



**Gasoline Station
Health Risk Assessment
Application Form -25T**

Santa Barbara County Air Pollution Control District
260 N. San Antonio Road, Suite A
Santa Barbara, CA 93110-1315

GENERAL: This form must be accompanied by a completed APCD Form -25 and a completed health risk assessment (HRA). Mail the completed form(s) and appropriate filing fees to the Air Pollution Control District (APCD) at the above address. This form is required for gasoline station permit applications which meet any of the criteria below:

1. The station is requesting a throughput greater ¹ than:
 - a. 2,050,000 gallons/year and is located in the South County; or
 - b. 3,350,000 gallons/year and is located in the North County.
2. The station is located within 1000 feet of the outer boundary of a school (k-12) and the permitting action will result in an increase in permitted emissions or if this is a new/rebuilt station.
3. The station has been identified by the APCD as posing a concern to public health.

The applicant is required to perform the HRA and submit this completed form. The APCD will review all work done by the applicant and/or their consultant. The fixed cost for this review is \$1,500 and is due with submittal of the permit application. Instructions for completing the HRA can be found in Attachments B-E of this document.

Daily operating hours of facility: _____ hours/day

Is the Pressure Vent Valve (PV Valve) located on or adjacent to a building?

- Yes
 No

What is the height of the PV Valve above grade in feet? _____

UTM ² coordinates of the PV Valve (Easting, Northing): _____

UTM coordinates of center of the dispensers ³ (Easting, Northing): _____

Building. Complete the table below with the UTM coordinates of the building. If the building is not square, use additional points to describe the building. Attach a separate table if necessary. Label the additional points.

What is the height of the building in feet? _____

Building Point Location	UTM Easting	UTM Northing
SW Corner		
NW Corner		
NE Corner		
SE Corner		

¹ If the station is already permitted above these thresholds, an HRA is required only if an increase is requested.

² Denote which datum, NAD27 or NAD83, is used. Use the same datum for all UTM's. UTM's must be in meters.

³ See Attachment A to determine the center of the dispensers.

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Property boundary. Complete the table below with the UTM coordinates of the property boundary. If the facility boundary is not square, use additional points to describe the facility. Attach a separate table if necessary. Label the additional points.

Boundary Location	UTM Easting	UTM Northing
SW Corner		
NW Corner		
NE Corner		
SE Corner		

Receptors. Provide the UTM coordinates in the table below of the nearest business and residential receptors in all four directions (N/S/E/W) and any applicable school receptors ⁴. Attach a separate table if necessary.

Receptor Name or Address	UTM Easting	UTM Northing

Applicant/Preparer Certification Statement

All applications are required to be signed by a responsible official who works for the owner/operator of the permitted equipment. The person who prepares the application also must sign the permit application. The preparer may be an employee of the owner/operator or an authorized agent (contractor/consultant) working on behalf of the owner/operator.

I certify that all information contained herein and information submitted with this application is true and correct.	
_____	_____
signature of owner/operator responsible official	date
_____	_____
print name of owner/operator responsible official	employer name

I certify that all information contained herein and information submitted with this application is true and correct.	
_____	_____
signature of application preparer	date
_____	_____
print name of application preparer	employer name

⁴ See note at bottom of page 3 regarding schools.

