitations that are included in this procedure. Failure to meet this criteria is a violation of District Rule 61.4 and State law. New and modified installations that do not meet the criteria are not, according to State law, certified vapor recovery systems. Rule 61.8 and State law require that only certified systems be installed. Furthermore, this procedure is used to detect prohibited equipment defects listed pursuant to District Rule 61.4 and CCR Section 94006, and to determine if the underground vapor piping configuration complies with the applicable ARB Executive Orders as required by District Rules 61.4 and 61.8 and State law.

This procedure consists of two separate tests which must be conducted sequentially in the order indicated below:

1.1 Pressure vs Flow Test (Dry Test): This test is used to determine the pressure drop (flow resistance) through balance Phase II vapor recovery systems (including nozzles, vapor hose, swivels, dispenser piping and underground piping) at prescribed flow rates. The test method consists of flowing gaseous nitrogen through a calibrated test panel into the vapor recovery system at various flow rates to simulate the back pressure created during vehicle refueling. The resulting back pressures are measured near the nozzle faceplate using a pressure gauge and compared with ARB certification criteria.

1.2 Liquid Blockage Test (Wet Test): This test is used to determine if the piping configuration is correct and to detect low points in the piping where the accumulation of liquid condensate may cause blockages which restrict the flow of vapors and thus decrease the system's vapor collection efficiency. The test method consists of introducing gasoline into the vapor piping at the dispenser. When the gasoline can be heard dropping into the appropriate tank, enough gasoline is

This Test Procedure supercedes TP-79-2-A & TP-79-3-B. The Liquid Blockage Test described in this test procedure is also applicable for aspirator-assist Phase II installations.

deemed to have been added to create a blockage should a low point or other restiriction be present. Gaseous nitrogen is introduced into the vapor piping at a rate of 60 standard cubic feet per hour (SCFH). A liquid blockage is indicated either by the needle pegging on the pressure gauge and/or wild pulsing of the needle, or a reading in excess 0.45 inches of water gauge (wcg) back pressure at a flow of 60 SCFH of nitrogen.

Where there is underground piping, the San Diego Air Pollution Control District only requires that the test be performed after all vapor piping is in place and covered. Nevertheless, it is recommended for new construction that the contractor conduct this blockage test both before and after the vapor recovery piping is covered to minimize the extensive effort and cost associated with repairing the piping system should the vapor recovery system fail the test.

2.0 PREREQUISITES TO TESTING

The following requirements must be met before a valid test can be performed:

2.1 The District Must Be Notified - The appropriate person specified in the Air Pollution Control District Authority to Construct letter must be contacted within 10 working days of completion of construction to establish a mutually agreeable test date. Normally, the tests will be witnessed by a District representative; however, a District engineer may, under certain circumstances, authorize testing without a District observer being present. If the District is not notified of this test or any other required tests, then this test or other required tests may be declared invalid. If found invalid, testing may have to be repeated with a District observer present.

2.2 Condition of the Vapor Recovery System - The vapor recovery system must be proven leak tight with the District's pressure decay/leak test (see TP-91-1), or other method approved by the District, prior to conducting this test. There can be no alteration of the vapor recovery system between the time the pressure decay/leak test is conducted and this pressure drop test is run.

2.3 Restriction of Gasoline Dispensing Operations - During testing of a given product, no dispensing of that product will be allowed. If the vapor spaces of the underground storage tanks are manifolded, dispensing of gasoline from the entire station shall be prohibited during testing.

3.0 EQUIPMENT

The following equipment will be needed to perform the pressure vs flow and the liquid blockage tests :

3.1 A bottle of gaseous nitrogen and pressure regulators capable of regulating final downstream pressure to 5.0 pounds per square inch gauge (psig) are required. Use assorted valves, fittings, and pressure tubing as necessary. A means of providing a grounding path from the bottle of compressed nitrogen must be employed. The bottle shall be grounded for safety. It is recommended that the tubing be flexible metal tubing or non-metallic tubing that incorporates a grounding path throughout its length.

A pressure relief valve must be installed prior to testing. Attached it to the vapor piping or a storage tank vent within the piping system. The pressure relief valve must be adjusted to release at one psig (27.7 inches of water column gauge.) (The diaphragms in balance system nozzles are not designed to withstand pressures exceeding one psig and may be accidently ruptured if this procedure is not followed.)

WARNING - The nitrogen bottle must be securely fastened to a large, stationary object at all times. <u>A compressed gas cylinder which falls and is damaged can easily become a lethal projectile.</u>

3.2 A flow regulator is required that is capable of delivering nitrogen at very low pressure and at measured flow rates of 20, 60 and 100 SCFH.

3.3 A test panel as shown in Figure 1 must be used for testing balance system vapor flow restrictions. The panel consists of a section of vehicle fill pipe, attached pressure gauges, a drain to drain off gasoline liquid that spills into fillpipe from the nozzle fill spout, a plug in the back through which nitrogen enters the fill neck, a flow gauge to adjust nitrogen flow, control valves and attachments to connect the nitrogen bottle. The pressure drop through the Phase II system is determined using a gauge capable of accurately measuring pressures from 0 to 1 inch of water column gauge ("wcg) and readable in increments of 0.01" wcg. The gauge is used to measure back pressure before and after the gasoline is introduced. Pressure is to be sensed through a port, perpendicular to the direction of flow, located as close as possible to the vapor piping. An additional simultaneous-reading gauge with a 0 to 10" wcg range is desirable to quantify excessive flow resistance.

4.0 TEST PROCEDURES

4.1 <u>Pressure vs Flow Test (Dry Test)</u>:

The farthest dispensing nozzle from the underground tanks for each product grade shall be tested using the following procedure unless otherwise required in the Authority to Construct letter.

4.1.1 Prop open only the Phase I drybreak valve at the tank with the same product as the nozzle being tested. (The pressure drop is measured through the nozzle, vapor hoses, dispenser, vapor piping and through the tank to the Phase I drybreak. This comes close to duplicating the actual flow resistances that occur during normal opeations.) Set up traffic barriers in the vicinity of the drybreak valve to preclude the approach of potential ignition sources.

4.1.2 For manifolded systems, install the pressure relief safety valve, set at one psig (27.7 inches of water), over the opening of one of the storage tank vents and cap the remaining storage tank vents. (Manifolding the tank vent lines is prohibited.) For non-manifolded systems, test each product vapor recovery system separately with the pressure relief safety valve installed on the vent of the storage tank being tested. (Alternative setups may be used as long as they do not interfer with the objectives of the test and have prior District approval.) (Note: The tank vents are closed because it was discovered that wind flowing over open vents 12 feet high can interfere with the pressure measurements, even with the drybreaks open. Since the pressure decay/leak test must be conducted first, the caps and relief valve are usually already in place.)

4.1.3 If there is no remote check valve in the dispenser, proceed to Step 4.1.4. If the Phase II balance system employs a remote vapor check valve that can be disabled by removing the poppet on the fuel side, carefully open the fuel side of the remote vapor check valve and remove the fuel poppet. Replace the threaded plug on the fuel side of the valve.

4.1.4 Connect the pressure drop test device to the vapor return piping and the regulated nitrogen source. If the nitrogen is introduced through the vapor recovery nozzle, apply a film of lubricant to the faceplate of the nozzle to be tested and insert the nozzle into the fillpipe simulator of the test device. The nozzle must fit tightly.

4.1.5 Zero the pressure gauges.

4.1.6 Adjust the pressure regulators and the pressure drop panel flow control valve to produce a nitrogen flow rate of 20 SCFH. Record the back pressure (balance system pressure drop) measured immediately upstream of the vapor piping, i.e., at the entrance to the nozzle, in the appropriate space of the data log (attached).

4.1.7 Repeat steps 4.1.6 above with flow rates of 60 SCFH and 100 SCFH.

4.1.8 If the system failed to meet the criteria for passage set forth in Section 5.1, make necessary replacements of or adjustment to the nozzles, vapor hoses, swivels, dispenser piping, or underground piping to bring the measured pressure drops within the appropriate standard.

4.1.9 After completion of the pressure vs flow test, close and cap the underground storage tank vapor dry break valves and remove the closures from the tank vent pipes.

4.1.10 For Phase II balance systems with remote vapor check valves, carefully reassemble the remote vapor check valve by removing the plug on the fuel side and reinserting the fuel poppet. Replace the threaded fuel plug.

4.2 Liquid Blockage Test (Wet Test):

Each dispensing nozzle/vapor return piping inlet shall be tested using the following procedure unless otherwise stated in the Authority to Construct letter. Testing shall be done starting with the farthest dispensing nozzle from the underground storage tanks for each product.

4.2.1 Prop open only the vapor dry break valve at the tank with the same product as the nozzle being tested. Set up traffic barriers in the vicinity of the dry break valve to preclude the approach of potential ignition sources.

4.2.2 Install a pressure relief safety valve set at a maximum cracking pressure of one pound per square inch gauge (27.7" wcg) at the vent of one of the storage tanks. If the system has manifolded vapor piping, cap the vents of the other storage tanks. If the system has non-manifolded piping, be sure the pressure relief valve is on the tank that has the same product as that which is dispensed at the location where liquid is introduced to the vapor piping.

4.2.3 For each nozzle, introduce gasoline into the vapor piping inlet located at or in each dispenser. (Don't introduce gasoline through the vapor return nozzle and vapor hose.) Have someone listening at the open Phase I drybreaks to identify the tank where liquid splashing is heard For systems with manifolded underground vapor piping, the liquid must drop into the leaded product tank, or the lowest octane unleaded tank if there is no leaded product. For non-manifolded systems with separate underground vapor piping, the liquid shall return to the tank that has the same product as is dispensed at the nozzle where the liquid was introduced into the vapor piping. If the product at the nozzle does not match the product in the tank, the underground piping is crossed and the system fails the test. For both manifolded and non-manifolded systems the piping must be the same as the configuration approved in the District's Authority to Construct letter or the facility fails the test.

