Applied GeoSystems, Inc.
A RESNA Company

RESNA
Working To Restore Nature

3315 Almaden Expressway, Suite 34
San Jose, CA 95118
Phone: (408) 264-7723
Fax: (408) 264-2435

PERMIT APPLICATION FOR AN AUTHORITY TO CONSTRUCT AND PERMIT TO OPERATE A VAPOR EXTRACTION SYSTEM

at

ARCO Station 2152
22141 Center Street
Castro Valley, California

12/9/91

69013.08

Permit prepared for
ARCO Products Company

for Submittal to
Bay Area Air Quality Management District

by
RESNA

Dana Dietz Weiss
Staff Engineer

Joan E. Tiernan, Ph.D., P.E.
Engineering Manager

December 9, 1991

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Working To Restore Nature

3315 Almaden Expressway, Suite 34
San Jose, CA 95118
Phone: (408) 264-7723
Fax: (408) 264-2435

December 9, 1991
1209ESTE
69013.08

Mr. Eric Stevenson
Permit Services Division
Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109

Subject: Permit Application for an Authority to Construct and Permit to Operate a Vapor Extraction System at ARCO Station 2152, 22141 Center Street, Castro Valley, California.

Mr. Stevenson:

At the request of the ARCO Products Company (ARCO), RESNA is submitting the attached application for an Authority to Construct and Permit to Operate a carbon adsorption system as an off-gas treatment method for hydrocarbon-bearing vapor removed from beneath ARCO Station 2152. The location of the site is shown on the Site Vicinity Map, Plate 1. Residential areas are southeast and west-southwest of the site, and commercial developments are northwest across Grove Way and northeast across Center Street. The locations of adjacent streets and structures are shown on the Area Map, Plate 2.

Previous Work

RESNA performed a vapor extraction test (VET) onsite on February 15, 1991, at the request of ARCO. The VET had two objectives: (1) to collect operational data to evaluate the efficiency and practicality of vapor extraction as a soil remediation alternative; and (2) to select the most appropriate off-gas treatment alternative. The VET was performed in accordance with Bay Area Air Quality Management District (BAAQMD) guidelines.

The vapor-extraction equipment consisted primarily of: (1) six-cylinder internal combustion (I.C.) engine to treat off-gas emissions; (2) instrumentation for measuring air flow, air velocity, air pressure, temperature, electrical current, and volatile organic compound (VOC) concentrations; and (3) PVC piping, fittings, and wellhead connections.

Air samples were collected and temperature, flow rate, pressure and vacuum readings, and VOC concentrations were monitored. Air samples were collected through a ¼-inch Teflon sample line connected to a stainless steel wellhead fitting and collected in air sample bags. Teflon tubing was used to minimize sample loss through adsorption and the possibility of distorted results from sample lines contaminated by a previous test run. The samples were sealed in the bags and labeled appropriately. The samples were immediately placed in a dry container for transport to a State Certified analytical laboratory under Chain of Custody documentation. Chain of Custody protocol was followed throughout field and laboratory procedures. The samples were analyzed at Superior Analytical Laboratory in San Francisco, California (Certification No. 319 & 220), for benzene, toluene, ethylbenzene, and total xylene isomers, by Environmental Protection Agency (EPA) method 8020, and for total petroleum hydrocarbons reported as gasoline (TPHg) by modified EPA method 8015. Chain of Custody Records and results of laboratory analyses of the vapor samples are attached to this letter report in Appendix A. These and other results were previously reported (Applied GeoSystems [AGS], July 1991) and submitted to the Regional Water Quality Control Board (RWQCB).

Results of these laboratory analyses are summarized in Table 1, and indicate average influent TPHg and benzene concentrations of 594 and 1.3 milligrams per cubic meter, respectively. The air flow rate was greater than 50 cubic feet per minute at vacuums ranging from 40-48 inches of water.

Proposed Remediation System

Based on the results of the vapor extraction test, RESNA recommended vapor extraction combined with carbon adsorption as an off-gas treatment method (Applied GeoSystems, July 1991).

A total of four vapor extraction wells (VW-2 through VW-5) will be connected to the system. The vapor extraction wells, and remediation compound location are shown on Plate 3. Wellheads will be piped and valved, and an air sampling port will be installed at each wellhead and at the remediation compound. Well vaults with traffic covers will be installed at each vapor well. The collection pipe will direct air flow to the remediation compound which will contain a condensate separator, vacuum blower, and two activated carbon canisters containing 1,200 pounds each of activated carbon. The treated off-gas will be discharged through a nine foot stack.

The Process Flow Schematic is shown in Plate 4 together with engineering details of the remediation compound and equipment. The compound will be fenced to preclude public access.

RESNA will install two VENT-SCRUB VSC-1200-2 activated carbon canisters onsite and operate the abatement equipment for approximately six months or until the combined off-gas airstream hydrocarbon concentration is less than 50 parts per million by volume (ppmv) TPHg, a typical detection limit for vapor samples. The manufacturer specifications for the VENT-SCRUB VSC-1200-2 activated carbon canisters are attached in Appendix B. The vapor extraction system will continue to run if this threshold value is not reached in six months, or it may be shut down sooner, if the threshold value is reached sooner.

BAAQMD Permit

The BAAQMD Permit Application for Authority to Construct and Permit to Operate is attached in Appendix B and includes Data Forms P101B, A, G, and P, Plant Data Form P-201, Risk Screening Analysis, manufacturer data on the carbon canisters and Rotron blower, a Process Flow Diagram, Emission Rate Calculations and other required data.

Emission Rates

Emission rate calculations are attached in Appendix B with the Bay Area Air Quality Management District (BAAQMD) Permit Applications. Calculations were conducted for system start-up emission rates and for emission rates after about two months.

The approximate start-up emission rates, after abatement, for TPHg and benzene at a flow rate of 500 cubic feet per minute (cfm) while on 24-hour operation, are 6.0 and 0.010 pounds per day, respectively. These concentrations will decrease with continued system operation. The emission rate calculations were based on the peak air flow capacity of the carbon, which is 500 cfm. However, at startup and during approximately the first two weeks of system operation, it is predicted that the in-the-field flow rates will be considerably less and could be as low as 300 cfm. Although in-the-field emissions are expected to be closer to 3.5 lb. TPHg/day at startup, rather than 6 lb/day, the carbon is designed to draw 500 cfm, and this is the reason 500 cfm was the value used to determine mass emission rate. This provides a factor of safety for startup emissions, and leaves capacity for adding additional wells to the system.

After about two months of system operation, emissions concentrations are estimated to decrease to 0.6 lb TPHg/day and 0.0010 lbs benzene/day at a flow of 500 cfm. This estimate is based upon theoretical data (Johnson, et al, 1990), and RESNA field data. Based on this information, the venting and abatement system will operate for 24 hours per day to meet discharge requirements set by the Bay Area Air Quality Management District of 10 lbs/day VOC emissions and 1 lb/day benzene emissions.

If you have any questions or require any additional data regarding this permit application, please call us at (408) 264-7723.

Sincerely,
RESNA

Dana Dietz Weiss

Dana Dietz Weiss
Staff Engineer

Joan Tiernan, Ph.D., P.E.
Engineering Manager

cc: Mr. Chuck Carmel, ARCO Products Company
Mr. Scott Seery, ACHCSA
Mr. Joel Coffman, RESNA
Ms. Kim Nyugen, RESNA

Attachments: References Cited

Permit Fee to BAAQMD for $395.00 (Check No. 433)
Plate 1: Site Vicinity Map
Plate 2: Area Map
Plate 3: Generalized Site Plan
Plate 4: Remediation Compound Layout and Process Flow Diagram

Table 1: Results of Laboratory Analyses of Air Samples

Appendix A: Chain of Custody and Results of Laboratory Analysis for Air Samples
Appendix B: BAAQMD Permit Applications for Authority to Construct and Permit to Operate Industrial Sources
Form P101B - Application for Authority to Construct and Permit to Operate Industrial Sources
Plant Data (P-201)
Data Form A - Abatement Device (Devices A-1 & A-2)
Data Form G - General Air Pollution Source
Data Form P - Emission Point
Request for Information; Risk Screening Analysis
Emissions Rate Calculations at Systems Start-Up
Emissions Rate Calculations after Two Months
Manufacturer's Specifications and Description of VENT-SCRUB VSC-1200-2 Carbon Adsorption System
Manufacturer's Specifications and Description of Rotron DR -12 Regenerative Blower
Process Flow Diagram

REFERENCES CITED

Applied Geosystems. July 2, 1991. Supplemental Subsurface and Remedial Investigation, 22141 Center Street, Castro Valley, California, AGS Report 69013-6.

Johnson et al, 1990. " A Practical Approach to the Design, Operation, and Monitoring of In-Situ Soil Venting Systems." Shell Development/Shell Oil Company, Westhollow Research Center. Houston, Texas.

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Working To Restore Nature

TRANSMITTAL

3315 Almaden Expressway, Suite 34
San Jose, CA 95118
Phone: (408) 264-7723
Fax: (408) 264-2435

TO: MR. SCOTT SEERY
ACHCSA
80 SWAN WAY, ROOM 200
OAKLAND, CALIFORNIA 94612

DATE: 12/10/91
PROJECT NUMBER: 69013.08
SUBJECT: ARCO STATION 2152 AT 22141 CENTER STREET, CASTRO VALLEY, CALIFORNIA.