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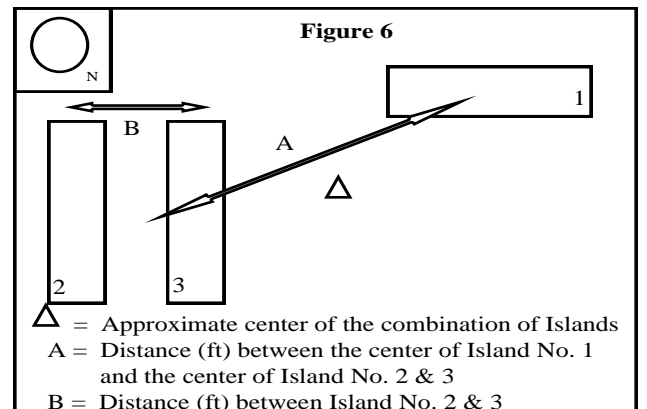
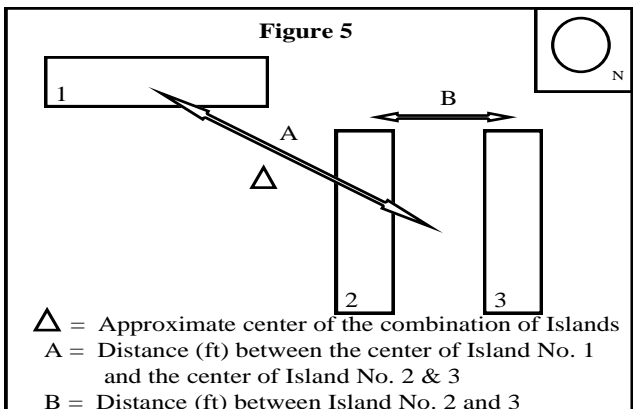
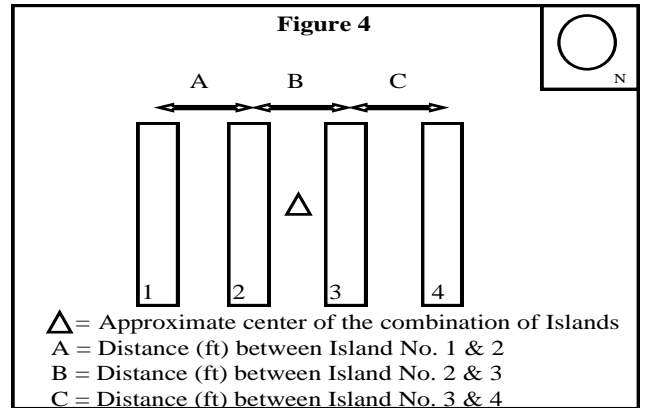
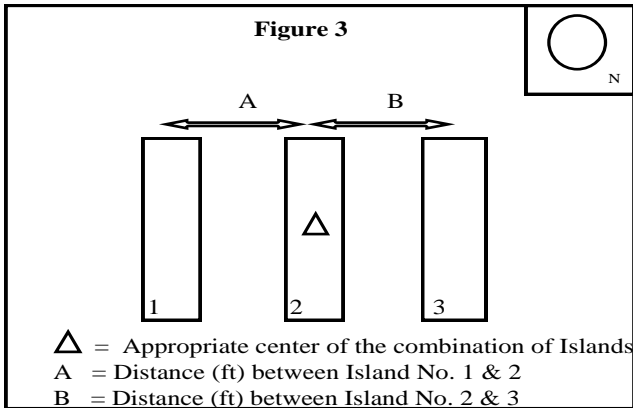
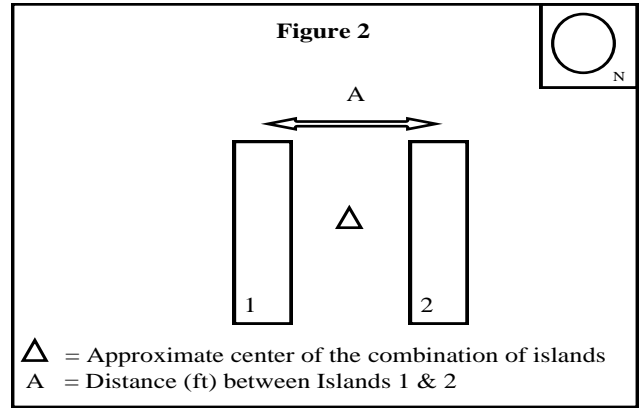
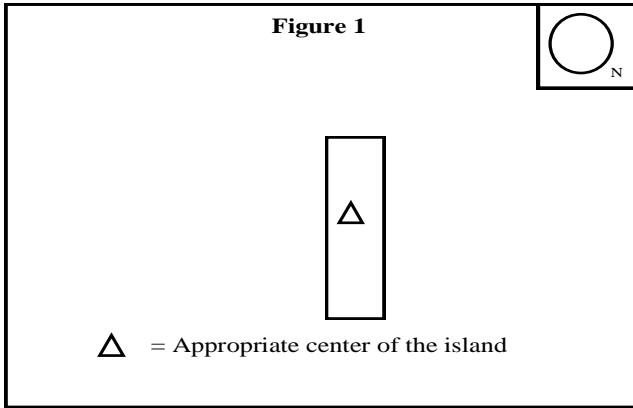
Application Checklist (have you submitted all the required information? Please check off the boxes)