4.2.4 Restore the dispensing/vapor return system to its normal balance system configuration.

4.2.5 If there is no remote check valve in the dispenser, proceed to Step 4.2.6. If the Phase II balance system employs a remote vapor check valve, that can be disabled by removing the poppet on the fuel side, carefully open the fuel side of the remote vapor check valve and remove the fuel poppet. Replace the threaded plug on the fuel side of the valve.

4.2.6 Connect the pressure drop test device to the vapor return piping and the regulated nitrogen source. If the nitrogen is introduced through the vapor recovery nozzle, apply a film of lubricant to the faceplate of the nozzle to be tested and insert the nozzle into the fillpipe simulator of the test device. The nozzle must fit tightly.

4.2.7 Zero the pressure gauges.

4.2.8 Adjust the pressure regulators and the pressure drop panel flow control valve to produce a nitrogen flow rate of 60 SCFH. Note the response and reading of the pressure gauge immediately upstream of the vapor piping, i.e., at the entrance to the nozzle. Record the back pressure reading on the attached data log under "wet test".

4.2.9 If during the "wet test" the back pressure gauge pegs at full scale or continously fluctuates, note this in the "Comments" section for the nozzle being tested.

4.2.10 If the system failed to meet the criteria for passage set forth in Section 5.2, make necessary repairs or adjustments to the tested piping to eliminate the blockage.

4.2.11 For Phase II balance systems with remote vapor check valves, carefully reassemble the remote vapor chech valve by removing the plug on the fuel side and reinserting the fuel poppet. Replace the threaded fuel plug.

4.2.12 Repeat steps 4.2.1 through 4.2.11 for each nozzle/vapor return piping inlet associated with the vapor return line being tested.

4.2.13 After completion of the liquid blockage test for all nozzles connected to the vapor return line, close and cap the underground storage tank vapor dry break valves and remove the closures from the tank vent pipes.

5.0 TEST STANDARDS

5.1 Pressure vs Flow Test (Dry Test):

In accordance with the California Air Resources Board (ARB) Executive Orders for balance systems, the system passes the pressure vs flow test if at the nitrogen flow rates of 20, 60 and 100 SCFH the flow resistance measured does not exceed the following pressure limits:

(a) 0.15 inches of water gauge at 20 SCFH
(b) 0.45 inches of water gauge at 60 SCFH
(c) 0.95 inches of water gauge at 100 SCFH

5.2 Liquid Blockage Test (Wet Test):

The system fails if the back pressure gauge pegs at full scale or continuously fluctuates during the "wet test", or if the "wet test" back pressure reading at 60 SCFH flow rate exceeds the maximum standard of 0.45 inches of water gauge prescribed in the applicable ARB Executive Orders.

6.0 REPORTING REQUIREMENTS

For those sites having Authorities to Construct requiring this or any other District tests, documentation of the required testings must be submitted to the District before a Permit to Operate will be issued. It is the ultimate responsibility of the applicant to make sure that the necessary documentation is submitted to the District; however, the District will accept test documentation directly from the contractor performing the tests. When a District observer is present and NCR forms are used, the observer will take the original of the form with him/her back to the office.

TEST PANEL

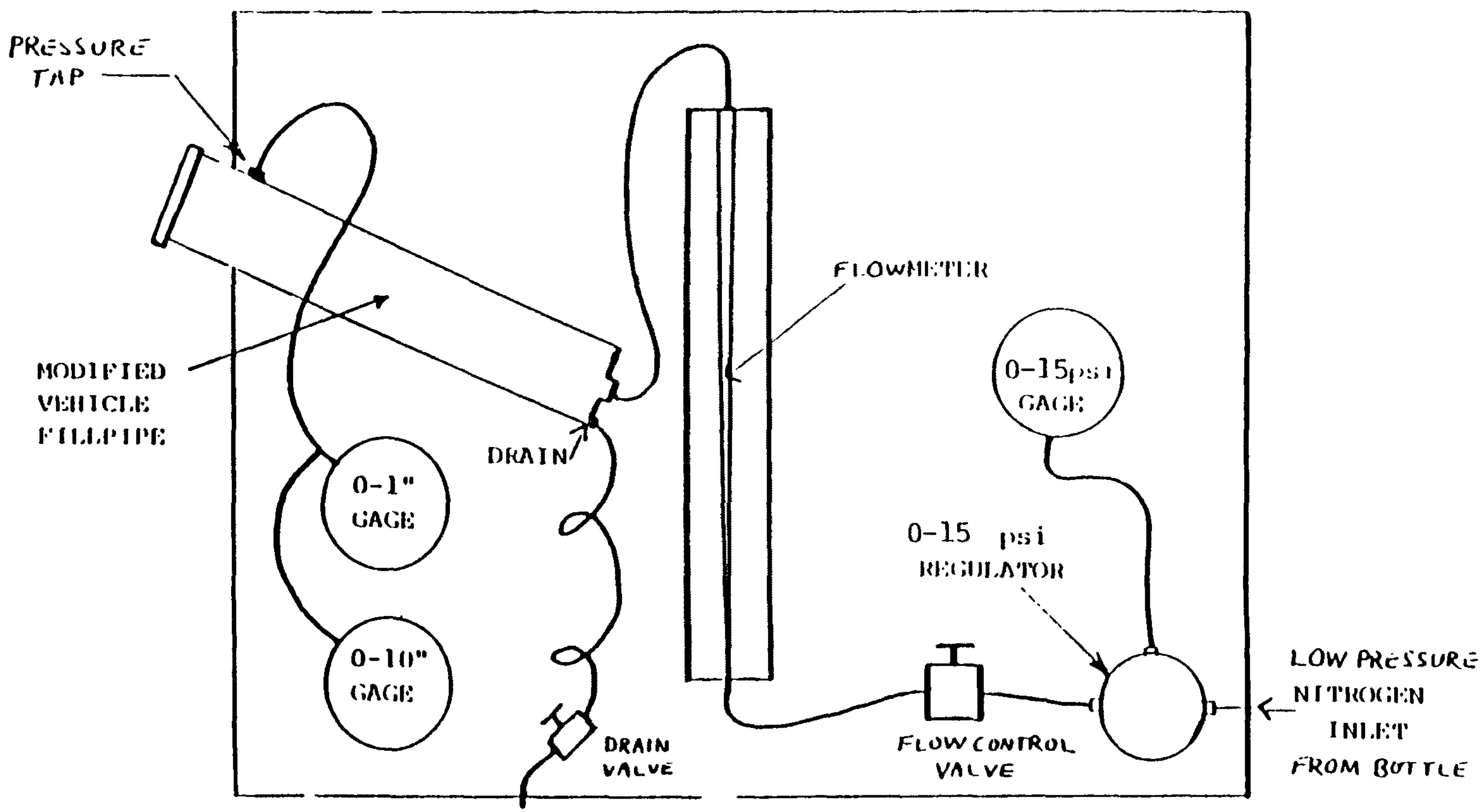


Figure 1

PHASE II BALANCE SYSTEMS PRESSURE DROP DURING FLOW TEST & LIQUID BLOCKAGE TEST

Site DBA:______________________ Test Date:______________________

Address:______________________ APCD Observer:______________________

______________________ Test Conductor:______________________

Test Contractor:______________________ Office Phone No:______________________

Site Plan:

NOZ. NO.	PROD.	Flowmeter, CFH				COMMENTS
		ΔP TEST			WET TEST	
		20	60	100	60	

White - APCD Yellow - Contractor Pink - Applicant APCD081286

APPENDIX J.5

SAN DIEGO TEST PROCEDURE TP-92-1 PRESSURE DECAY/LEAK TEST PROCEDURE

SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT
TEST PROCEDURE TP-91 -1*

PRESSURE DECAY/LEAK TEST PROCEDURE
PHASE I & PHASE II VAPOR RECOVERY INSTALLATIONS

1.0 INTRODUCTION

This procedure is applicable to facilities that recover vapors from vehicle fueling operations (Phase II vapor recovery). It is used to determine compliance with District Rules 61.3, 61.4, and 61.8; Chapter 3, Article 5 of the State Health & Safety Code (HS&C); and Section 94006, Title 17, California Code of Regulations (CCR). Rule 63.1 requires 95% vapor recovery during the truck delivery of fuel to bulk storage tanks (Phase I vapor control). Air aspirated into the fuel during Phase I deliveries prevents compliance. Vapor leakage from adjacent tanks with a vapor manifold to the tank receiving fuel also precludes compliance. This will not happen if the system is leak tight. Rule 61.4 and State law require that the vapor recovery nozzle backpressure shut-off mechanisms not malfunction in any way. This procedure is used to check the shutoff mechanisms. Rule 61.4 and State law also require that all Phase I and Phase II vapor recovery systems perform with the same effectiveness as the State Air Resources Board (ARB) certification test systems associated with the applicable State Executive Orders defining the systems. All ARB test systems passed the pressure decay/leak criteria of the procedure that follows. It is impossible for any vapor recovery system failing the criteria to be as effective as the corresponding ARB certification test system. Rule 61.8 and State law require that all vapor recovery systems be ARB certified. To be certified, all bulk storage tanks must be connected to the Phase II vapor recovery system. This procedure is used to check vapor manifolds. The following procedure may also be used to identify equipment defects prohibited by Rule 61.4 and Section 94006 of the CCR.

2.0 PREREQUISITES TO TESTING

The following requirements must be met before a valid test may be performed:

2.1 <u>The District Must Be Notified</u> - The appropriate person specified in the Air Pollution Control District Authority to Construct letter must be contacted within ten working days of completion of construction to establish a mutually agreeable test date. Normally, the tests will be witnessed by a District representative; however, the District engineer may, under certain circumstances, authorize testing without a District observer being present. If the District is not notified of this test or any of the other required tests, then this test or any other required test may be declared invalid, in which case a retest will be required.

2.2 <u>Minimum Tank Ullage</u> - The ullage (vapor space) in each tank being tested must be at least 10% of the tank's capacity, but in no case less than 300 gallons

*This Test Procedure supercedes TP-88-1 & TP-79-4.

per tank. If the tanks are manifolded, each tank must meet the minimum ullage requirement described above.