FROM: DANA DIETZ WEISS
TITLE: STAFF ENGINEER

WE ARE SENDING YOU [XX] Attached [ ] Under separate cover via _____ the following items:

[ ] Shop drawings [ ] Prints [ ] Reports [ ] Specifications

[ ] Letters [ ] Change Orders [ ] _____

COPIES	DATED	NO.	DESCRIPTION
1	12/9/91		PERMIT APPLICATION FOR AN AUTHORITY TO CONSTRUCT AND PERMIT TO OPERATE A VAPOR EXTRACTION SYSTEM AT THE ABOVE SUBJECT SITE.

THESE ARE TRANSMITTED as checked below:

[ ] For review and comment [ ] Approved as submitted [ ] Resubmit ___ copies for approval

[ ] As requested [ ] Approved as noted [ ] Submit___ copies for distribution

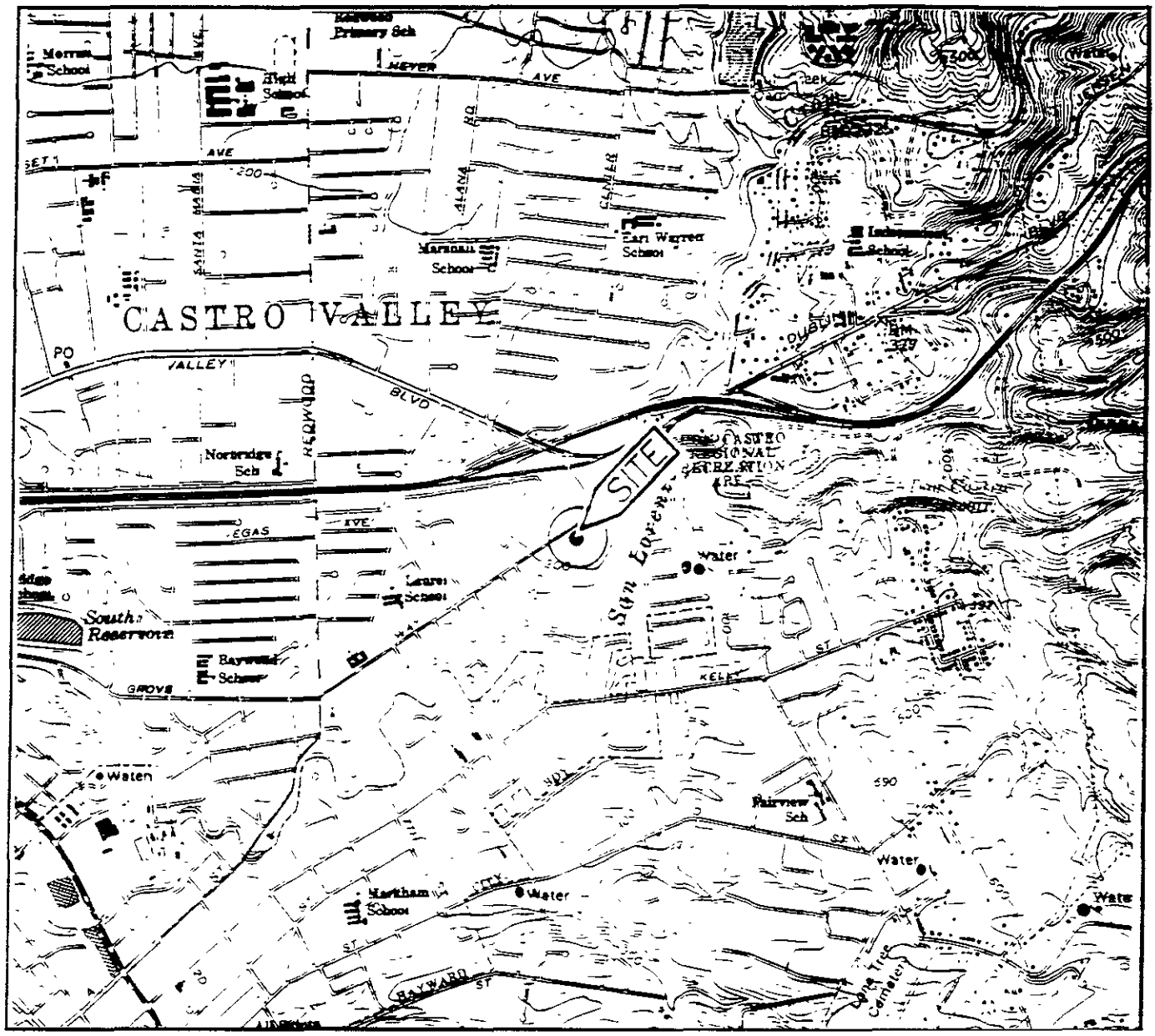
[ ] For approval [ ] Return for corrections [ ] Return ___ corrected prints

[ ] For your files [ ] _____

REMARKS: _____

Copies: 1 to project file no. 69013.08

*Revision Date: 11/21/91
*File Name: TRANSMT.PRJ



Base: U.S. Geological Survey
7.5-Minute Quadrangle
Hayward, California.
Photorevised 1980

N

LEGEND

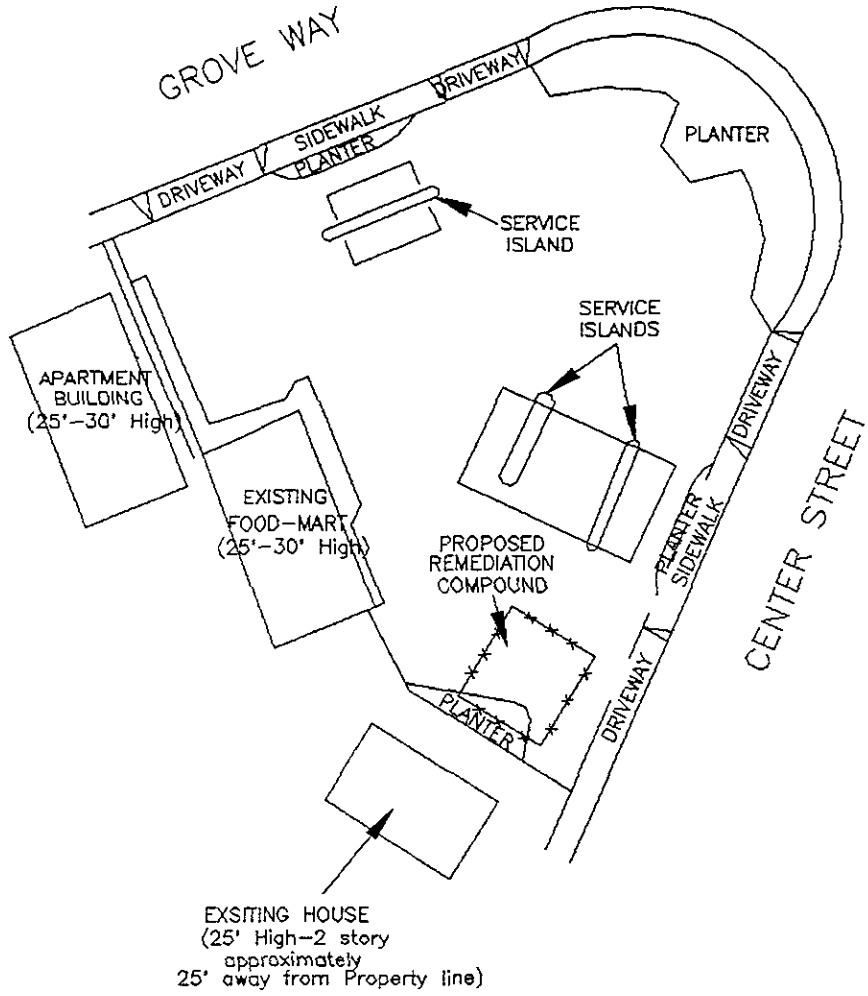
⊙ = Site Location

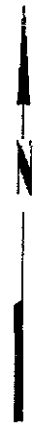
Approximate Scale

2000 1000 0 2000 4000

feet

RESNA	**SITE VICINITY MAP** **ARCO Station 2152** **22141 Center Street** **Castro Valley, California**	**PLATE** **1**
PROJECT 69013.08		