- Health Risk Assessment Evaluation Fee (Fee = \$1,500 for the APCD to review the applicant-provided Health Risk Assessment).
- Completed APCD Form -25 (and any other forms, attachments, or fees required by APCD Form -25).
- Completed Health Risk Assessment and Report (see Attachment E for more details).
- Electronic HARP files (see Attachment E for more details).
- Plot Plan. Submit a plot plan drawing (required size: 17" by 11"), with:
 - Dimensions and **true North** direction indicated showing the overall site with cross streets
 - Property boundary (**with UTM coordinates shown**)
 - Buildings (**with UTM coordinates shown**)
 - Pressure vent valve (**with UTM coordinates shown**)
 - Identification of adjacent property owners
 - Tank locations
 - Island/dispenser locations (**with UTM coordinates shown**)
 - Product piping
 - Vapor return piping and vent piping
 - Indicate the material, length, diameter, and slope of the piping.
 - Identify any schools located within one thousand feet of the gasoline station and the location of the nearest business and residential receptors in all four directions (N/S/E/W).
- If the gasoline station is located within 1000 feet of a school (k-12), provide the UTM coordinates for the property boundaries of all schools listed in APCD Form -03.

PLEASE NOTE THAT FAILURE TO COMPLETELY PROVIDE ALL REQUIRED INFORMATION WILL RESULT IN YOUR APPLICATION BEING RETURNED OR DEEMED INCOMPLETE.

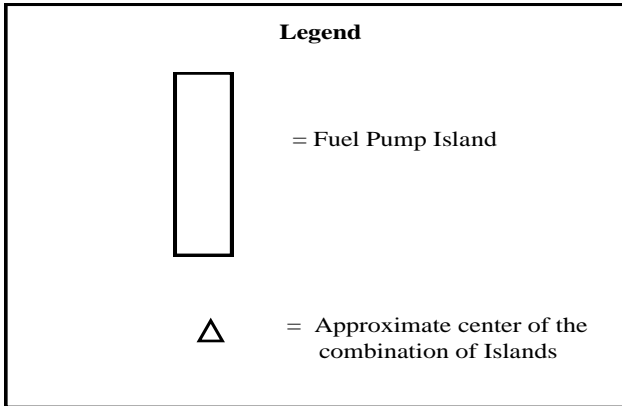
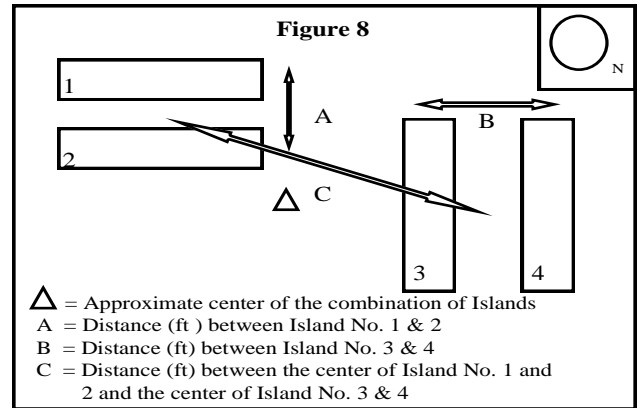
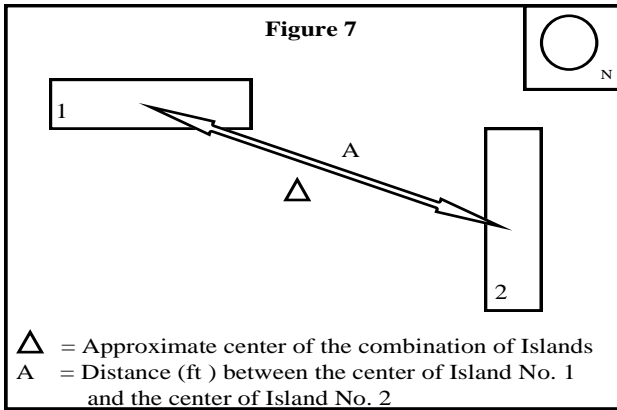
ATTACHMENT A