2.3 Maximum Tank Ullage - There is no maximum tank ullage requirement. However, since the required test duration is directly proportional to the amount of tank ullage, it is recommended that the total tank ullage be kept as close as possible to the minimum tank ullage requirement to preclude excessively long tests.

2.4 Condition of the Vapor Recovery System - The complete vapor recovery system must be installed and intact during the test. If the installation includes a Phase II vapor recovery system, all hoses, nozzles, fittings, valves, and other system components must be installed as if the system were to be placed into service. All system components must be free of all visible defects such as torn or punctured bellows, loose or torn faceplates, or defective check valves. Plugging the vapor return plumbing where a leaking vapor recovery nozzle or remote check valve has been discovered is not allowed.

2.5 Restrictions on Gasoline Transfer Operations - Bulk transfers of gasoline into the storage tanks within one hour prior to the test is prohibited. In addition, dispensing of gasoline is not allowed during the test.

3.0 EQUIPMENT

The following equipment will be needed to perform this test. (Refer to the schematic presented in attached Figure 1 for a typical set-up.)

3.1 A bottle of compressed gaseous nitrogen and pressure regulators capable of regulating final downstream pressure to 1.0 pound per square inch gauge (psig) is required. Use assorted valves, fittings, and pressure tubing as necessary. A means of providing a grounding path from the bottle of compressed nitrogen is required. The bottle shall be grounded for safety. It is recommended that the tubing be flexible metal tubing or non-metal tubing that incorporates a grounding path throughout its length. A pressure relief device must also be installed prior to testing. The pressure relief device is installed to prevent accidental over pressurization. The pressure relief device must be adjusted to vent at one pound per square inch gauge (27.7 inches water column gauge).

WARNINGS:

a. Attempting the pressure decay test without a pressure relief device may result in over-pressurizing the system, which may create a hazardous condition and may cause damage to the underground storage tanks, associated piping, and other system components.

b. The nitrogen bottle must be securely fastened to a large, stationary object at all times. A compressed gas cylinder which falls and is damaged can easily become a lethal projectile.

3.2 An accurate device for measuring pressure, such as a water manometer (preferable) or a Magnehelic gauge (or equivalent), is required to measure the system pressure. This device must be graduated in increments of one tenth (0.1) of an inch of water column pressure.

3.3 A stopwatch accurate to within 1 second.

4.0 TEST PROCEDURE

4.1 Determine the ullage of the underground storage tank (or tanks, if manifolded). Measure the gasoline gallonage in the underground storage tank(s). Calculate the ullage space for the storage tank(s) by subtracting the gasoline gallonage present from the tank capacity(ies). Note the ullage and total tank capacity in the appropriate space of the data log (attached). The actual tank ullage must meet the minimum tank ullage criteria specified in Section 2.2.

4.2 Calculate the required test duration by multiplying the total ullage (in thousand gallons) by 5.0. Note the resulting required test time (in minutes) in the appropriate space on the data log.

4.3 Install the pressure relief device, grounding wire, fittings, tubing, and equipment needed to pressurize and to monitor the system vapor space (see Figure 1). Nitrogen can be introduced into the system through the storage tank vent pipe or through the vapor return piping.

4.4 For manifolded systems, install the pressure relief safety valve, set at one psig (27.7 inches of water), over the opening of one of the storage tank vents and cap the remaining storage tank vents. (Manifolding the vent line is prohibited since this infers with the check of underground vapor manifolds.) For non-manifolded systems, test each product vapor recovery system separately with the pressure relief safety valve installed on the vent of the storage tank being tested. (Alternative setups may be used as long as they do not interfere with the objectives of the test and have prior District approval.)

4.5 Remove the Phase I adapter cap(s) on the vapor return drybreak valve(s) of the underground storage tank(s). The system must pass the pressure decay/leak test with the drybreak cap(s) removed. It is permissible for the tank fill cap(s) to be in place on the fill adapter(s) during the test.

4.6 With no dispensing taking place, begin pressurizing the vapor system (or subsystem for individual vapor return line systems) to 11 inches water column gauge (wcg). Let the system sit for fifteen minutes to allow vapor pressure stabilization in the tank(s). Check the vent cap assembly(ies), nitrogen connector assembly, nozzles, vapor return adapter(s) and all accessible vapor connections using leak detecting solution to verify that the test equipment is leak tight. If after fifteen minutes, the ullage pressure is still above 10 inches wcg, reduce the system pressure to 10.0 inches wcg. If the ullage pressure is below 10 inches wcg, then again pressurize the vapor system to 10.0 inches wcg.

4.7 With the system pressurized to 10.0 inches wcg, begin the test. Start the stopwatch and note the time at which the test was begun in the appropriate space on the data log.

4.8 Intermediate readings may be taken to monitor the performance of the system, but the final system pressure reading must be taken at the end of the required test duration calculated in step 4.2 and recorded in the appropriate space on the data log. Refer to the test standards specified in Section 5.0 below to determine the acceptability of the final system pressure result.

4.9 While the system is still pressurized, check the integrity of the automatic back pressure relief device on each nozzle connected to the vapor recovery system being tested by pulling on the nozzle's trigger. The back pressure relief device is acceptable if there is no resistance when the nozzle's trigger is pulled. Nozzles with defective back pressure relief devices shall be replaced.

4.10 At the end of the pressure decay test, with the tank(s) still pressurized, complete the following checks:

(a) For systems with vapor manifolded tanks, depress the Phase I vapor drybreak valve of each tank to see if gases are released under pressure. (A tank where gases are not released under pressure is not manifolded to the Phase II vapor piping as required by District rules and State law.)

(b) For non-manifolded systems, depress the drybreak valve of each tank to see if the product in the storage tank matches the product dispensed by the nozzles where checks were made of the back pressure shut-off mechanisms. (This is a check to see if the underground vapor piping is crossed and goes to the wrong storage tanks. If crossed piping is indicated, verify by sending five gallons of liquid down the Phase II piping while a second person listens for splashing at the tank with the drybreak open. See test procedure TP-91-2-Liquid Blockage Test/)

(c) Remove the caps of the fill risers of the storage tanks. If it appears that any gasket is damaged or missing, it must be replaced and the fill adapter tightened.

4.11 If the system failed to meet the criteria for passage set forth in Section 5.0, repressurize the system and check all accessible vapor connections using leak detecting solution. If vapor leaks in the system are encountered, repair or replace the defective component(s) and repeat the pressure decay test (steps 4.6 through 4.8). (Note: **applicants and contractors are advised to do a pre-test before the District witnesses compliance tests. Repairs that keep the District inspector waiting or that result in scheduling a re-test may result in substantial reinspection fees.**)

4.12 Depressurize the system by carefully removing the vent cap assembly(ies). Allow any remaining pressure to be relieved through the vent pipe(s).

4.13 If the vapor recovery system utilizes individual vapor return lines for each gasoline product or each underground storage tank, repeat the entire pressure decay/leak test for each vapor return system (steps 4.1 through 4.12).

5.0 TEST STANDARDS

<u>The minimum allowable pressure decay time from 10.0 to 9.0 inches wcg shall be 5.0 minutes per 1000 gallons ullage.</u>

This means that from an initial pressure of 10.0 inches wcg, if the system pressure reading at the end of the required test duration, as calculated using the methodology specified in Section 4.2, is less than 9.0 inches wcg, the system fails.

6.0 REPORTING REQUIREMENTS

For those sites having Authorities to Construct requiring this or any other District tests, documentation of the required testings must be submitted to the District before a Permit to Operate will be issued. It is the ultimate responsibility of the <u>applicant</u> to make sure that the necessary documentation is submitted to the District; however, the District will accept test documentation directly from the contractor performing the tests. When a District observer is present and NCR forms are used, the observer will take the original of the form with him/her back to the office.