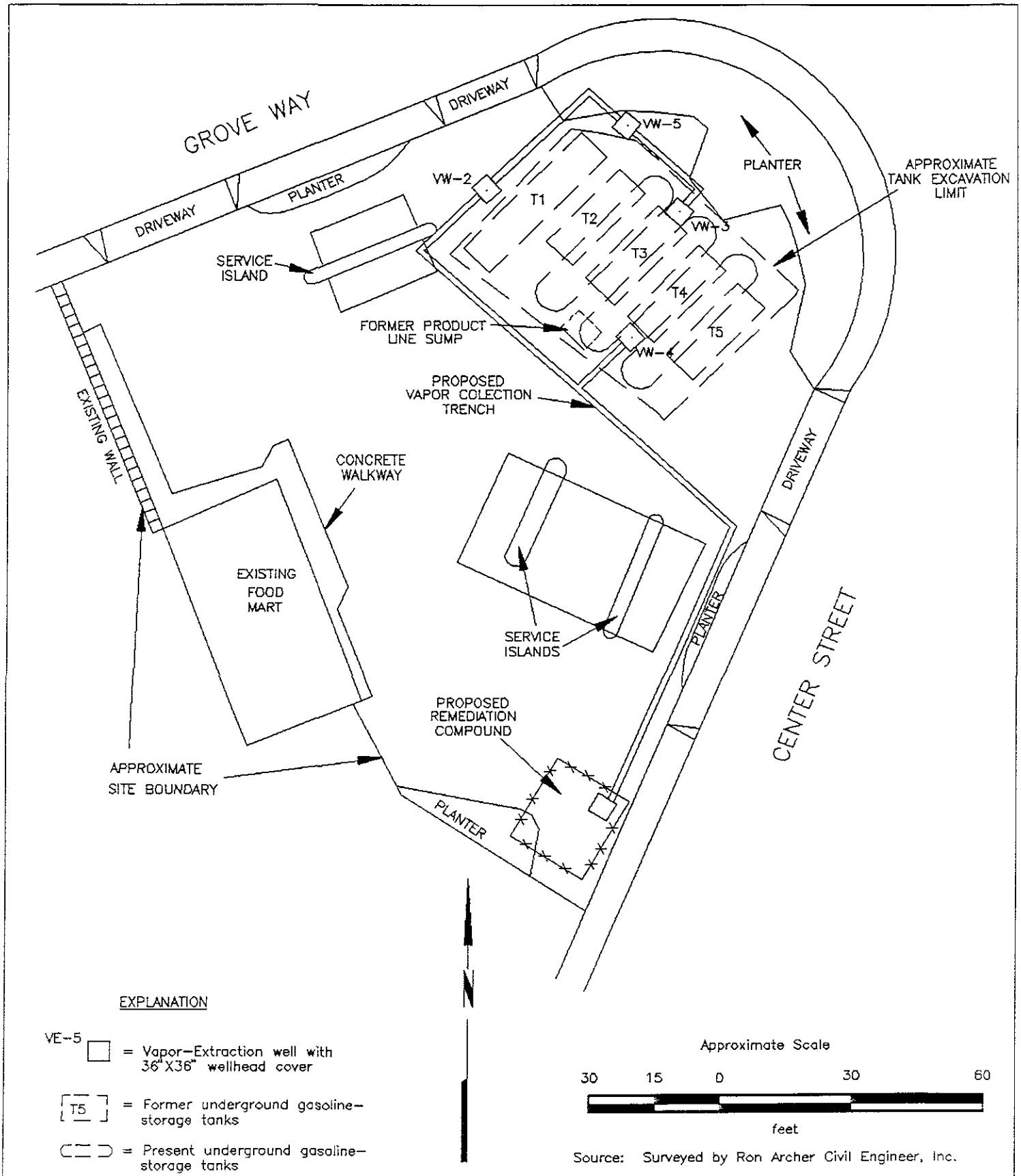
Approximate Scale

50 25 0 50 100

feet

Source: Surveyed by Ron Archer Civil Engineer, Inc.

RESNA	**AREA MAP** **ARCO Station 2152** **22141 Center Street** **Castro Valley, California**	**PLATE** **2**
PROJECT 69013.08		



RESNA	**GENERALIZED SITE PLAN** **ARCO Station 2152** **22141 Center Street** **Castro Valley, California**	**PLATE** **3**
PROJECT 69013.08		

TABLE 1
RESULTS OF LABORATORY ANALYSES OF AIR SAMPLES
ARCO Station No. 2152
22141 Center Street
Castro Valley, California

Sample ID	Taken From	Elapsed Time (minutes)	TPHg	B	T	E	X
AS-0215-1	VW-1 INF	20	150	<0.3	1.2	0.6	3.7
AS-0215-2	VW-2 INF	20	12,000	<0.3	46	11	26
AS-0215-3	VW-3 INF	20	<110	<0.3	<1.0	0.3	1.9
AS-0215-4	VW-5 INF	15	600	12	1.7	6.9	27
AS-0215-5	VW-5 INF	120	130	1.3	<1.0	1.0	3.9
AS-0215-6	VW-5 EFF	125	<110	<0.3	<1.0	1.0	7.6
AS-0215-7	VW-1 INF	5	<110	0.3	<1.0	0.6	4.5
AS-0215-8	VW-1 INF	120	380	<0.3	2.2	1.2	6.4

* Concentrations are in mg/m^3
Minimum detection limit for Gasoline in Air: 110 mg/m^3
Minimum detection limit for Benzene : 0.30 mg/m^3
Minimum detection limit for Toluene : 1.0 mg/m^3
Minimum detection limit for Ethyl benzene : 0.30 mg/m^3
Minimum detection limit for Xylenes : 1.1 mg/m^3

TPHg: Total petroleum hydrocarbons as gasoline (analyzed by EPA SW-846 Methods 5030 and 8015).

B: benzene, T: toluene, E: ethyl benzene, X: total xylene isomers

BTEX: Analyzed by EPA SW-846 Methods 5030 and 8020.

Sample identification: AS-0215-1
- AS-0215-1 — Air Sample Designation
- 0215 — Date of Sample
- 1 — Air sample number

APPENDIX A

CHAIN OF CUSTODY AND RESULTS OF LABORATORY ANALYSIS FOR AIR SAMPLES

Applied GeoSystems

CHAIN-OF-CUSTODY RECORD

PROJ NO: 69013.07
PROJECT NAME: ARCO 2152
P.O NO.:
SAMPLERS (Signature): Peter Schurman PETER Schurman

DATE MM/DD/YY	TIME	SAMPLE I.D.	No. of Containers	TPHg	BTEX	TPHd	Preserved?	LABORATORY I.D. NUMBER
02-15-91	0940	AS . 0215 . 1	1	✓	✓			
02-15-91	1005	AS . 0215 . 2	1	✓	✓			
02-15-91	1035	AS . 0215 . 3	1	✓	✓			
02-15-91	1055	AS . 0215 . 4	1	✓	✓			
02-15-91	1240	AS . 0215 . 5	1	✓	✓			
02-15-91	1245	AS . 0215 . 6	1	✓	✓			
02-15-91	1300	AS . 0215 . 7	1	✓	✓			
02-15-91	1500	AS . 0215 . 8	1	✓	✓			

ANALYSIS

Superior LABS

RELINQUISHED BY (Signature): Peter Schurman — DATE / TIME: 2-15-91 1520 — RECEIVED BY (Signature): Laura Jordan

RELINQUISHED BY (Signature): Laura Jordan — DATE / TIME: 2-15-91 1538 — RECEIVED BY (Signature): Dave Chatt — 2-15-91 16:00

RELINQUISHED BY (Signature): Dave Chatt — DATE / TIME: 2-15-91 1730 — RECEIVED FOR LABORATORY BY (Signature): [illegible] 2-15-91 1724

REMARKS:
NORMAL TAT
Please send results to M. Hodges

SEND RESULTS TO:
Applied GeoSystems
4191 Power Inn Road
Suite D & E
Sacramento, California 95826
(916) 452-2901

Proj. Mgr.: Michael Hodges

SUPERIOR ANALYTICAL LABORATORIES, INC.
825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512
DOHS #319
DOHS #220

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 82483
CLIENT: APPLIED GEOSYSTEMS
CLIENT JOB NO.: 69013.07

DATE RECEIVED: 02/15/91
DATE REPORTED: 02/18/91

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 5030 and 8015

LAB #	Sample Identification	Concentration mg/m³ Gasoline Range
1	AS.0215.1	150
2	AS.0215.2	12000
3	AS.0215.3	ND<110
4	AS.0215.4	600
5	AS.0215.5	130
6	AS.0215.6	ND<110
7	AS.0215.7	ND<110
8	AS.0215.8	380

Minimum Detection Limit for Gasoline in Air: 110 mg/m³
Concentration of gasoline in air calculated based on standard temperature and pressure and an assumed molecular weight of hexane.

QAQC Summary:

Daily Standard run at 2mg/L: RPD Gasoline = 15
MS/MSD Average Recovery = 96%: Duplicate RPD = 3

Richard Srna, Ph.D.

Kristin K. Dennis
Laboratory Manager

OUTSTANDING QUALITY AND SERVICE

SUPERIOR ANALYTICAL LABORATORIES, INC.
825 ARNOLD, STE. 114 • MARTINEZ, CALIFORNIA 94553 • (415) 229-1512
DOHS #319
DOHS #220

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 82483
CLIENT: APPLIED GEOSYSTEMS
CLIENT JOB NO.: 69013.07

DATE RECEIVED: 02/15/91
DATE REPORTED: 02/18/91

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES
by EPA SW-846 Methods 5030 and 8020

LAB #	Sample Identification	Concentration mg/m³ Benzene	Toluene	Ethyl Benzene	Xylenes
1	AS.0215.1	ND<0.3	1.2	0.6	3.7
2	AS.0215.2	ND<0.3	46	11	26
3	AS.0215.3	ND<0.3	ND<1.0	0.3	1.3
4	AS.0215.4	12	1.7	6.9	27
5	AS.0215.5	1.3	ND<1.0	1.0	3.3
6	AS.0215.6	ND<0.3	ND<1.0	1.2	7.5
7	AS.0215.7	0.3	ND<1.0	0.6	4.5
8	AS.0215.8	ND<0.3	2.2	1.2	6.4

Minimum Detection Limit in Air for Benzene: 0.30 mg/m³
Minimum Detection Limit in Air for Toluene: 1.0 mg/m³
Minimum Detection Limit in Air for Ethyl Benzene: 0.30 mg/m³
Minimum Detection Limit in Air for Xylenes: 1.1 mg/m³

Concentration of BTXE in air calculated based on standard temperature and pressure.