Layouts for the Center of the Dispensers



ATTACHMENT A (Continued)

Layouts for the Center of the Dispensers



ATTACHMENT B

ROC and Benzene Emissions

Emission Sources

ROC and benzene emissions are released in four processes at a gasoline dispensing facility:

- 1) Loading emissions occur at the P/V Valve during gasoline delivery to the tanks;
- 2) Breathing emissions occur at the P/V Valve due to changes in temperature and the volume of tank;
- 3) Refueling emissions occur at the vehicle's tank that is being refueled; and
- 4) Spillage emissions occur on the ground at the dispenser from the nozzle.

Emission Factors

Santa Barbara County APCD's ROC emission factors used to calculate emissions from these processes are shown below.

GDF ROC Emission Factors for Underground Tanks w/ Phase I EVR and Phase II (Non-EVR and EVR) and Vent Valves

	SBCAPCD Approved	
	<i>Phase I EVR and Phase II Non-EVR</i>	<i>Phase I EVR and Phase II EVR</i>
	lb/1000 gal	lb/1000 gal
Loading	0.15	0.15
Breathing	0.25	0.00 ⁵
Refueling	0.42	0.38
Spillage	0.42	0.24
Total	1.24	0.77

Use the appropriate ROC emission factor above with the vapor weight fraction of benzene in gasoline to calculate benzene emissions from each process. CAPCOA's *Gasoline Service Station Industrywide Risk Assessment Guidelines* (<http://www.arb.ca.gov/ab2588/rrap-iwra/gasiwra.pdf>) lists the weight percent of benzene in the gasoline vapor as 0.3 percent.

Sample Calculation

A sample calculation is provided below for loading emissions for a throughput of 1,000,000 gal/year. Breathing, refueling, and spillage emissions are calculated using the same methodology.

$$\text{Benzene Emissions}_{\text{Loading}} = (1,000,000 \text{ gal/yr}) \left(\frac{0.15 \text{ lb ROC}}{1000 \text{ gal}} \right) \left(\frac{0.003 \text{ lb benzene}}{\text{lb ROC}} \right) = 0.45 \text{ lb/yr}$$

$$\text{Benzene Emissions}_{\text{Loading}} = (0.45 \text{ lb/yr}) \left(\frac{1 \text{ yr}}{8760 \text{ hr}} \right) = 5.14 \times 10^{-5} \text{ lb/hr}$$

⁵ Emissions from breathing are included in the refueling emission factor per Table 4-1 of ARB's CP-201 (February 9, 2005)

ATTACHMENT C

Modeling Parameters

Modeling Parameter Basis

The modeling parameters for each process should be determined based on CAPCOA's *Gasoline Service Station Industrywide Risk Assessment Guidelines* (CAPCOA's Guidelines, accessible at <http://www.arb.ca.gov/ab2588/rrap-iwra/gasiwra.pdf>):