PRESSURIZATION APPARATUS

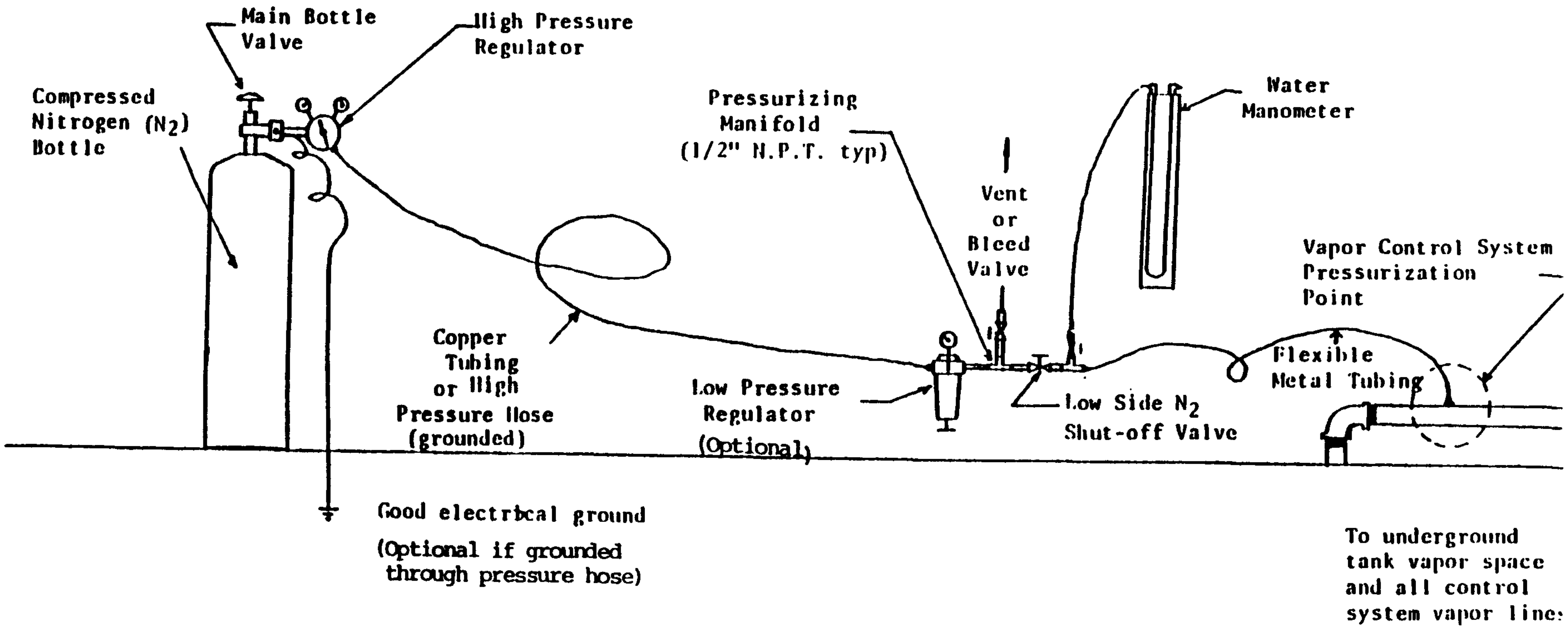


Figure 1

PRESSURE DECAY LOG

Site DBA: ______________________ Test Date: ______________________

Address: ______________________ APCD Observer: ______________________

______________________ Test Conductor: ______________________

Test Contractor: ______________________ Office Phone No: ______________________

Tank Capacity (total, if manifolded): ______________________ gallons

Product(s): ______________________

Tank Ullage (total, if manifolded): ______________________ gallons

$\frac{\text{Ullage Volume*}}{\text{Total Volume}}$ ______________________ X 100 = __________%

*The ullage (vapor space) in each tank being tested must be at least 10% of the tank's capacity, but in no case less than 300 gallons per tank.

Pressure Decay Test Criteria:

Test Duration = (5.0 minutes/1000 gallons ullage) x __________ thousand gallon ullage

= ______________________ minutes**

**The pressure decay test is failed if the final pressure at the end of the test duration, as calculated above, is less than 9.0" wcg.

Time of Day	Elapsed Time From Start of Test	System Pressure ("wcg)
	0 minute	10.0
	______ minutes**	

White - APCD Yellow - Contractor Pink - Applicant

APPENDIX K
INSPECTION INFORMATION

Detailed inspection procedures and checklists are helpful in the development and implementation of a consistent and equitable enforcement program. All of the standard agency pre- and post-inspection procedures such as identification of the purpose of the inspection and consultation with the owner/operator after the inspection should be followed. In addition, procedures specific to the inspection of Stage II equipment can be developed. This appendix contains inspection checklists and procedures developed by areas for their Stage II inspection programs. Specifically, this appendix contains the following sections:

Section K.1	Example Inspection Forms from San Diego District and the District Enforcement Policy
Section K.2	Bay Area District Inspection Checklist
Section K.3	South Coast District Inspection Report
Section K.4	New Jersey Inspection Report
Section K.5	Missouri Inspection Checklist
Section K.6	New York Inspection Checklist
Section K.7	Massachusetts Inspection Checklist
Section K.8	Dade County, FL, Inspection Checklist

APPENDIX K.1

COUNTY OF SAN DIEGO
AIR POLLUTION CONTROL DISTRICT

[illegible]
[illegible] CHECKLIST
[illegible]

E.O. G-70-17AA G-70-33AA
G-70-23AA G-70-48AA
G-70-25AA G-70-49AA
G-70-36AA G-70-52A
G-70-53AA

ANY NAME: ______________ ID = ________ P/O = ________

In compliance with Rule 10(b)? Yes X No ____ 10(c)? Yes ____ No X

Operating in compliance with P/O conditions. Yes ____ No X

Phase I Vapor Recovery

Submerged fillpipe measurement/tank size/component condition.

Prod. U Capacity 6K SFP Meas. 4" D/B Cond. OK Cap Cond. OK

Prod. SU Capacity 4K SFP Meas. 4" D/B Cond. OK Cap Cond. [illegible]

Prod. SU Capacity 4K SFP Meas. 4" D/B Cond. OK Cap Cond. OK

Prod. R Capacity 12K SFP Meas. 4" D/B Cond. OK Cap Cond. OK

Vent pipes in compliance with P/O and E.O. Requirements. Yes ____ No ____

Phase II Balance Vapor Recovery System

Are the nozzles certified for the Balance System? Yes X No ____

Are nozzles installed in accordance with the E.O. shown on the P/O? Yes X No ____

Are the required nozzle components in place and in good condition? Yes X No ____

Are the vapor recovery hoses of the required size and length and as shown on the P/O?

Yes X No ____ Are the correct swivels installed? Yes X No ____

Are flow limiters required, if so are the correct limiter installed? Yes X No ____

Does the hose configuration allow for adequate drainage? Yes X No ____

a. Does the hose-to-island dimension meet the requirements of E.O. G-70-52-A ?

Yes X No ____

Are there liquid or vapor leaks? Yes ____ No X Where? ____________

N/V written? Yes X No ____ Rule(s) 10c, 21, 614

List any defect found by the Defect Code and show the number for each type of defect.

____

Notice to Repair issued? Yes X No ____

List any Notice to Repair item and the number of each item.

Bellow Slits, Loose Spouts, Misswired Check Valve

____

Vehicle fueling operation observed? Yes X No ____

[illegible]: ______________ Date: ______________

COUNTY OF SAN DIEGO
AIR POLLUTION CONTROL DISTRICT

HA03-01 EQUIPMENT LIST PAGE 1

SECTOR A ID NUMBER 03858A COORDINATES : X = 17471 Y = 1661 INSPECTION FOR OCTOBER (ANNUAL)
RENEWAL MONTH : FEBRUARY

DBA: OWNERSHIP:

EQUIPMENT ADDRESS: MAILING ADDRESS:

CONTACT: PRESIDENT
PLEASE
PRINT NAME TITLE Manager PHONE ( ) SIGNATURE DATE

SIC CODE : DATE AT THIS LOCATION :
___ CORPORATION ___ PARTNERSHIP ___ INDIVIDUAL ___ GOVERNMENT AGENCY ___ PUBLIC DISTRICT

INSPECTOR: DATE:

ITEM	EQUIPMENT DESCRIPTION	PO#/BEC	COMPLIANCE STATUS
1.	GASOLINE SERVICE SITE (24 EMCO WHEATON A3005 COAXIAL NOZZLES) PHASE II VRS: EMCO WHEATON BALANCE PER ARB EO G-70-17-AB; COAXIAL HOSES AND HIGH-RETRACTORS PER ARB EO G-70-52-AI, EXHIBIT 8; PHASE I VRS: TWO POINT, PER ARB EO G-70-97-A; TANKS: 2-4,000; 1-6,000 & 1-12,000 GALLON. 880215 FEE SCHEDULES: 26A24 APPLICABLE RULES : 0061.3 0061.4 0061.7	PO# 6619 BEC 0670C (HJG) 1188	[illegible] 21 N/V # 6431 61.4 - N/V " 41960.2 no defects

Signs & ... Posted, No Visible Liquid leaks, No Defects, ... C ...
NV - No Hold open Latches (HOL) Below
N/R - see Below

	SFP	D/B	...
SU	Repair CAP	ok	ok 4"
U	ok	ok	4"
R	OK	OK	4"

COMMENTS :

#1 - R - HOL
SU - HOL
U - [illegible], HOL

#4 R HOL
SU - " Missing C.V.
U - 2-1/4" Pull ...

#7 - R - HOL
SU - "
U - "

#2 - R - HOL
SU - " Loose spout
U - "

#5 - R - HOL
SU - OK
U - HOL

#8 - R - Lock out/HOL
SU - HOL
U - HOL

#3 R - HOL
SU - "
U - OK

#6 - R - HOL, Loose spout
SU - Lock out/HOL
U - HOL

K.1-3

005481

AIR POLLUTION CONTROL DISTRICT
COUNTY OF SAN DIEGO
9150 CHESAPEAKE DRIVE
SAN DIEGO, CALIFORNIA 92123
TELEPHONE (619) ~~565-5912~~

NOTICE OF VIOLATION

Seq.

Date ....

Name: .... Phone: ....

Address: .... City: .... (Zip Code)

Location of Violation: .... City: .... (Zip Code)

You are hereby notified that a VIOLATION of RULE 61(b) of the Rules and Regulations of the San Diego Air Pollution Control District, SECTION 41960.2 of the California Health and Safety Code, SECTION .... of the California ~~Administrative Code~~ Code of Regulations, was committed on 2/12/9- by: .... GASOLINE DISPENSING FACILITY WHICH IS PART OF PERMIT NO. .... RENEWED THE PERMIT WHICH EXPIRED FEBRUARY 1, 1990 AND FAILED TO POST NOZZLE OPERATING SIGNS AND DISPLAY A TOLL FREE NUMBER FOR COMPLAINTS WITH DISTRICT IN WHICH THE STATION IS LOCATED. SPECIFICALLY NEED OPERATIONAL SIGNS AND TOLL FREE NUMBER 1-800

Pursuant to Section 42400 of the Health and Safety Code of the State of California, any person who violates any Order, Rule or Regulation of the State Board or of an Air Pollution Control District is guilty of a MISDEMEANOR. Every day during any portion of which such violation occurs constitutes a separate offense.

ADVISE THIS DISTRICT IN WRITING, WITHIN 10 DAYS, OF THE CORRECTIVE ACTION TAKEN TO RESOLVE THIS VIOLATION. YOUR RESPONSE DOES NOT PRECLUDE THE POSSIBILITY OF FURTHER LEGAL ACTION.

.... Issued By (Signature) .... Date 12:30 Time

SIGNING THIS NOTICE ACKNOWLEDGES RECEIPT OF THE NOTICE. IT IS NOT AN ADMISSION OF GUILT.

X

Issued To: .... Title: President

X .... Signature of Person Receiving Notice .... Title .... Date

Sector 4 ID# .... Permit No. .... Equip. 80 Method M I

Tagged Defects / Cleared

Code	No	Code	No	Code	No	Code	No	Code	No	Code	No	Yr	Mo	Day

Follow up action ....