QAQC Summary:

Daily Standard run at 20ug/L: RPD = 15%
MS/MSD Average Recovery = 94%: Duplicate RPD = <2

Richard Scha, Ph.D.
Laboratory Manager

OUTSTANDING QUALITY AND SERVICE

APPENDIX B

BAAQMD Permit Applications for Authority to Construct and Permit to Operate Industrial Sources

Form P101B - Application for Authority to Construct and Permit to Operate Industrial Sources

Plant Data (P-201)

Data Form A - Abatement Device

Data Form G - General Air Pollution Source

Data Form P - Emission Point

Request for Information; Risk Screening Analysis

Emissions Rate Calculations at Systems Start-Up

Emissions Rate Calculations after Two Months

Manufacturer's Specifications and Description of VENT-SCRUB VSC-1200-2 Carbon Adsorption System

Manufacturer's Specifications and Description of Rotron DR -12 Regenerative Blower

Process Flow Diagram

PERMIT SERVICES DIVISION
BAY AREA AIR QUALITY MANAGEMENT DISTRICT
939 Ellis Street, San Francisco, CA. 94109
(415) 771-6000

RECEIVED
MAR 4 1991
APPLIED GEOSYSTEMS
SAN JOSE BRANCH

BAAQMD PLANT NO._____ APPLICATION NO._____

APPLICATION FOR AUTHORITY TO CONSTRUCT AND PERMIT TO OPERATE

INDUSTRIAL SOURCES

BUSINESS NAME ARCO Products Company (ARCO), Station No. 2152 (C/O RESNA)

MAILING ADDRESS 3315 Almaden Expressway, Ste.34 CITY/ZIP CODE San Jose, CA 95118

PLANT ADDRESS 22141 Center Street CITY/ZIP CODE Castro Valley 94546

NAME OF CONTACT Dana Weiss or Joan Tiernan PHONE (408) 264-7723

EQUIPMENT DESCRIPTION Rotron DR-12 regenerative blower and activated carbon

NUMBER OF SOURCES [ ] NEW CONSTRUCTION [ ] MODIFICATION [ ] REPLACEMENT [ ]

RELOCATION [ ] DEMOLITION OR SHUT DOWN [ ] TRANSFER OF OWNERSHIP [ ]

ABATEMENT EQUIPMENT ONLY [xx]

HAS AN ENVIRONMENTAL IMPACT REPORT (EIR) BEEN PREPARED FOR THIS PROJECT? YES____ NO x

IF YES, BY WHOM?_____

IS THIS APPLICATION A RESULT OF A VIOLATION NOTICE? YES____ NO X

IF YES, GIVE THE VIOLATION NOTICE NUMBER: _____

TOTAL EMISSIONS FOR THIS APPLICATION: _____

EMISSIONS IN LB/HR				
TSP	NMHC	SOx	TPHg	benzene
			0.25	4.2×10^{-4}

TYPICAL USAGE RATE: HOURS/DAY 24 ; DAYS/WEEK 7 ; WEEKS/YEAR 36

ARE OFFSETS OR TRADEOFFS INVOLVED IN THIS APPLICATION? YES____ NO X

IF YES, GIVE DOCUMENTS AND PAGE NUMBERS ON WHICH THIS INFORMATION IS PROVIDED: _____

(OVER)

HAVE YOU PROVIDED AN AIR QUALITY ANALYSIS? YES ____ NO XX

IF YES, GIVE DOCUMENTS AND PAGE NUMBERS ON WHICH THIS INFORMATION IS PROVIDED: _____

THE FOLLOWING ITEMS SHOULD ACCOMPANY THIS APPLICATION: (a) A map showing location of this facility; (b) Process Flow Diagram (if applicable) and; (c) a description or manufacturer's catalogue of equipment and air pollution abatement equipment. (See AB884 -Lists and Criteria for further details.

IMPORTANT: All information that you submit will be considered as public information unless you indicate that it is considered TRADE SECRET and give the reasons.

[X] ACKNOWLEDGEMENT

SIGNATURE Dana Dietz Weiss for JTE TITLE Staff Engineer / ENGINEERING MANAGER

NAME (PRINTED) Dana Dietz Weiss / JOAN TIERNAN DATE 10-21-91

NOTE: PERMITS FOR YOUR PROJECT MAY ALSO BE REQUIRED FROM OTHER AGENCIES. FOR FURTHER INFORMATION, YOU SHOULD CONTACT THE LOCAL CITY OR COUNTY OFFICE IN WHICH THE PROPOSED PROJECT WILL BE LOCATED. ALSO, THE OFFICE OF PERMIT ASSISTANCE WITHIN THE OFFICE OF PLANNING AND RESEARCH IN SACRAMENTO IS AVAILABLE TO PROVIDE INFORMATION ON PERMITTING THE ADDRESS IS AS FOLLOWS:

OFFICE OF PLANNING AND RESEARCH
1400 Tenth Street
Sacramento, California 95814

FORM P-101B
Revised 9/86
jrb

BAY AREA

AIR QUALITY MANAGEMENT DISTRICT

PERMIT SERVICES DIVISION
939 Ellis Street, San Francisco
California 94109
(415) 771-6000

PLANT DATA P-201

STATION 2152

Plant Identification No.

ARCO PRODUCTS COMPANY (ARCO) (CARE OF RESNA)
Business Name

None
Other Business Name(s)(if any)

Plant Telephone Number

None
Name of Parent Company (if any)

22141 Center Stfeet
Plant Address

Castro Valley, California 94546
City State Zip Code

3315 Almaden Expressway, Ste. 34
Mailing Address

San Jose, CA 95118
City State Zip Code

PLANT AREA (Acres) <1

NUMBER OF EMPLOYEES <10

PRINCIPAL PRODUCT Gas Station

OWNERSHIP:

( ) Private
( ) Utility
( ) Local Government
( ) State Government
( ) Federal Government

Please submit a name and address to whom all correspondence can be sent.

Dana Weiss/ Joan Tiernan / Staff Engr/ Engr Mgr.
Contact Name Title

RESNA/APPLIED GEOSYSTEMS
3315 Almaden Expressway, Suite 34
Street Address

San Jose, CA 95118
City State Zip Code

(408) 264-7723
Telephone Number

*Plant Identification Numbers are assigned by the BAAQMD. Leave blank if number is not known.

Dana Weiss / Staff Engineer
Name & Title of person preparing this

Dana Weiss
signature

9/84

BAY AREA
AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street, San Francisco, CA 94109 (415) 771-6000

DATA FORM A
ABATEMENT DEVICE

Abatement Device: Equipment/process whose primary purpose is to reduce the quantity of pollutant(s) emitted to the atmosphere.

1. Business Name: ARCO Products Company (ARCO) Plant No.: Sta. 2152 (If unknown, leave blank)

2. Name or Description: Vapor-phase carbon adsorption system Abatement Device No.: A-1

3. Make, Model and Rated Capacity: Vent-Scrub, VSC-1200-2, 500 cfm

4. Abatement Device Code (Table on reverse side): 56 Date of Initial Operation: Upon BAAQMD Apprc

5. With regard to air pollutant flow into this abatement device, what source(s) and/or abatement device(s) are immediately upstream?

				(BLOWER)			
				S-1	S NONE	S NONE	
S NONE	S None	S None	A None	A None	A None	A None	A None

6. Typical Gas Stream Temperature at Inlet: 75 °F

If this form is being submitted as part of an application for an AUTHORITY TO CONSTRUCT, completion of the following table is mandatory. If not, and the Abatement Device is already in operation, completion of table is requested but not required.

	POLLUTANT	WEIGHT PERCENT REDUCTION (at typical operation)	BASIS CODE (Codes on reverse side)
7.	Particulate	%	
8.	Organics	%	
9.	Nitrogen Oxides (as NO_2)	%	
10.	Sulfur Dioxide	%	
11.	Carbon Monoxide	%	
12.	Other: TPHg	95 %	3
13.	Other: Benzene	95 %	3

14. ☐ Check box if this Abatement Device burns fuel; complete lines 1, 2 and 15-36 on Form C (using the Abatement Device No. above for the Source No.) and attach to this form.

15. With regard to air pollutant flow from this abatement device, what source(s), abatement device(s) and/or emission point(s) are immediately downstream?