- Use the stack diameter and stack exhaust temperatures from CAPCOA's Guidelines.
- The stack gas exit velocity must be calculated according to CAPCOA's Guidelines. An example calculation is shown below.
- The default stack height, and initial vertical and lateral dimensions from CAPCOA's Guidelines may be used. Alternatively, the applicant may provide the PV Valve stack height and the dimensions to calculate the initial vertical and lateral dimensions ($\sigma_{Z_{int}}$, $\sigma_{Y_{int}}$). If the PV Valve stack height is above 12 feet, the APCD may require a permit condition to enforce the height.

Default Stack Parameters

The default stack parameter inputs to the dispersion model are as follows:

Process	Release Height (ft)	Stack Temp (°F)	Stack Vel (fpm)	Stack Dia (ft)	$\sigma_{Z_{int}}$ (ft)	$\sigma_{Y_{int}}$ (ft)
Loading	12	65	No default	0.167		
Breathing	12	60	No default	0.167		
Refueling	3.28				6.10	9.16
Spillage	0				6.10	9.16

Initial Vertical and Lateral Dimensions

The defaults for initial vertical and lateral dimensions from CAPCOA's Guidelines are calculated by the following (assumed volume source is 4 m high x 13 m long x 13 m wide):

$$\text{Initial Lateral Dimensions } (\sigma_{Y_{int}}) = \frac{\sqrt{[(\text{Length of Pump Island or Canopy}) \text{ ft} \times (\text{Width of Pump Island or Canopy}) \text{ ft}]}{4.3}$$

$$\sigma_{Y_{int}} = \frac{\sqrt{\left[\left(13 \text{ m} \times 3.28 \frac{\text{ft}}{\text{m}} \right) \times \left(13 \text{ m} \times 3.28 \frac{\text{ft}}{\text{m}} \right) \right]}{4.3} = 9.16 \text{ ft}$$

$$\text{Initial Vertical Dimensions } (\sigma_{Z_{int}}) = \frac{(\text{Height of Canopy}) \text{ ft}}{2.15}$$

$$\sigma_{Z_{int}} = \frac{\left(4 \text{ m} \times 3.28 \frac{\text{ft}}{\text{m}} \right)}{2.15} = 6.10 \text{ ft}$$

ATTACHMENT C (Continued)

Modeling Parameters

Stack Gas Exit Velocity

The stack gas exit velocity is calculated by the following:

$$\text{Velocity} = \frac{(\text{Mass Emission Rate})}{(\text{Cross Sectional Area of Stack})(\text{Density of Gasoline Vapor})}$$

Where:

$$\text{Area} = \frac{\pi D^2}{4} = \frac{\pi(0.167\text{ft})^2}{4} = 0.0218\text{ft}^2$$

$$\text{Density of Gasoline Vapors} = 0.105 \frac{\text{lb}}{\text{ft}^3}, \text{ from Appendix D of CAPCOA's Guidelines}$$

Sample Calculation

A sample calculation is provided below for the velocity of loading emissions leaving the PV Valve for a throughput of 1,000,000 gal/year.

$$\text{Velocity}_{\text{Loading}} = (1,000,000 \text{ gal/yr}) \left(\frac{0.15 \text{ lb ROC}}{1000 \text{ gal}} \right) \left(\frac{1 \text{ yr}}{8760 \text{ hr}} \right) \left(\frac{1 \text{ hr}}{3600 \text{ sec}} \right) \left(\frac{1}{(0.105 \text{ lb/ft}^3)(0.0218 \text{ ft}^2)} \right) (60 \text{ sec/min}) = 0.125 \text{ fpm}$$

ATTACHMENT D

Control Options for Dispersion Model

Building Downwash

Building downwash is not required to be included in the model due to its minimal effects. The analysis in Section IX., *Miscellaneous Modeling Parameters*, of CAPCOA’s *Gasoline Service Station Industrywide Risk Assessment Guidelines* (CAPCOA’s Guidelines, accessible at <http://www.arb.ca.gov/ab2588/rtrap-iwra/gasiwra.pdf>) shows that the effects from building downwash are minimal when determining the dispersion from the vent pipes.