Disposition NFA — 6/5/9 . Fee Paid

APCD 23 (Rev 1-84)

NOTICE OF VIOLATION

NAME ____________ DATE ____________

ADDRESS ____________

PERSON IN AUTHORITY ____________ TITLE PRESIDENT

OPERATOR ____________ ADDRESS ____________

STATEMENT: C[illegible] NEAL, PERMIT ADMINISTRATOR IN LAS VEGAS HEAD OFFICE: I JUST TOOK OVER THIS JOB A MONTH AGO. MY PREDECESOR LEFT THIS PLACE A MESS. I'LL MAIL A CHECK FOR RENEWAL RIGHT AWAY.

INSPECTOR'S REPORT PURSUANT TO A MID YEAR INSPECTION I SAW THAT THE PERMIT TO OPERATE HAD EXPIRED ON FEBRUARY [illegible], 1990. I TELEPHONED THE DISTRICT AND CONFIRMED THAT THE PERMIT HAD EXPIRED. DURING MY INSPECTION I SAW THAT NOZZLE OPERATIONAL SIGNS AND THE TOLL FREE TELEPHONE NUMBER WERE NOT POSTED.

THE STATION WAS IN OPERATION DISPENSING GASOLINE, AS I SAW DISPENSING INTO A BLACK CHEVROLET WITH CALIF. LICENSE 2GCT945 OF 5.[illegible] GALLONS OF UNLEADED GASOLINE BY A MALE CAUSCASIAN, DARK HAIR, 165lb, 5'[illegible]".

apcd
County of San Diego

R. J. Sommerville
Air Pollution Control Officer

October 16, 1990

TO: Vapor Recovery Engineering Staff

FROM: Teresa Morris TM
Barnard R. McEntire BRM

SUBJECT: **GASOLINE DISPENSING FACILITY ENFORCEMENT POLICY (EFFECTIVE IMMEDIATELY)**

NOTICE OF VIOLATION (N/V)

Initial Engineering Vapor Recovery inspections shall be conducted using the attached defect list as a guide. If any listed defects are found, the defective equipment may not be operated legally until corrective action is completed or a variance granted. The engineering inspector will advise the source of noncompliance and issue a Defect Advisory.

In addition, the engineering inspector shall place an Out of Order tag on any nozzle associated with a defect as indicated on the attached list. Section 41960.2(d) of the State Health and Safety Code states, "When a district determines that a component contains a defect specified pursuant to subdivision (c), the district shall mark the component "Out of Order". No person shall use or permit the use of the component until the component has been repaired, replaced, or adjusted, as necessary, and the district has reinspected the component or has authorized use of the component pending reinspection." [State identified defects pursuant to CCR Section 94006 and District identified defects pursuant to Health and Safety Code 41954(g) and District Rule 61.4(c)(5).]

If the applicant has demonstrated that it is possible to operate a portion of the dispensing facility in compliance with Rules 61.3 and 61.4, then they will be issued written temporary authorization to operate that portion until repairs are made to the rest of the equipment. For example, if two out of ten nozzles are defective, the applicant may receive a Startup Authorization to operate the eight nozzles that are in compliance if the facility as a whole remains in compliance with the emission

AIR POLLUT L DISTRICT
9150 Chesapeake Driv alifornia 92123-1095
(619) 694-3307 FAX (619) 694-2730

standards. However, if the facility cannot be operated in compliance, no temporary authorization can be issued. The engineering inspector shall provide the applicant with general information regarding the variance process and advise the site operator to call the Enforcement Division. The applicant shall also be advised by the Engineering inspector that they are subject to a Notice of Violation from the District's Enforcement Division if they operate any equipment not authorized by an Startup Authorization, Permit to Operate or variance.

NOTICE TO REPAIR (NTR)

For all defects not identified in the attached list, both District Rule 61.4(c)(5) and Health and Safety Code Section 41960.2(e) allow seven days for repairs or adjustments to be made. The engineering inspector shall issue a Notice to Repair (NTR). (For example, an NTR would be issued if the system fails the pressure decay leak test, or vapor return hoses do not meet the lengths or loop requirements of the State Executive Orders, or flow rates are excessive, etc.) The engineering inspector shall advise the applicant that if the repairs are not completed within seven days, they may be subject to a Notice of Violation. Temporary authorization will be issued with the condition that repairs be completed within 7 days for minor problems. If corrections are not called in by the 7th day, the source shall be contacted by Engineering staff regarding actions taken by the site and reminded that if the problem has not been corrected, a Notice of Violation may result. If corrective action has not been completed, the engineering inspector shall forward documentation to Enforcement. Where testing is needed to confirm compliance, the temporary authorization shall expire the day after the compliance test has been witnessed by the engineering inspector. The reinspection date will be scheduled at the end of the initial inspection.

If upon reinspection, the engineering inspector determines a source falsely reported corrections, the Enforcement Division shall be notified within one week and provided a copy of the NTR and supporting documents. Enforcement action will be taken.

Failure to complete the repairs associated with vehicle fueling is a violation of District Rule 61.4(c)(3) which states the vapor recovery system shall be installed, operated, and maintained so that its performance in actual use is the same as the ARB certification test system. It is also a violation of Health and Safety Code Section 41960.2 which states the system must be in <u>good working order.</u> Furthermore, the ARB has ruled that any system that is defective is not, in accordance with the Executive Orders, a certified system. Therefore, the installation would also be in violation of District Rule 61.8 and Health and Safety Code Section 41954(f), both of which require certified systems and certified components. Seven day notices can only be issued once for the same problem involving the same equipment.

PHASE I

Health and Safety Code Section 41960.2 does not clearly deal with Phase I only operations. Title 17, Code of Regulations, Section 94006 does not list Phase I only defects. Therefore, Rule 61.3 prevails. The source must be advised that fuel delivery without the drop tube is a violation. Any Phase I system that is inoperative, missing or damaged so as to impair the effectiveness of the Phase I System is a violation (Rule 61.3(c)(5)). A Defect Advisory shall be issued and the variance process explained. A Startup Authorization shall not be issued in such cases. The engineering inspector will inform the applicant that a Notice of Violation will be issued if they take a delivery prior to installation of the submerged fillpipe or prior to the correction of other defects. All other Phase I only problems such as missing fill cap, short drop tube, etc., will be subject to a seven day NTR, although an NTR is not required by the Health and Safety Code or District Rules and Regulations.

GENERAL PROCEDURES

Each NTR will have three copies. The original shall be issued to the applicant. The second and third copies will be retained by the engineering inspector. The engineering inspector shall submit the second copy to Enforcement as needed to document a violation. The third copy is to be retained by Engineering in the site folder.

It is Enforcement's decision and responsibility to follow-up with the issuance of Notices of Violation after receiving report and back-up information indicating a source is operating in violation of District rules or state law.

An initial engineering inspection may cover more than one day if the number of nozzles and type of system involved cannot be tested and inspected in a single day. However, initial inspections involving more than one day must have prior approval from the Senior Engineer in charge of Vapor Recovery. The project engineer will try to determine the potential duration of an initial inspection of a large facility and make prior arrangements for testing and inspection to cover subsequent days.

A second inspection is to cover items that failed the initial field evaluation. NTRs can only be issued for non-listed defects that are revealed for the first time during the second inspection. All other defects are violations. Information documenting the Notice of Violation shall be forwarded to Enforcement. The engineering inspector shall issue a Defect Advisory and advise the applicant of the variance process. If the facility fails the second inspection, the temporary authorization cannot be extended. Enforcement is to be provided the inspection report and supporting documents. The source must be provided with the hearing board advisory and advised to contact the District's Enforcement Division.

If an application for permit is denied in accordance with Rule 20, the source shall be advised to reapply and to submit full fees. A new application package shall be provided. The source must be advised of the hearing board process.

In all cases where enforcement action is requested, it must be accompanied by a request form, a copy of the Defect Advisory, a copy of the NTR and supporting documentation.

BRMc:TM:ap

Attachments

APPENDIX K.2

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
VAPOR RECOVERY INSPECTION SHEET

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
939 ELLIS STREET • SAN FRANCISCO, CALIFORNIA 94109 • (415) 771-6000

VAPOR RECOVERY INSPECTION SHEET

G# ____________
INSP# ____________
#TAGGED ____________
#MINOR ____________

STATION ____________ ADDRESS ____________

CITY ____________ ZIP ________ CONTACT ____________

TITLE ____________ PHONE (______) ____________

NUMBER OF NOZZLES (GASOLINE) ________ SYSTEM TYPE ____________ DATE ________

OF FIRST GENERATION NOZZLES ________ PROCESSOR OPERATIONAL? ____________ VN# ________

NOZZLE NUMBER												
NOZZLE TYPE												
GAS GRADE												

ACCEPTABLE

NOZZLE	1 NOZZLE TYPE............												
	2 MOUNTING RACK........												
	3. FACE SEAL..................												
	4 BELLOWS												
	5. RING, RIVET, SPRING.....												
	6. SWIVELS....................												
	7 FLOW LIMITER............												
HOSE	8. 8 FT LENGTH...............												
	9. SWIVEL......................												
	10. RECIRCULATION TRAP....												
	11. FLAT, TORN, KINKED......												
	12. PRESSURE DROP..........												
	13. VACUUM DEVICE..........												
	14. TAGGED O/S ?.............												

REMARKS: ____

____

1/4/82 INSPECTOR________ ____________________

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
939 ELLIS STREET
SAN FRANCISCO, CALIFORNIA 94109
(415) 771-6000

Date: ______________________

Company: ____________________________ **Terminal:** ____________________

Your gasoline cargo tank was tested on the above date by District Source Test personnel for compliance with the CARB year-round leak-rate criteria and/or internal vapor valve certification rate.