S None	A None	A-2	P STACK	P None	P None	P None	P None

11-30-87

Person Completing this Form: Dana Weiss/ Joan Tiernan Date: 10-21-91

Abatement Device Codes

CODE	DEVICE
	ADSORBER (See VAPOR RECOVERY)
	AFTERBURNER
1	CO Boiler
2	Catalytic
3	Direct Flame
4	Flare
5	Furnace-Firebox
6	Other
	BAGHOUSE (See DRY FILTER)
	CYCLONE (See DRY INERTIAL COLLECTOR and SCRUBBER)
	DRY FILTER
7	Absolute
8	Baghouse, Pulse Jet
9	Baghouse, Reverse Air
10	Baghouse, Reverse Jet
11	Baghouse, Shaking
12	Baghouse, Simple
13	Baghouse, Other
14	Envelope
15	Moving Belt
16	Other
	DRY INERTIAL COLLECTOR
17	Cyclone, Dynamic
18	Cyclone, Multiple, (12 inches diam. or more)
19	Cyclone, Multiple, (less than 12 inches diam.)
20	Cyclone, Simple
21	Settling Chamber, Baffled/Louvered
22	Settling Chamber, Simple
23	Other
	ELECTROSTATIC PRECIPITATOR
24	Single Stage
25	Single Stage, Wet
26	Two Stage
27	Two Stage, Wet
28	Other
	INCINERATOR (See AFTERBURNER)
	KNOCK-OUT POT (See LIQUID SEPARATOR)
	LIQUID SEPARATOR
29	Knock-Out Pot
30	Mist Eliminator, Horizontal Pad, Dry
31	Mist Eliminator, Panel, Dry
32	Mist Eliminator, Spray/Irrigated
33	Mist Eliminator, Vertical Tube, Dry
34	Mist Eliminator, Other
35	Other
	MIST ELIMINATOR (See LIQUID SEPARATOR)
	SCRUBBER
36	Baffle and Secondary Flow
37	Centrifugal
38	Cyclone, Irrigated
39	Fibrous Packed
40	Impingement Plate
41	Impingement and Entrainment
42	Mechanically Aided
43	Moving Bed
44	Packed Bed
45	Preformed Spray
46	Venturi
47	Other
	SETTLING CHAMBER (See DRY INERTIAL COLLECTOR)
	SULFUR DIOXIDE CONTROL
48	Absorption and Regeneration, for Sulfur Plant
49	Claus Solution Reaction, for Sulfur Plant
50	Dual Absorption, for H_2SO_4 Plant
51	Flue Gas Desulfurization, for Fossil Fuel Combustion
52	Reduction and Solution Regeneration, for Sulfur Plant
53	Reduction and Stretford Process, for Sulfur Plant
54	Sodium Sulfite-Bisulfite Scrubber, for H_2SO_4 Plant
55	Other
	VAPOR RECOVERY
56	Adsorption, Activated Carbon/Charcoal
57	Adsorption, Silica
58	Adsorption, Other
59	Balance
60	Compression/Condensation/Absorption
61	Compression/Refrigeration
62	Condenser, Water-Cooled
63	Condenser, Other
64	Other
	MISCELLANEOUS
65	Not classified above

Basis Codes

CODES	METHOD
0	Not applicable for this pollutant
1	Source Testing or other measurement by plant
2	Source Testing or other measurement by BAAQMD
3	Specifications from vendor.
4	Material balance by plant using engineering expertise and knowledge of process
5	Material balance by BAAQMD using engineering expertise and knowledge of process
6	Taken from AP-42 ("Compilation of Air Pollutant Emission Factors", E.P.A.)
7	Taken from literature, other than AP-42
8	Guess

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street, San Francisco, CA 94109 (415) 771-6000

DATA FORM A
ABATEMENT DEVICE

Abatement Device: Equipment/process whose primary purpose is to reduce the quantity of pollutant(s) emitted to the atmosphere.

1. Business Name: ARCO Products Company (ARCO) Plant No.: Sta. 2152 (If unknown, leave blank)

2. Name or Description: Vapor-phase carbon adsorption system Abatement Device No.: A-2

3. Make, Model and Rated Capacity: Vent-Scrub, VSC-1200-2, 500 cfm

4. Abatement Device Code (Table on reverse side): 56 Date of Initial Operation: Upon BAAQMD Approv

5. With regard to air pollutant flow into this abatement device, what source(s) and/or abatement device(s) are immediately upstream?

				(BLOWER)			
				S -1	S NONE	S NONE	
S NONE	S None	S None	A -1	A None	A None	A None	A None

6. Typical Gas Stream Temperature at Inlet: 75 °F

If this form is being submitted as part of an application for an AUTHORITY TO CONSTRUCT, completion of the following table is mandatory. If not, and the Abatement Device is already in operation, completion of table is requested but not required.

	POLLUTANT	WEIGHT PERCENT REDUCTION (at typical operation)	BASIS CODE (Codes on reverse side)
7.	Particulate	%	
8.	Organics	%	
9.	Nitrogen Oxides (as NO_2)	%	
10.	Sulfur Dioxide	%	
11.	Carbon Monoxide	%	
12.	Other: TPHg	95 %	3
13.	Other: Benzene	95 %	3

14. ☐ Check box if this Abatement Device burns fuel; complete lines 1, 2 and 15-36 on Form C (using the Abatement Device No. above for the Source No.) and attach to this form.

15. With regard to air pollutant flow from this abatement device, what source(s), abatement device(s) and/or emission point(s) are immediately downstream?

S None	A None	A None	P Stack	P None	P None	P None	P None

11-30-87

Person Completing this Form: Dana Weiss/ Joan Tiernan Date: 10-21-91

Abatement Device Codes

CODE	DEVICE
	ADSORBER (See VAPOR RECOVERY)
	AFTERBURNER
1	CO Boiler
2	Catalytic
3	Direct Flame
4	Flare
5	Furnace-Firebox
6	Other
	BAGHOUSE (See DRY FILTER)
	CYCLONE (See DRY INERTIAL COLLECTOR and SCRUBBER)
	DRY FILTER
7	Absolute
8	Baghouse, Pulse Jet
9	Baghouse, Reverse Air
10	Baghouse, Reverse Jet
11	Baghouse, Shaking
12	Baghouse, Simple
13	Baghouse, Other
14	Envelope
15	Moving Belt
16	Other
	DRY INERTIAL COLLECTOR
17	Cyclone, Dynamic
18	Cyclone, Multiple, (12 inches diam. or more)
19	Cyclone, Multiple, (less than 12 inches diam.)
20	Cyclone, Simple
21	Settling Chamber, Baffled/Louvered
22	Settling Chamber, Simple
23	Other
	ELECTROSTATIC PRECIPITATOR
24	Single Stage
25	Single Stage, Wet
26	Two Stage
27	Two Stage, Wet
28	Other
	INCINERATOR (See AFTERBURNER)
	KNOCK-OUT POT (See LIQUID SEPARATOR)
	LIQUID SEPARATOR
29	Knock-Out Pot
30	Mist Eliminator, Horizontal Pad, Dry
31	Mist Eliminator, Panel, Dry
32	Mist Eliminator, Spray/Irrigated
33	Mist Eliminator, Vertical Tube, Dry
34	Mist Eliminator, Other
35	Other
	MIST ELIMINATOR (See LIQUID SEPARATOR)
	SCRUBBER
36	Baffle and Secondary Flow
37	Centrifugal
38	Cyclone, Irrigated
39	Fibrous Packed
40	Impingement Plate
41	Impingement and Entrainment
42	Mechanically Aided
43	Moving Bed
44	Packed Bed
45	Preformed Spray
46	Venturi
47	Other
	SETTLING CHAMBER (See DRY INERTIAL COLLECTOR)
	SULFUR DIOXIDE CONTROL
48	Absorption and Regeneration, for Sulfur Plant
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52	Reduction and Solution Regeneration, for Sulfur Plant
53	Reduction and Stretford Process, for Sulfur Plant
54	Sodium Sulfite-Bisulfite Scrubber, for H_2SO_4 Plant
55	Other
	VAPOR RECOVERY
56	Adsorption, Activated Carbon/Charcoal
57	Adsorption, Silica
58	Adsorption, Other
59	Balance
60	Compression/Condensation/Absorption
61	Compression/Refrigeration
62	Condenser, Water-Cooled
63	Condenser, Other
64	Other
	MISCELLANEOUS
65	Not classified above

Basis Codes

CODES	METHOD
0	Not applicable for this pollutant
1	Source Testing or other measurement by plant
2	Source Testing or other measurement by BAAQMD
3	Specifications from vendor.
4	Material balance by plant using engineering expertise and knowledge of process
5	Material balance by BAAQMD using engineering expertise and knowledge of process
6	Taken from AP-42 ("Compilation of Air Pollutant Emission Factors", E.P.A.)
7	Taken from literature, other than AP-42
8	Guess

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

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DATA FORM G
General Air Pollution Source

If in addition to the general process described hereon this source burns fuel, then complete Form C also. Use specific forms if applicable: Form T (organic tankage, loading), Form S (surface coating, solvent use).

1 Business Name: ARCO Products Company (ARCO) Plant No: Sta. 2152 (If unknown, leave blank)

2 SIC Number: _____ Date of Initial Operation: Upon BAAQMD Approval

3 Name or Description: Rotron DR12 Regenerative Blower Source No.: S -1

4 Make, Model, and Rated Capacity of Equipment: Rotron DR12BG72W, Rated Capacity 40,200 scfh

5 Process Code* (Column A): 7098 Materials Code* (Column B): 504 Usage Unit* (Column C): cubic feet

6 Total throughput, last 12 months: N/A Usage Units* Max operating rate: 40,200 Usage Units*/hr

7 Typical % of total throughput: Dec-Feb 50 % Mar-May 50 % Jun-Aug 0 % Sep-Nov 0 %

8 Typical operating times: 24 hrs/day 7 days/week 36 weeks/year

9 For batch or cyclic processes: N/A min/cycle N/A min. between cycles

10 Exhaust gases from source: (at max. operation)
Wet gas flow rate N/A cfm at _____ °F
Approximate water vapor content N/A vol %

EMISSION FACTORS (at maximum operating rate)

If this form is being submitted as part of an application for an AUTHORITY TO CONSTRUCT, completion of the following table is mandatory. If not, and the Source is already in operation, completion of table is requested but not required.

If this source also burns fuel, do not include those combustion products in the emission factors below; they are accounted for on Form C. If source test or other data are available for composite emissions only, estimate from those data the emissions attributable to just the general process and show below.

[XX] Check box if factors apply to emissions after Abatement Device(s).

		EMISSION FACTORS lbs/Usage Unit*	Basis Code (see reverse)
11	Particulate		
12	Organics		
13	Nitrogen Oxides (as NO_2)		
14	Sulfur Dioxide		
15	Carbon Monoxide		
16	Other: TPHg	4.96 lb/hr	3
17	Other: Benzene	4.2×10^{-4}	3

18 With regard to air pollutant flow from this source, what source(s), abatement device(s) and/or emission points(s) are immediately downstream?