Elevation

The following elevation options shall be used in the dispersion model:

- In most cases the neighboring parcels will be graded to the same level as the gas station. In those circumstances, the dispersion model may be run with “FLAT” terrain heights.
- If there are significant elevation changes surrounding the gas station, choose “ELEV” for terrain heights and “BOTH” for the terrain model, with the appropriate Digital Elevation Model (DEM) files.

Control Options

The following control options shall be used in the dispersion model.

Table 1 – Control Options for Dispersion Model

Control Option	Assumption
Use Regulatory Default?	No
Rural or Urban	To be determined by applicant
Gradual Plume Rise?	Yes
Stack Tip Downwash?	Yes
Buoyancy Induced Dispersion?	No
Calms Processing?	No
Missing Data Processing?	No
Include Building Downwash?	No
Lowbound Option?	No
Terrain Heights	To be determined by applicant
Terrain Model	BOTH (If applicable)

ATTACHMENT E

Health Risk Assessment Report and HARP Files

Health Risk Assessment

The following is required as part of the Health Risk Assessment:

1. A health risk assessment report that complies with the Office of Environmental Health Hazard Assessment's (OEHHA) guidelines as discussed in Chapter 9, *Summary of the Requirements for a Modeling Protocol and a Health Risk Assessment Report*, of OEHHA's HRA guidance document, *Air Toxics Hot Spots Program Risk Assessment Guidelines*. This document is available at: http://www.oehha.ca.gov/air/hot_spots/pdf/HRAguidefinal.pdf
2. Submit the following HARP files in electronic format:
 - Transaction file with facility and emission inventory data (filename.TRA)
 - ISC workbook file with all ISC parameters (filename.ISC).
 - ISC input file generated by HARP when ISC is run (filename.INP)
 - ISC output file generated by HARP when ISC in run (filename.OUT)
 - ISC binary output file; holds X/Q for data for each hour (filename.BIN)
 - List of error messages generated by ISC (filename.ERR)
 - Sources receptor file; contains list of sources and receptors for the ISC run; generated by HARP when you set up ISC (filename.SRC)
 - Point estimate risk values generated by HARP; this file is updated automatically each time you perform one of the point estimate risk analysis functions (filename.RSK)
 - Average and maximum X/Q values for each source-receptor combination; generated by ISC (filename.XOQ)
 - Plot file generated by ISC (filename.PLT)
 - Representative meteorological data used for the facility air dispersion modeling (filename.MET)
 - Site-specific parameters used for all receptor risk modeling (filename.SIT)
 - Map file used to overlay facility and receptors (filename.DEB)

Important Notes

When conducting the HRA and writing the report, please be aware of the following:

1. The air dispersion (ISC model) and risk assessment must be completed in ARB's current version of HARP (currently Version 1.3). HARP is available for download at: <http://www.arb.ca.gov/toxics/harp/harp.htm>
2. The offsite Point of Maximum Impact (PMI) must be reported. This value will be compared to the APCD's significant risk threshold to determine if the project creates a significant risk to the surrounding community. To further clarify, the offsite PMI may be a boundary receptor, grid receptor or a sensitive receptor. No residence or business is required to occupy the offsite PMI.
3. The 70 year (adult resident) exposure duration with the Derived (Adjusted) Method shall be used to determine the cancer risk for any parcels that are not zoned commercial. For parcels zoned commercial, the 40 year worker exposure point estimate may be used. The Derived (OEHHA) Method shall be used to determine the chronic hazard index.

If the health risk assessment and HRA report fail to comply with these guidelines, the health risk assessment and report will be returned to the applicant for revision.