The cargo tank(s), listed below by CT#(s), failed to comply with the District requirement(s) as indicated:

CT#: ________________________ [ ]A [ ]B [ ]C [ ]D [ ]E [ ]F

CT#: ________________________ [ ]A [ ]B [ ]C [ ]D [ ]E [ ]F

A. The year round leak-rate criteria adopted by the ARB. The cargo tank **shall be removed from service immediately,** repaired and tested for certification in accordance with CARB's "Certification and Test Procedures for Vapor Recovery Systems of Gasoline Delivery Tanks." **A Violation Notice will be issued for violation of District Regulation 8, Rule 33 or Rule 39, and mailed to you.** The attached test form should be completed and returned with your response to the Violation Notice. *

B. The applicable year-round leak-rate criteria adopted by the ARB. Because the cargo tank was loading diesel over diesel, no violation occurred. **However, subsequent loading of gasoline without repair and recertification in accordance with CARB's Certification and Test Procedures may result in a violation of Regulation 8, Rule 33 or Rule 39.**

C. The internal vapor valve exceeded the annual certification rate of 5" H_2O pressure increase in 5 minutes. This does not constitute a violation, however the excess should be corrected.

D. Missing or expired CARB decal. The cargo tank **shall be removed from service immediately** and certified in accordance with CARB's Certification and Test Procedures. **A Violation Notice will be issued for violation of District Regulation 8, Rule 33 or Rule 39, and mailed to you.** *

E. Missing or expired CARB decal. Because the cargo tank was loading diesel over diesel, no violation occurred. **However, any subsequent loading of gasoline without certification in accordance with CARB's Certification and Test Procedures may result in a violation of Regulation 8, Rule 33 or Rule 39, Section 304.**

F. Failure to maintain equipment leak free, vapor tight or in good working order. The cargo tank **shall be removed from service immediately and repaired. A Violation Notice will be issued for violation of Regulation 8, Rule 33 or Rule 39, and mailed to you.** *

* NOTE: All Violation Notices responses shall be mailed to: Mutual Settlement Group, Enforcement Division BAAQMD, 939 Ellis Street, San Francisco, CA 94109.

If you need additional information, please contact Tony Gambardella at (415) 771-6000 extension 214.

TANK.DOC #7
1/1991 TG:rg

BAAPCD INSPECTION DATA SHEET
PHASE II VAPOR RECOVERY SYSTEM

STATION ______________ ADDRESS ______________ CITY ______________

MANAGER ______________ PHONE ______________ DATE ______________

OWNER ______________ PHONE ______________ PERMIT # ______________

****

NO. OF SELF-SERVICE ISLANDS ______________ NO. OF UNLEADED DISPENSERS ______________

NO OF FULL-SERVICE ISLANDS ______________ NO. OF REGULAR DISPENSERS ______________

TOTAL NO. OF DISPENSERS ______________ NO. OF PREMIUM DISPENSERS ______________

****

	PUMP NUMBER												
	NOZZLE TYPE												
	GASOLINE GRADE												
DEFECTIVE		YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
NOZZLE	1. MOUNTING RACK												
	2. FACE SEAL												
	3. PLASTIC CUP												
	4. RETAINING RING												
	5. BELLOWS												
	6. UNACCEPTABLE TYPE												
HOSE	7. FLAT SPOT												
	8. TORN												
	9. KINKED												

****

COMMENTS: ____

VIOLATION NUMBER ______________ INSPECTOR ______________

Station ______________________ Address ______________________ GDF# ________
City ______________________ Zip ______________ Tel.(   )______________

Phase II System Type	Phase I System Type
Balance [ ] Other ________	[ ] Two Point [ ] Other ________
Hirt [ ] Exempt 8-7- ________	[ ] Coaxial [ ] Exempt 8-7-________

Number of Storage Tanks - Gasoline ____ Diesel ____ Methanol ____

PRODUCT GRADE	TANK SIZE (GALLONS)	POPPETED DRYBRAKES	DUST COVER(S)
		[] Yes [] No	[] Yes [] No
		[] Yes [] No	[] Yes [] No
		[] Yes [] No	[] Yes [] No
		[] Yes [] No	[] Yes [] No

Registered Owner ______________________ P or N # ________
Address ______________________ City ______________________
State ______________________ Zip ______________________
Telephone (   )______________________ Drivers Name ______________________

VEHICLE TYPE	CT #	CARB DECAL #	EXPIRES (M/D/Y)	# OF COMPARTMENTS
TRUCK				
TRAILER				
.4I				

COMPARTMENT NUMBER	PRODUCT GRADE	GALLONS DROPPED	VAPOR LEAKS % LEL	LIQUID LEAKS DROPS/MINUTE	AIR ENTRAINMENT COAXIAL ONLY
					[] B [] M []E
					[] B [] M []E
					[] B [] M []E
					[] B [] M []E
					[] B [] M []E

Cargo Tank Not Equipped With Vapor Recovery [ ]	Vent Pipe Emissions
Vapor Recovery On Cargo Tank Not Used [ ]	Start of Drop []Y []N
Vapor Recovery On Cargo Tank Defective [ ]	Middle of Drop []Y []N
Vapor Recovery Hose Defective [ ]	End of Drop []Y []N

VN # ________ Regulation 8-33- ________ VN # ________ Regulation 8-7- ________

Inspector ______________ # ____ Inspection Date __________ Time __________

Comments: ____

____

____

Combustible Gas Detector # ______________ Calibration Due Date

APPENDIX K.3

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT INSPECTION REPORT

South Coast Air Quality Management District

INSPECTION REPORT

9150 FLAIR DRIVE, EL MONTE, CA 91731

IDENTIFICATION NUMBER	023456	PERMIT #	M00001	ITEM #	

FIRM NAME
2 ARCO DEALER ROBERT SMITH

LOCATION ADDRESS

ADDRESS	1000 W. BASELINE AVE	CITY	SAN	COUNTY	
7 ZIP	92410	8	BERNARDINO	31	SB 4
TELEPHONE 9	714-555-1212	AIR BASIN 33	SC 1	UTM 10	
SIC 32	5541	SECTOR 11	KC		

MAILING ADDRESS

ADDRESS 3	1000 W. BASELINE	SECTION	SS
BUSINESS TELEPHONE	714-555-1212		
CITY 4	SAN BERNARDINO	STATE 5	CA.
ZIP 6	92410		

APPLICATION DATA

APPLICATION TYPE 13		BUSINESS TYPE 14	1	BOARD OF EQUALIZATION 12	SREHA23-000012	35	
20 THRU PUT (LEADED)		GALLONS		18 NUMBER OF TANKS	03		
21 THRU PUT (UNLEADED)		GALLONS		19 NUMBER OF NOZZLES	06		
22 THRU PUT (DIESEL)		GALLONS		23 CONTROLS	91		
25 THRU PUT (GASOHOL)		GALLONS		46 FILL	1		
45 TYPE				48 VAPOR 1 & 2	3		
LAST INSPECTION DATE 34		INSTALLATION DATE 38		PERMIT DATE 16		INSPECTOR CODE 42	I-812

INSPECTION DATE 7-16-85 APP. # 189101

PRODUCT	NUMBER OF TANKS		NUMBER OF NOZZLES		ACTION CODE			INFO. CHANGE	
GASOLINE					ANNUAL INSP.		X	P/O	
DIESEL					C/O		G/O —	X/A	
GASOHOL					ALT		E/F	APPL	
METHANOL					OPERATOR REPRESENTATIVE SIGNATURE	R. Smith			
WASTE OIL					INSPECTOR'S SIGNATURE	R. Clu[illegible]			

Example 7.14 Sample Inspection Report completed by an inspector.

RULE 461 – INSPECTION REPORT SUMMARY

NOZ NO.	BELLOWS	SWIVEL	F V HOSES	RETR	SPOUT	LATCH EQUIP	FACE SEAL	FLOW REST	N/C	TAG	LEAK
REG											
SUP											
UNL											
ME OH											
GA OH											

T = TORN C = CUT M = MISSING L = LOOSE S = SHORT N = NOT CERTIFIED B = BROKEN
LO = LONG F = FRAYED D = DUAL CO = COAX O = OFFSET SU = SUBMERGED

SYSTEM	REQUIREMENTS
90–BAL STD	1, 2, 4, 5, 6, 11, 20
91–BAL RET	1, 2, 4, 5, 6, 13, 20
92-BAL COAX	2, 6, 20
81–RJ STD	3, 4, 7, 11, 12, 20
82–RJ RET	3, 4, 7, 12, 13, 20
83–HIRT STD	3, 7, 11, 15 thru 20
84–HIRT RET	3, 7, 13, 15 thru 20
85–HASSTECH	8, 9, 14, 16, 17, 19, 20
86–HEALY	10, 20, 21

LOCATION SKETCH

KEY

1–A3003	11–ARV
2–A3005	12–MOD.ASP.V.Ck.VV
3–A3006.3007	13–RETRACTOR
4–FLOW REST.	14–VAC. PUMP
5–OPW7VC	15–AIR COMP.
6–OPW11VC	16–MAG. GAUGE
7–OPW–E	17–BURNER
8–OPW-HP1	18–PILOT
9–HUSKY–HP2	19–ELEC. PANEL
10–HEALY	20–VENT.PVV. 12"
	21–JET PUMP

REMARKS

TANK NO.	PRODUCT	SIZE	FILL	D/CD	CAP	A/U	DDBK	MISC
1								
2								
3								
4								
5								
6								
7								
8								

APPENDIX K.4

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
INSPECTION REPORT

DEQ-062
1/88

PLANT ID #	INSPECTOR ASSIGNED
A1581	800

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
BUREAU OF ENFORCEMENT OPERATIONS