S None	S None	S None					
A -1	A -2	A None	P Stack	P None	P None	P None	P None

*From Tables G-1 through G-7 (See listing on reverse side)

Person Completing this Form: Dana Weiss/ Joan Tiernan Date: Oct. 21, 1991

Basis Codes

CODES	METHOD
0	Not applicable for this pollutant
1	Source Testing or other measurement by plant
2	Source Testing or other measurement by BAAQMD.
3	Specifications from vendor
4	Material balance by plant using engineering expertise and knowledge of process
5	Material balance by BAAQMD using engineering expertise and knowledge of process
6	Taken from AP-42 ("Compilation of Air Pollutant Emission Factors", E.P.A.)
7	Taken from literature, other than AP-42
8	Guess

CODE TABLES* for GENERAL AIR POLLUTION SOURCES

Table	Process
G-1	Food & Agricultural
G-2	Metallurgical (Primary Metals)
G-3	Metallurgical (Secondary Metals)
G-4	Mineral
G-5	Petroleum Refining
G-6	Incineration
G-7	Chemical/Other

*Available from the BAAQMD upon request.

BAY AREA
AIR QUALITY MANAGEMENT DISTRICT

939 Ellis Street, San Francisco, CA 94109 (415) 771-6000

DATA FORM P
Emission Point

Form P is for well-defined emission points such as stacks or chimneys only; do not use for windows, room vents, etc.

Business Name: ARCO Products Company (ARCO) Plant No.: Station 2152

Emission Point No.: P-1 Stack

With regard to air pollutant flow into this emission point, what source(s) and/or abatement device(s) are immediately upstream?

				S-1	S NONE	S NONE	
S NONE	S None	S None	A-1	A-2	A None	A None	

Exit Cross-section Area: 0.0218 Square feet Height above grade: 9 Feet

Effluent Flow from Stack:

	Typical Operating Condition	Maximum Operating Condition
Actual Wet Gas Flow Rate	400 cfm	500 cfm
Percent Water Vapor	Vol %	Vol %
Temperature	75 °F	120 °F

If this stack is equipped to measure (monitor) the emission of any air pollutants,

-is monitoring continuous? no

-what pollutants are monitored? Benzene, toluene, total xylene isomers, ethylbenzene, total petroleum hydrocarbons as gasoline

Person Completing this Form Dana Weiss/Joan Tiernan Date October 21, 1991

Form P 1 of 1

4-25-77

REQUEST FOR INFORMATION; RISK SCREENING ANALYSIS

NOTE: You must fill out one of these forms for each source in the permit application that requires a risk screen. These may be discrete sources such as stacks, or area sources such as surface area fugitive emissions.

Plant name ARCO Station No. 2152

Source description Regenerative Blower in line with a carbon adsorption system

SECTION A

1. Is the source a clearly defined emission point, i.e., a stack? YES NO
   (If NO, go on to section B)

2. Does the stack stand alone or is it located on the roof of a building?
   ALONE ON ROOF

3. What is the stack height? 9 meters or feet
   (Note: stack height only, whether free-standing or on rooftop)

4. What is the combined stack height and building height (if applicable)?
   N/A meters or feet

5. What is the stack diameter? 0.167 meters or feet

6. What is the stack flowrate? 500 cfm or m^3/sec

7. What is the stack exit temperature? 120 degrees
   Fahrenheit or Centigrade

8. If the stack is located on a rooftop, what are the dimensions of the building?

   height = N/A meters or feet

   width = N/A meters or feet

   length = N/A meters or feet

9. Are there any buildings, walls or other structures located near this source ?

YES NO

If YES, what are their dimensions?

height = 25 meters or feet

width = 28 meters or feet

length = 54 meters or feet

distance from source 76 meters or feet

(GO ON TO SECTION C)

SECTION B

1. Is the source located within a building? YES NO

(If NO, please provide a description of the source. For example, fugitive emissions that must be evaluated as an area source. If an area source, provide the dimensions of the area in question. Then go on to section C.)

(If YES, proceed to #2, below)

Regenerative blower in line with a carbon adsorption system. Emissions come from a stack.

2. Does the source exhaust through the building ventilation system? YES NO

a. If NO, can we assume that emissions from the source escape via the building's doors and windows? YES NO

(If your answer here is also NO, please explain where the emissions are going)

3. Please provide the building dimensions:

   height = _____meters or feet

   width = _____meters or feet

   Length = _____meters or feet

4. Are there any buildings, walls or other structures located near this source ?

   YES NO

   If YES, what are their dimensions?

   height = _____meters or feet

   width = _____meters or feet

   length = _____meters or feet

   distance from source _____meters or feet

(GO ON TO SECTION C)

ARCO Station 2152

SECTION C

1. Describe the area where the source is located (select one):

   a) zoned for commercial use

   b) zoned for residential use

2. Distance from source (stack or building) to property line =

   approx. 12 meters or feet

2. Distance from property line to nearest receptor** =

   25 meters or feet

You must provide a plot plan or a map, drawn to scale, which clearly demonstrates the location of your site, the property lines and any surrounding residences and/or businesses.

(SEE PLATE 2, AREA MAP)

** Receptors are defined as individual dwellings where persons are assumed to be in continuous residence.

EMISSIONS RATE CALCULATIONS AT SYSTEM STARTUP

For the following emission calculations, the average influent concentrations observed during the pilot test were used for the initial TPHg and benzene concentrations.

TPHg Extraction Rate Calculation at Startup

$$\frac{2{,}652\ \text{mg TPHg}}{1\ \text{m}^3} \times \frac{1\ \text{g}}{1{,}000\ \text{mg}} \times \frac{1\ \text{mole TPHg}}{100\ \text{g TPHg}} \times \frac{22.414\ \text{l}}{1\ \text{mole}} \times \frac{1\ \text{m}^3}{1{,}000{,}000\ \text{cm3}} \times \frac{1\ \text{cm}^3}{1\ \text{ml}} \times \frac{1{,}000\ \text{ml}}{1\ \text{l}} = \frac{594\ \text{l}}{1{,}000{,}000\ \text{l}} = 594\ \text{ppmv TPHg}$$

The average initial TPHg concentration is 594 ppmv. The approximate initial TPHg mass extraction rate is as follows:

$$\frac{594\ \text{l (vapor)}}{1{,}000{,}000\ \text{(l air)}} \times \frac{500\ \text{ft}^3}{\text{min}} \times \frac{1{,}440\ \text{min}}{\text{day}} \times \frac{28.32\ \text{l (air)}}{1\ \text{ft}^3} \times \frac{1\ \text{mole (gas)}}{22.414\ \text{l (vapor)}} \times \frac{100\ \text{grams}}{1\ \text{mole (gas)}} \times \frac{1\ \text{lb}}{454\ \text{grams}}$$

$$= \frac{119.1\ \text{lbs TPHg}}{\text{day}}$$

TPHg Emission Rate at Startup after Abatement

The approximate initial TPHg mass emission rate is as follows:

$$\frac{119.1\ \text{lbs TPHg}}{\text{day}} \times 0.05\ \text{(for a 95\% destruction efficiency)} = \frac{6.0\ \text{lbs TPHg}}{\text{day}}$$

Benzene Extraction Rate Calculation at Startup

$$\frac{4.5\ \text{mg benzene}}{1\ \text{m}^3} \times \frac{1\ \text{g}}{1{,}000\ \text{mg}} \times \frac{1\ \text{mole benzene}}{78\ \text{g benzene}} \times \frac{22.414\ \text{l}}{1\ \text{mole}} \times \frac{1\ \text{m}^3}{1{,}000{,}000\ \text{cm3}} \times \frac{1\ \text{cm}^3}{1\ \text{ml}} \times \frac{1{,}000\ \text{ml}}{1\ \text{l}} = \frac{1.3\ \text{l}}{1{,}000{,}000\ \text{l}} = 1.3\ \text{ppmv Benzene}$$

The average initial benzene concentration is 1.3 ppmv. The approximate initial benzene mass extraction rate is as follows:

$$\frac{1.3\ \text{l (vapor)}}{1{,}000{,}000\ \text{(l air)}} \times \frac{500\ \text{ft}^3}{\text{min}} \times \frac{1{,}440\ \text{min}}{\text{day}} \times \frac{28.32\ \text{l (air)}}{1\ \text{ft}^3} \times \frac{1\ \text{mole (gas)}}{22.414\ \text{l (vapor)}} \times \frac{78\ \text{grams}}{1\ \text{mole (gas)}} \times \frac{1\ \text{lb}}{454\ \text{grams}}$$

$$= \frac{0.2\ \text{lbs benzene}}{\text{day}}$$

Benzene Emission Rate at Startup after Abatement

The approximate initial benzene mass emission rate is as follows:

$$\frac{0.2\ \text{lbs benzene}}{\text{day}} \times 0.05\ \text{(for a 95\% destruction efficiency)} = \frac{0.01\ \text{lbs benzene}}{\text{day}}$$

EMISSIONS RATE CALCULATION AFTER TWO MONTHS

A ninety-percent reduction from initial hydrocarbon concentrations usually results in the first few months of operation (Johnson, et al, 1990). For the following emission calculations, a ninety-percent reduction of the average influent concentrations observed during the pilot test were used for the initial TPHg and benzene concentrations.

TPHg Extraction Rate Calculation After Two Months of Operation

$$\frac{265.2\ \text{mg TPHg}}{1\ \text{m}^3} \frac{1\ \text{g}}{1{,}000\ \text{mg}} \frac{1\ \text{mole TPHg}}{100\ \text{g TPHg}} \frac{22.414\ \text{l}}{1\ \text{mole}} \frac{1\ \text{m}^3}{1{,}000{,}000\ \text{cm3}} \frac{1\ \text{cm}^3}{1\ \text{ml}} \frac{1{,}000\ \text{ml}}{1\ \text{l}} = \frac{59.4\ \text{l}}{1{,}000{,}000\ \text{l}} = 59.4\ \text{ppmv TPHg}$$

The average initial TPHg concentration is 59.4 ppmv. The approximate initial TPHg mass extraction rate is as follows:

$$\frac{59.4\ \text{l (vapor)}}{1{,}000{,}000\ \text{(l air)}} \frac{500\ \text{ft}^3}{\text{min}} \frac{1{,}440\ \text{min}}{\text{day}} \frac{28.32\ \text{l (air)}}{1\ \text{ft}^3} \frac{1\ \text{mole (gas)}}{22.414\ \text{l (vapor)}} \frac{100\ \text{grams}}{1\ \text{mole (gas)}} \frac{1\ \text{lb}}{454\ \text{grams}}$$

$$= \frac{11.9\ \text{lbs TPHg}}{\text{day}}$$

TPHg Emission Rate after Abatement and after Two Months of Operation

The approximate initial TPHg mass emission rate is as follows:

$$\frac{11.9\ \text{lbs TPHg}}{\text{day}} \times 0.05\ \text{(for a 95\% destruction efficiency)} = \frac{0.6\ \text{lbs TPHg}}{\text{day}}$$

Benzene Extraction Rate Calculation

$$\frac{0.45\ \text{mg benzene}}{1\ \text{m}^3} \frac{1\ \text{g}}{1{,}000\ \text{mg}} \frac{1\ \text{mole benzene}}{78\ \text{g benzene}} \frac{22.414\ \text{l}}{1\ \text{mole}} \frac{1\ \text{m}^3}{1{,}000{,}000\ \text{cm3}} \frac{1\ \text{cm}^3}{1\ \text{ml}} \frac{1{,}000\ \text{ml}}{1\ \text{l}} = \frac{0.13\ \text{l}}{1{,}000{,}000\ \text{l}} = 0.13\ \text{ppmv benzene}$$

The average initial benzene concentration is 0.13 ppmv. The approximate initial benzene mass extraction rate is as follows:

$$\frac{0.13\ \text{l (vapor)}}{1{,}000{,}000\ \text{(l air)}} \times \frac{500\ \text{ft}^3}{\text{min}} \times \frac{1{,}440\ \text{min}}{\text{day}} \times \frac{28.32\ \text{l (air)}}{1\ \text{ft}^3} \times \frac{1\ \text{mole (gas)}}{22.414\ \text{l (vapor)}} \times \frac{78\ \text{grams}}{1\ \text{mole (gas)}} \times \frac{1\ \text{lb}}{454\ \text{grams}}$$

$$= \frac{0.02\ \text{lbs benzene}}{\text{day}}$$

Benzene Emission Rate after Abatement and after Two Months

The approximate initial benzene mass emission rate is as follows:

$$\frac{0.02\ \text{lbs benzene}}{\text{day}} \times 0.05\ \text{(for a 95\% destruction efficiency)} = \frac{0.001\ \text{lbs benzene}}{\text{day}}$$

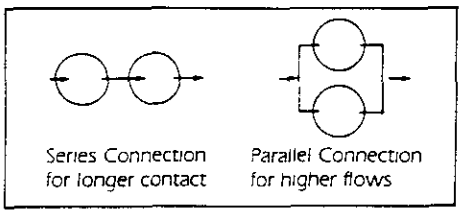
Air Purification System

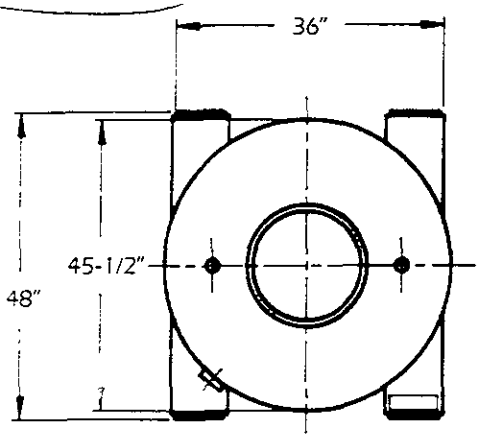
VENT-SCRUB™

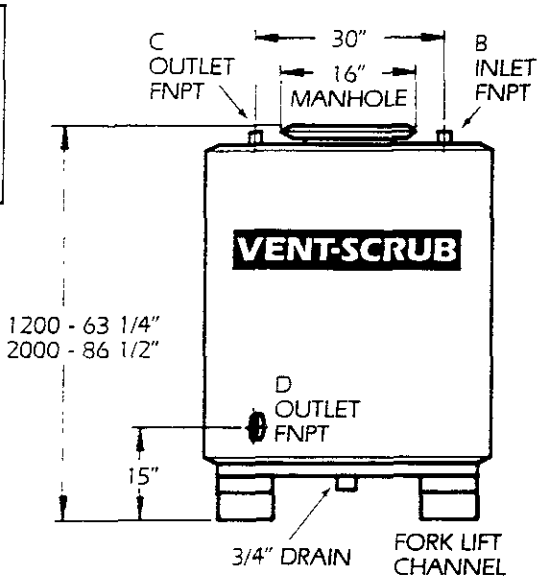
VSC-1200 VSC-2000

EASY TO INSTALL

VENT-SCRUB™ adsorbers are designed for fast and easy installation on any hard, flat surface. Place the unit as close to the vapor source as possible. The only hardware needed is properly sized pipe or ducting—rigid or flexible—for connection to the inlet/outlet ports. For outdoor use, a rain guard may be needed to protect VENT-SCRUB's™ exhaust.







SAFETY

Under certain conditions, some chemical compounds may oxidize, decompose, or polymerize in the presence of activated carbon. This could result in temperature increases sufficient to cause ignition. As a result, particular care must be taken with compounds having peroxide-forming tendencies

CORROSION RESISTANCE

The combination of activated carbon and many VOC's can cause severe corrosive or electrolytic damage to metals, even stainless steel VENT-SCRUB™ adsorbers are designed to prevent these effects in normal service

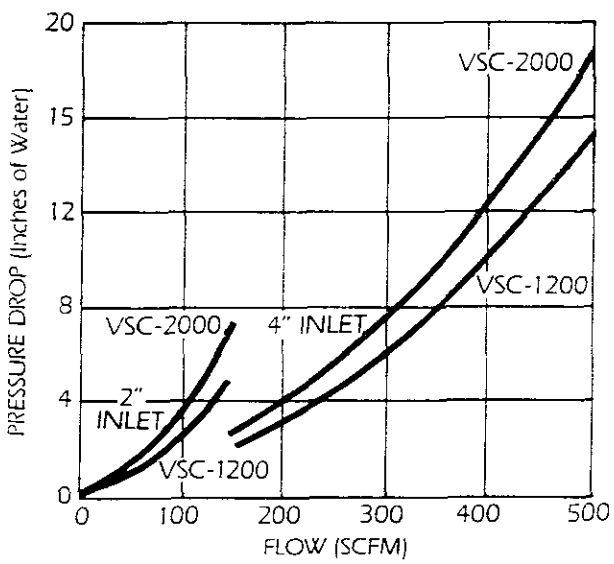
DIMENSIONS

Model No.	A	B	C	D
VSC-1200-2	63-1/4"	2"	2"	N/A
VSC-1200-4	63-1/4"	4"	N/A	4"
VSC-2000-4	86-1/2"	4"	N/A	4"
VSC-2000-4V	86-1/2"	4"	N/A	4"

MATERIALS OF CONSTRUCTION

Vessel:
Coated 12 ga. Carbon Steel
7 ga. Top/Bottom
External Coating.
Powder Coat Enamel
Internal Coating.
Fusion Bonded Epoxy
Piping: PVC

PRESSURE DROP



SPECIFICATIONS

	VSC-1200	VSC-2000
Flow* cfm (max)	500	500
Pressure psig (max)	12	12
Vacuum (in Hg)	15	**
Temperature deg F (max)	120	120
Carbon Fill Volume (cu. ft.)	33	65
Cross Section (sq. ft.)	12.5	12.5
Shipping Weight (lbs.)	1600	2500

*Note. actual design should be based on superficial bed velocity (sbv) as required for specific contaminants.

** VSC-2000-4 8 (in Hg) VSC-2000-4V 15 (in Hg)

WESTATES carbon
ACTIVATED CARBON SYSTEMS

WESTATES CARBON, INC.
2130 Leo Ave., Los Angeles, CA 90040
PHONE (213) 722-7500
FAX (213) 722-8207 TWX: 910-321-2355

DR 12
Regenerative Blower

FEATURES

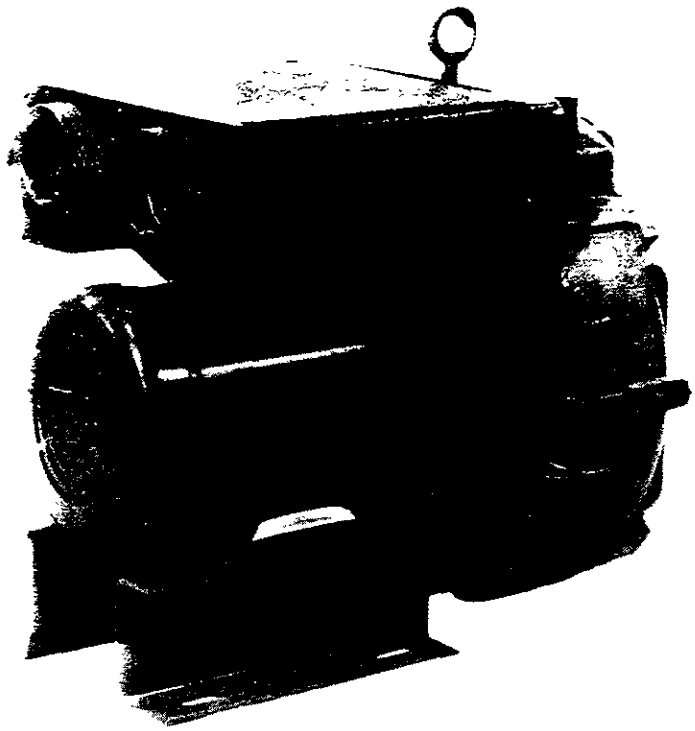
- Manufactured in the USA
- Maximum flow 670 SCFM
- Maximum pressure 110" WG
- Maximum vacuum 7.5" Hg
- 15 HP, TEFC motor, standard
- Blower construction—cast aluminum housing, impeller and cover
- Inlet and outlet internal muffling
- Noise level within OSHA standards when properly piped or muffled
- Weight: 426 lbs. (194 Kg)

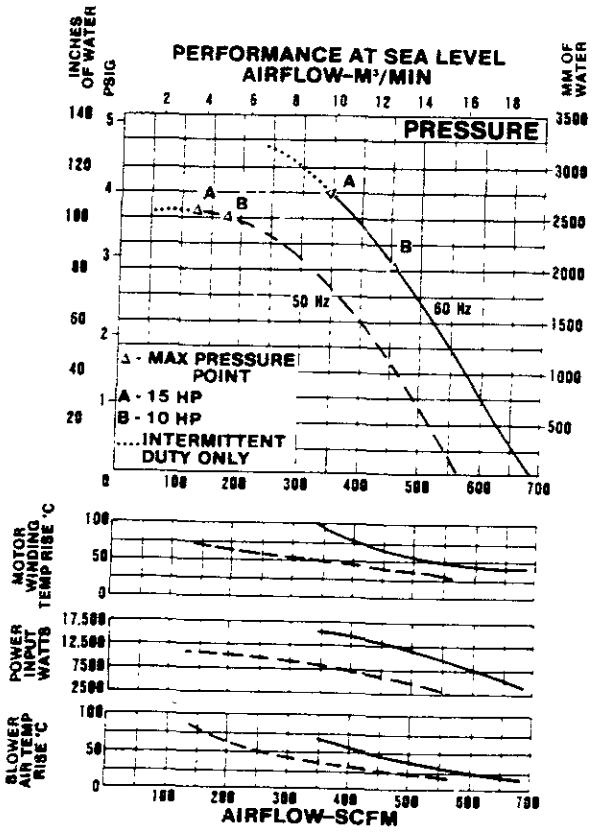
ACCESSORIES

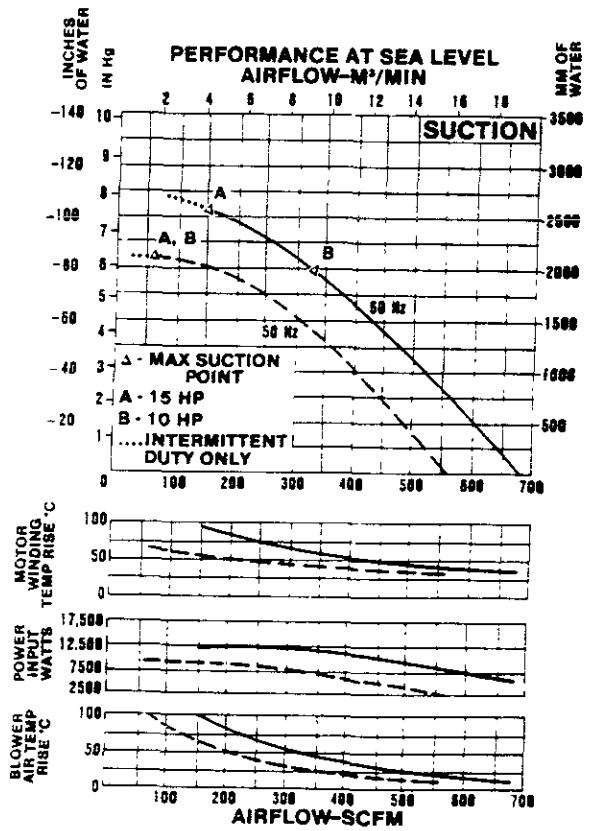
- Additional inlet/outlet mufflers
- Inlet or Inline filters
- For details see Accessories Section

OPTIONS

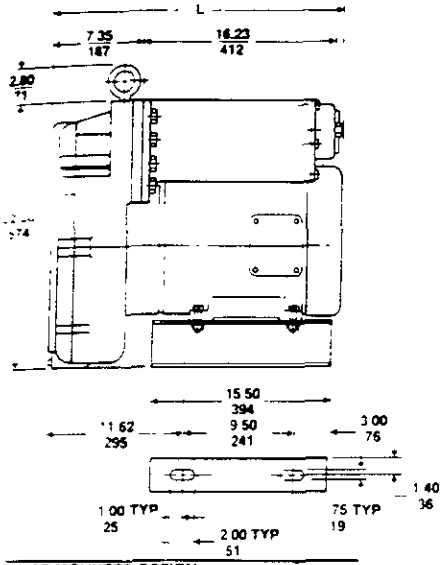
- Smaller and larger HP motors
- 575-volt motors
- Surface treatments
- Gas tight sealing
- Belt drive (motorless) models; for details see Remote Drive Section

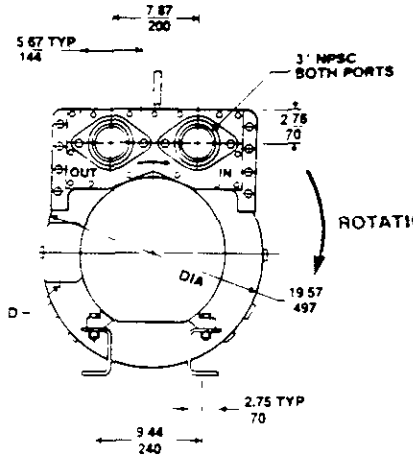




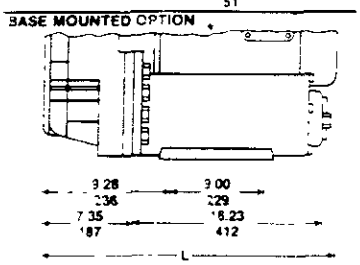


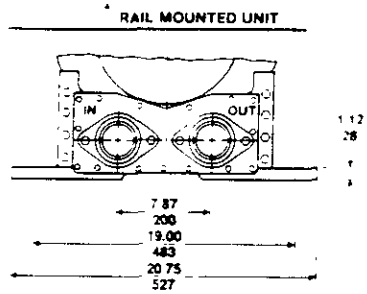
DR 12
Regenerative Blower





MODEL	L In (±.31) MM(±8)	D (Dia.)
DR12BB72 ____	23.18 589	1.06 In.
DR12BE72 ____	24.31 617	1.06 In
DR12BG72 ____	25.81 656	1" NPT
DR12BE86 ____	24.31 617	1.06 In





DIMENSIONS IN / MM
TOLERANCES: .XX ± 1/2.5

SPECIFICATIONS

MODEL (RAIL MOUNT)	DR12BB72W	DR12BE72W	DR12BG72W	DR12BE86W
Part No. (Rail Mount)	036717	036716	036917	036918
Motor Enclosure Type	TEFC	TEFC	XP	TEFC
Motor Horsepower	10	15	15	15
Voltage[1]	230/460	230/460	230/460	575
Phase	3	3	3	3
Frequency[1] (Hz)	60	60	60	60
Insulation Class[2]	F	F	B	F
NEMA Rated Motor Amps	26/13	46/23	46/23	19
Service Factor	1.15	1.15	1.0	1.15
Locked Rotor Amps	160/80	232/116	232/116	93
Max. Blower Amps	32.4/16.2	39.4/19.7	39.4/19.7	15.8
Recommended NEMA Starter Size	2/1	2/2	2/2	2
Weight (lbs/Kg)	411/186	426/194	580/264	424/193
Model No. (Base Mount)	DR12BB72X	DR12BE72X	DR12BG72X	DR12BE86X
Part No. (Base Mount)	036721	036720	036919	036920
Blower Limitations for Continuous Duty (60 Hz/50 Hz)				
Max. Pressure-In. of water	77/101	110/101	110/101	110 (60 Hz)
Max. Suction-In. of water	77/83	102/83	102/83	102 (60 Hz)
Min. Flow-Pressure-SCFM	450/200	350/120	350/120	350 (60 Hz)
Min. Flow-Suction-SCFM	320/70	150/70	150/70	150 (60 Hz)

All 3-phase motors are factory tested and certified to operate on 200-230/460 VAC 3 ph-60 Hz and 220-240/380-415 VAC 3 ph-50 Hz

[2]Maximum operating temperatures. Motor winding temperature (winding rise plus ambient) should not exceed 140 °C for Class F insulation or 110 °C for Class B insulation. Blower outlet air temperature should not exceed 140 °C air temperature rise plus ambient)