FIELD INVESTIGATION ASSIGNMENT REPORT

DATE ASSIGNED	DATE DUE
DATE COMPLETED	**COUNTY**
4/23/91	Middlesex

COMPANY NAME ______

LOCATION ______

CDS CLASS: A1 ___ A2 ___ B ___ NSPS ___ NESHAPS ___ PSD ___

AIR GRANT (105): ☐ Yes ☐ No PLLT: PT ___ S2 ___ CO ___ N2 ___ VO ___ Other ___

TYPE OF ASSIGNMENT
☐ Complaint ☐ APEDS
☐ Order Followup
☐ Other (by code) GSV01

CYCLE ___

COMPLAINANT NAME ______ PHONE # ______

COMPLAINANT ADDRESS ______

DATE RECEIVED ______ TIME RECEIVED ______ RECORDED BY ______

ASSIGNMENT UGST Inspection

PLANT CONTACT Joe Criola

TITLE Manager

ARRIVAL TIME AT PLANT 1550

TOTAL ASSIGNMENT TIME 30

STACKS INSPECTED 1 TEMPS ___

TOTAL SOURCES INSPECTED 15

DEQ-012 COMPLETED FOR SUBCHAPTERS ______

SUBCHAPTER	# INSP
8	2
16	15
17	15
OTHER	

COMPLAINT

TYPE	NUMBER

Time/Date at Complainant ___/___

Verified: ☐ Yes ☐ No

Give details below

VIOLATION FOLLOWUP INSPECTION

Violation Log # ______

Order Dated ______

Subchapter Violated ______

Compliance Achieved ☐ Yes ☐ No

Give details below

TYPE SAMPLE COLLECTED —

OF SAMPLES COLLECTED —

COMMENTS (by code) C01

DETAILS OF INSPECTION Inspection disclosed 8-12 [illegible] UGST with submerged fill and monitored vapor return. Valid Stage I NJDEP BAPC Pick # 091475 exp. 8/9/95 and valid Stage II NJDEP BAPC Pick # 083936 exp. 3/21/93. This facility has [illegible] islands, [illegible] pumps, and coaxial Stage II recovery nozzles installed in November 1988. Monthly [illegible] throughput is 60 [illegible] gallons. Pressure drop and leaking test performed by [illegible] Maintenance on 5/24/90 — [illegible] delivered by [illegible] on 4/20/91. Nozzles are repaired —

Tel # (908) 591-1282

INSPECTOR'S SIGNATURE [illegible]

TITLE: Sr. Public Health Investigator

SUPERVISOR'S REVIEW

INITIALS: [illegible] DATE: 5/1/91

SEE ATTACHED FOR ADDITIONAL INFORMATION: ☒ YES ☐ NO

GS# 78-91

4/29/91

4-29-91

VEM-032B BACK SIDE

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)
A 1581	879 & Texas Road		826,800	0990016A

* *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)

X 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: X **APPROVED** ____ **DENIED**

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

NSR DECISION DATE: 8-10-90

BY: Louis Mikolajczyk
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.

APPENDIX K.5

MISSOURI DNR INSPECTION REPORT

MISSOURI DEPARTMENT OF NATURAL RESOURCES
AIR POLLUTION CONTROL PROGRAM
8460 WATSON RD., ST. LOUIS, MISSOURI 63119
MOBILE SOURCE UNIT I/M

Info #

PHONE (800) 334-6946

NAME ☐ CORP ☐ PART ☐ INDIV

ADDRESS — FC# → #2096

DATE 8/30/90

CITY IMPERIAL | STATE Mo | ZIP CODE 63052 | TELEPHONE NO

RE. PREMISE AT | CITY | COUNTY | STATE | ZIP CODE

OPERATOR NAME | TELEPHONE NUMBER

ADDRESS SAME | CITY | STATE | ZIP CODE

REASON FOR INSPECTION ☑ SEMI-ANNUAL ☐ ALTERATION ☐ COMPLAINT ☐ OTHER

☐ VIOLATION RECHECK ______ DATE & NO ☐ EXCESS EMISSIONS RECHECK ______ DATE & NO ☐ CHANGE OF OWNERSHIP

EQUIPMENT OPERATING ☑ YES ☐ NO | FUEL IN TANKS ☑ YES ☐ NO

TOTAL GASOLINE NOZZLES 8 | TYPE OF NOZZLES OPW 11VV EWA4001

SIZE OF GASOLINE TANKS 3ea - 8,000 | TYPE OF STAGE II SYSTEM Balance - Single Point

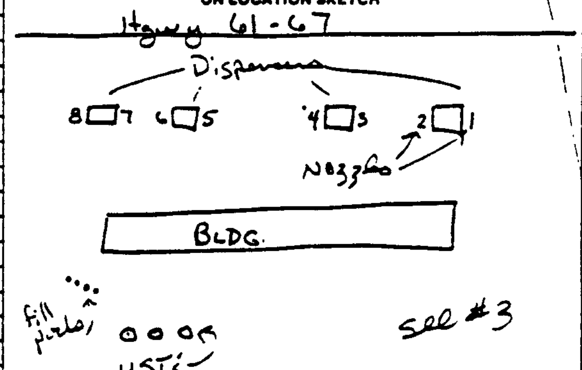
1 COULD THE VIOLATION HAVE BEEN PREVENTED?	☐ YES	☐ NO	(EXPLAIN BELOW)
2 WAS POOR MAINTENANCE INVOLVED?	☐ YES	☐ NO	(EXPLAIN BELOW)
3 PREVIOUS VIOLATIONS OF THE SAME TYPE?	☐ YES	☐ NO	(DATE OF MOST RECENT)
4 WAS VIOLATION OBSERVED BY ANOTHER AGENCY?	☐ YES	☐ NO	(WHO?)
5 OBSERVED VAPORS?	☐ YES	☐ NO	
6 OBSERVED HEAT CONVECTIONS?	☐ YES	☐ NO	
7 OBSERVED TWO VEHICLE FILLS	☐ YES	☐ NO	
8 BREAKDOWN CALLED IN?	☐ YES	☐ NO	(WHEN?)
9 DEFECTS REPAIRED WHILE INSPECTOR PRESENT?	☐ YES	☐ NO	

PUMP/NOZZLE NO.

TYPE OF DEFECTS												
TORN/CUT BOOT > 1" LGTH												
TEAR > ½" TO A SIDE												
HOLE > ½" DIA (OVER >)												
FACEPLATE NO SEAL > ¼ CIR												
FLEX CONE ¼" CIR MISSING												
BOOT OFF OR CLAMPED BACK												
LATCHING DEVICE MISSING												
INOPERATIVE CHECK VALVE												
FLOW RESTRICTORS MISSING												
NOZZLE LEAKING												
SWIVELS MISSING												
VAPOR HOSE CRIMPED SEVERED												
RETRACTORS LOOSE BROKEN												
PROCESSOR UNIT NOT OPER												
COMPRESSOR OFF												
SYSTEM TURNED OFF												
NO PHASE II												
DRYBREAK NOT SEALING												
IMPROPER EQUIPMENT												
DISCONNECTED EQUIPMENT												
OTHER												

See #2

IDENTIFY DEFECTIVE EQUIPMENT ON LOCATION SKETCH



See #3

PUMP/NOZZLE NO.

EXCESS EMISSIONS												
TORN/CUT BOOT < 1" LGTH.												
TEAR < ½" TO A SIDE												
HOLE < ½" DIA. (UNDER <)												
FACEPLATE NO SEAL < ½" CIR.												
OTHER												

TIME	INSPECTOR'S FINDINGS
	Severed Hose : #1
	Torn Faceplate < ½ Circ : #2
	Loose Spout : #2
	Cut in Hose : #8 — I don't know why this wasn't Tagged
	It must have been very small cut.

Tagged

See #4

INSPECTOR'S CONCLUSIONS NOV-NOEF #1478 ISSUED FOR ABOVE DEFECTS

TAGGED OUT OF SERVICE
#1 TOT # = 421597.7
#2 TOT # = 621499.9

REPORTING INSPECTOR W. Ruppel | REPORT COMPLETED See #5

MO 780-1153 (5-88) DISTRIBUTION/ WHITE-AIR POLLUTION CC

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
AIR POLLUTION CONTROL PROGRAM

NOTICE OF VIOLATION/EXCESS EMISSIONS

P.O. BOX 176
JEFFERSON CITY, MO 65102

CENTRAL OFFICE
NO. 1478

☒ NOTICE OF VIOLATION ☒ NOTICE OF EXCESS EMISSIONS

DATE AND TIME: 8/30/90 10:15 ☒ AM ☐ PM

SOURCE (NAME, ADDRESS, LOCATION)

5933 Hgwy 61-67

IMERIAL Mo 63052

MAILING ADDRESS | CITY | STATE | ZIP CODE

NAME OF OWNER OR MANAGER

IN VIOLATION OF MISSOURI AIR CONSERVATION COMMISSION REGULATION 10CSR 10- 5.220

Control of Petroleum Liquid Storage Loading & Transfer

REMARKS ON NATURE OF VIOLATION

NOV: SEVERED Hose : #1 tagged Tot# = 421597.7

LOOSE SPOUT : #2 tagged Tot# = 621427.9

NOEE: TORN Faceplate < 1/4 Circ : #2

CUT IN HOSE : #8.

SIGNATURE (PERSON RECEIVING NOTICE): Wanda Dunn

TITLE OR POSITION: owner

SIGNATURE (PERSON ISSUING NOTICE): Charles A. Dachweder

TITLE OR POSITION/DNR REGION: Inspector Stage II SLRO

MO 780-0179 (3-88) DISTRIBUTION: WHITE - AIR POLLUTION CONTROL PROGRAM; CANARY - REGIONAL OFFICE; PINK - SOURCE

APPENDIX K.6

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION
STAGE II VAPOR RECOVERY INSPECTION FORM

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NASSAU COUNTY DEPARTMENT OF HEALTH
GASOLINE STORAGE & TRANSFER SYSTEM
RENEWAL APPLICATION
CERTIFICATE TO OPERATE - STAGE II
VAPOR RECOVERY INSPECTION FORM

LOCATION FAC

OWNER	FACILITY	
(1)	(6)	INSPECTION DATE: / /
(2)	(7)	INSPECTOR'S NAME:
(3) (4)	(8) (9)	CONTACT :
(5)	(10) OPER:	PHONE :

SUBMERGED FILL (Y/N) ____

STAGE I

GASKETS (M, T) ____
DUAL SYSTEM DRY BREAK OPERATIONAL (Y/N) ____
COAXIAL SYSTEM OPERATIONAL (Y/N) ____

STAGE II

EQUIPMENT COMPATIBILITY (Y/N) ____
OPERATING INSTRUCTIONS / 800 NO'S (Y/N) ____

STATUS KEY :

A - ACCEPTABLE
B - BROKEN
D - DEFECTIVE
F - FLAT
I - IMPROPER
K - KINKED
L - LEAKING
M - MISSING
N - NO
T - TORN
U - UNCERTIFIED
Y - YES

GAS GRADES :

R - REGULAR LEADED
U - UNLEADED
S - SUPER UNLEADED

NOZZLE TYPE :

1 - EMCO WHEATON A3005
2 - EMCO WHEATON A4001
3 - EMCO WHEATON A4003
4 - EMCO WHEATON A3007
5 - OPW 11VF
6 - HEALY 200

NOZZLE NUMBER																
GAS GRADE (R, U, S)																
NOZZLE TYPE (1, 2, 3, 4, 5, 6, U)																
NOZZLE BOOT (A, F, I, L, M, T)																
AUTOMATIC SHUTOFF (A, D)																
CHECK VALVE (A, I, L, M, U)																
FACE SEAL (A, I, M, T)																
RETRACTORS (A, D, I)																
HOSE (A, F, K, L, T)																
LATCH DEVICE (A, B, M)																
NOZZLE SWIVEL (A, D, L, M)																
DISPENSER SWIVEL (A, D, L, M)																
PASS (Y/N)																

/8 (6/86)

LOC	FAC	EP

Inspected on ____/____/____ AT ________ AM PM time

WHITE - APPLICANT
PINK - DATA ENTRY
YELLOW - REGIONAL OFFICE

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF AIR RESOURCES

NOTICE OF COMPLIANCE DETERMINATION

TO

Name ____________________

Address ____________________

City ____________________ ZIP ________

Contact ____________________

FOR

Source Description ____________________

☐ INSPECTION
☐ COMPLAINT
☐ OTHER

Type ____________________

MULTIPLE EMISSION POINTS

LIST IF MORE THAN ONE

INSPECTION COMMENTS (DESCRIBE VIOLATION, IF ANY)

____

____

____

____

____

____

____

____

COMPLIANCE STATUS

☐ NON COMPLIANCE PLEASE TAKE NOTICE THAT based upon this inspection, there is reason to believe that you are in violation of Article 19 of the New York Environmental Conservation Law and the regulation promulgated thereunder 6NYCRR Part(s) ______, ______.

PLEASE TAKE FURTHER NOTICE THAT the sanctions for such violations include a civil penalty of up to $10,000 plus $500 per day the violation continues a criminal fine of up to $10,000 per day of violation, and/or imprisonment of up to one year per day of violation.

YOU ARE HEREBY DIRECTED TO TAKE CORRECTIVE ACTION

☐ IN COMPLIANCE

☐ SOURCE SHUT DOWN

☐ SOURCE REMOVED

☐ OTHER

Type ____________

DISPOSITION

☐ AGREEMENT FOR VOLUNTARY COMPLIANCE BY ____/____/____

☐ REINSPECTION TO BE MADE BY ____/____/____

☐ OTHER ____________________ BY ____/____/____

☐ FURTHER ACTION NOT REQUIRED

☐ PRIOR ACTION (S) COMPLETE

INSPECTION PERFORMED BY (print) ____________________ TITLE ____________

DEC REPRESENTATIVE'S SIGNATURE ____________________ DATE ____________

DEC RESERVES THE RIGHT TO TAKE FURTHER ENFORCEMENT ACTION FOR ANY VIOLATION NOTED IN THIS NOCD OR ANY OTHER VIOLATION OF THE ENVIRONMENTAL CONSERVATION LAW.

for further information please contact -

____
name

____________________ ____________
title phone no.

APPENDIX K.7

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY CONTROL
COMPLIANCE INSPECTION FORM

Facility license number: ________
Facility name: ____________________
Facility Address: ____________________

____

____

Licensee name: ____________ _ ____________

System type: __ Complete I&C form?: _

NOZZLES:
Number: __ Mfr: ___ Model number: ________

HOSES:
Number: __ Mfr: ___ Model number: ________

DISPENSERS:
Number: __ Mfr: ___ Model number: ________

INSPECTOR NAME: ____________________

DATE OF INSPECTION ________ RECEIPT LEFT: __

DISPENSER #	NOZZLE #	NOZZLE TYPE	Certified?	Check valve	Faceplate	Shut-off?	Boot attch.	Boot cond.	HOSE TYPE	Hose cond.	Swivel cond	Retractor	Length	10" loop	VAPOR CNTRL	Switch On?	Compressor	TANK SEALS	Valves Clsd	Seal Cond?	SIGNS
			CARB/UL certification tag present?	Is the check valve operating?	Good seal, and less than 1/4 missing?	Shut-off valve working?	Clamp in place?	No triangular tears or 1/2" slits?		No kinks or flat spots?	Swivel moves freely?	Retractor moves freely?	Hose does not touch the ground?	If applicable, no more than a 10" loop?		Is the processor on?	Is the compressor on?		Are the tank valves closed?	Are the valve seals in good condition?	Are all required signs in place?

DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF
AIR QUALITY CONTROL

This receipt is to inform you, the owner/operator of a motor vehicle dipsensing facility, that an inspector from the Department of Environmental Protection's Division of Air Quality Control has visited.

The inspector visited your facilty in order to determine compliance with the Department's Stage I and II vapor recovery program. (310 CMR 7.24)

This receipt is NOT a certificate of compliance, nor is it a notice of non-compliance.

If, as a result of the inspection, the facility has been determined to be out of compliance with the regulations, you will be informed of the enforcement action(s) which will be taken.

The Department thanks you for your cooperation in contributing to the success of these important air pollution control programs.

INSPECTOR: ______________________________ DATE: __________

STAGE II INFO LINE (617) 556-1035

DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF
AIR QUALITY CONTROL

This receipt is to inform you, the owner/operator of a motor vehicle dipsensing facility, that an inspector from the Department of Environmental Protection's Division of Air Quality Control has visited.

The inspector visited your facilty in order to determine compliance with the Department's Stage I and II vapor recovery program. (310 CMR 7.24)

This receipt is NOT a certificate of compliance, nor is it a notice of non-compliance.

If, as a result of the inspection, the facility has been determined to be out of compliance with the regulations, you will be informed of the enforcement action(s) which will be taken.

The Department thanks you for your cooperation in contributing to the success of these important air pollution control programs.

INSPECTOR: ______________________________ DATE: __________

STAGE II INFO LINE (617) 556-1035

APPENDIX K.8

DADE COUNTY, FLORIDA
INSPECTION CHECKLIST

METROPOLITAN DADE COUNTY
DEPARTMENT OF ENVIRONMENTAL RESOURCES MANAGEMENT
111 N.W. First Street, Suite 1310
Miami, Florida 33128
(305)375-3376

INSPECTION FORM

Station________________________ Address________________________

Contact________________________ Phone____________ System Type: BA HI AM Other_____

Inspector______________________ Date______________ Notice Rec'd By________________

NOZZLE #																								
GAS GRADE																								
NOZZLE TYPE																								

DEFICIENCY

NOZZLE	Certified nozzle/ 1. mounting rack																								
	2. Check Valve																								
	3. Face Seal																								
	4. Ring, rivet, spring																								
	5. Bellows																								
	6. Swivel(s)																								
	7. Flow Limiter																								
VAPOR HOSE	1. Hose condition																								
	2. Length																								
	3. Configuration																								
	4. Swivel																								
	5. Overhead retractor																								
	6. Power/pilot on (HI)																								

Key to Deficiencies: NC=Not Certified B=Broken M=Missing TO=Torn F=Flat TN=Tangled AD=Needs adjustment L=Long LO=Loose S=Short MA=Misaligned K=Kinked FR=Frayed

* INSPECTION RESULTS *																								

Key to inspection results: OK=Ok 10=Repair within TEN days T=Tagged (nozzle tagged out of order until repairs are completed)

TECHNICAL REPORT DATA

(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA-450/3-91-022b	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE Technical Guidance - Stage II Vapor Recovery Systems for Control of Vehicle Refueling Emissions at Gasoline Dispensing Facilities, Vol. II-Appendices		5. REPORT DATE November 1991 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)		8. PERFORMING ORGANIZATION REPORT NO
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Environmental Protection Agency Office of Air Quality Planning and Standards Emission Standards Division (MD-13) Research Triangle Park, NC 27711		10. PROGRAM ELEMENT NO. 11 CONTRACT/GRANT NO. 68D10116
12. SPONSORING AGENCY NAME AND ADDRESS US Environmental Protection Agency Office of Air and Radiation Washington, DC 20460		13. TYPE OF REPORT AND PERIOD COVERED Final 14. SPONSORING AGENCY CODE EPA/200/04

15 SUPPLEMENTARY NOTES

16. ABSTRACT

The Clean Air Act Amendments (CAAA) of 1990 require the installation of Stage II vapor recovery systems in many ozone nonattainment areas and direct EPA to issue guidance as appropriate on the effectiveness of Stage II systems. This document provides guidance on the effectiveness of Stage II systems and other Stage II technical information on emissions, controls, costs, and program implementation. Stage II vapor recovery on vehicle refueling is an effective control technology to reduce gasoline vapor emissions that contain volatile organic compounds (VOC) and hazardous air pollutants. Vehicle refueling emissions consist of the gasoline vapors displaced from the automobile tank by dispensed liquid gasoline. The Stage II system collects these vapors at the vehicle fillpipe and returns them to the underground storage tank.

17 KEY WORDS AND DOCUMENT ANALYSIS

a DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Gasoline Air Pollution Refueling Service Stations Stage II	Air Pollution Control	

18. DISTRIBUTION STATEMENT Unlimited	19. SECURITY CLASS (This Report) Unclassified	21 NO OF PAGES 474
	20 SECURITY CLASS (This page) Unclassified	22. PRICE

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE