

California Air Resources Board
Oil and Gas Industry Survey

**For additional information related to this survey, please see accompanying
General Instructions.**

Reporting Year 2007

Table 1: Facility Description

Company Name:			
Facility Name:		Air District:	
Address:			
City:	State:		Zip:
Contact Person:	Phone:	Email:	
Type of Business (Check all that apply)		Air District Facility ID¹:	
<input type="checkbox"/> Onshore Crude Oil Production		_____	
<input type="checkbox"/> Offshore Crude Oil Production		_____	
<input type="checkbox"/> Onshore Natural Gas Production		_____	
<input type="checkbox"/> Offshore Natural Gas Production		_____	
<input type="checkbox"/> Natural Gas Storage Facility		_____	
<input type="checkbox"/> Natural Gas Processing		_____	
<input type="checkbox"/> Crude Oil Pipeline		_____	
<input type="checkbox"/> Crude Oil Storage		_____	
<input type="checkbox"/> Crude Oil Processing		_____	
<input type="checkbox"/> PERP Equipment Owner ²		_____	
<input type="checkbox"/> Other (Specify): _____		_____	

1. If your facility does not have an air district facility ID, please see instructions to create one. This code will be used in the remaining tables under "Air District Facility ID".
2. Portable Equipment Registration Program (PERP).

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Table 2: Facility Production

Facility Name: _____						
Box 1: Production						
	Produced Natural Gas¹	Natural Gas Storage	Ultra Heavy Oil API < 10°	Heavy Oil API 10° - 20°	Light Oil API 20° - 30°	Ultra Light Oil API > 30°
Number of:						
Active Wells	_____	_____	_____	_____	_____	_____
Well Cellars	_____	_____	_____	_____	_____	_____
New Wells Drilled	_____	_____	_____	_____	_____	_____
Workovers (Tubing Removal)	_____	_____	_____	_____	_____	_____
Well Cleanups ³	_____	_____	_____	_____	_____	_____
Well Completions	_____	_____	_____	_____	_____	_____
Volume Produced (bbl)		_____	_____	_____	_____	_____
Box 2: Associated or Produced Natural Gas Production²						
	Mole % Methane	Mole % CO ₂	Mole % H ₂ S	Higher Heating Value (Btu)	Volume Produced (SCF)	
Average Raw Gas Stream	_____	_____	_____	_____	_____	
Box 3: Crude Oil Transmission Pipeline (After LACT Unit)						
Volume Transported						
Barrels Crude Oil	_____		Length (Miles)	_____		

1. Produced Natural Gas is gas extracted from a non-oil producing gas well. This category does not include associated gas.
2. Associated Gas is gas produced with crude oil extraction. Box 2 is to be used for both associated and produced natural gas.
3. Well cleanups are maintenance activities that include fracturing or removing fluids to increase production.

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Table 3: Facility Electrification

Air District Facility ID:		
Onsite Generated Electricity:		
Amount Generated: _____ MWh	Amount Exported: _____ MWh	Amount Purchased: _____ MWh

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**Table 4: Vapor Recovery and Flares
(Complete one for each piece of equipment)**

Air District Facility ID: _____	
Type: <input type="checkbox"/> Flare <input type="checkbox"/> Thermal Oxidizer <input type="checkbox"/> Incinerator <input type="checkbox"/> Carbon Adsorption	Use: <input type="checkbox"/> Vapor Recovery <input type="checkbox"/> Emergency
Flares, Thermal Oxidizers, and Incinerators Only Size (Btu/hr): _____ Throughput (SCF): _____ Combustion Efficiency: _____ Avg. Composition (Mole %): _____ % Methane _____ % CO ₂ Carbon Mole Ratio ¹ _____	Carbon Adsorbers Only: Size (ft ³): _____ Throughput (SCF): _____ Capture Efficiency: _____ Avg. Composition (Mole %): _____ % Methane

1. Please see instructions to calculate the carbon mole ratio.

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Table 5: Combustion Equipment
(Complete one for each piece of equipment)

Air District Facility ID: _____			
External Combustion Type:			
<input type="checkbox"/> Boiler	<input type="checkbox"/> Heater/Treater	<input type="checkbox"/> Reboiler	<input type="checkbox"/> Other (Specify) _____
<input type="checkbox"/> Steam Generator	<input type="checkbox"/> Oil Heater	<input type="checkbox"/> Glycol <input type="checkbox"/> Amine	
Internal Combustion Type:			
Type:		Use:	
<input type="checkbox"/> Reciprocating	<input type="checkbox"/> Turbine	<input type="checkbox"/> Compressor	
<input type="checkbox"/> Rich Burn Two-Stroke <input type="checkbox"/> Lean Burn Two-Stroke <input type="checkbox"/> Rich Burn Four-Stroke <input type="checkbox"/> Lean Burn Four-Stroke	<input type="checkbox"/> Simple Cycle <input type="checkbox"/> Combined Cycle <input type="checkbox"/> Microturbine <input type="checkbox"/> Drill Rig <input type="checkbox"/> Workover Rig	<input type="checkbox"/> ID ¹ _____ <input type="checkbox"/> Vapor Recovery <input type="checkbox"/> Crude Oil Pump <input type="checkbox"/> Well Pump <input type="checkbox"/> Water Injection Pump <input type="checkbox"/> Other (Specify) _____	
Manufacturer²:	Fuel Type:	Primary	Secondary
	Diesel	<input type="checkbox"/>	<input type="checkbox"/>
	Pipeline Quality Gas	<input type="checkbox"/>	<input type="checkbox"/>
Model Year:	Associated Gas	<input type="checkbox"/>	<input type="checkbox"/>
	Produced Gas	<input type="checkbox"/>	<input type="checkbox"/>
	Waste Gas	<input type="checkbox"/>	<input type="checkbox"/>
Average Load (HP/BTU/MW):	Landfill Gas	<input type="checkbox"/>	<input type="checkbox"/>
	Liquefied Petroleum Gas	<input type="checkbox"/>	<input type="checkbox"/>
	Propane	<input type="checkbox"/>	<input type="checkbox"/>
Avg. Thermal Efficiency: (Steam Generators and Turbine Engines)	Gasoline	<input type="checkbox"/>	<input type="checkbox"/>
	Other (Specify): _____	<input type="checkbox"/>	<input type="checkbox"/>
Inspection Frequency:	Annual Fuel Volume: (Gallons/SCF)		
Instrument Test _____	Metered	_____	_____
Visual Inspection _____	Calculated	_____	_____
Third Party _____	Avg. Higher Heating Value (Btu)		
		_____	_____
	Carbon Weight %		
		_____	_____
Under Air District Permit?	Liquid Fuel Density (lb/gal)		
<input type="checkbox"/> Yes <input type="checkbox"/> No		_____	_____
PERP⁴ Registered?	Gaseous Fuel Molecular Weight³		
<input type="checkbox"/> Yes <input type="checkbox"/> No		_____	_____

1. Create a unique ID number for each compressor engine. The number will be used in conjunction with Table 12.
 2. For external combustion, list the burner manufacturer.
 3. See instructions for calculation.
 4. Portable Equipment Registration Program (PERP)

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Table 6: Component Counts¹

Air District Facility ID:			
Type:	Number of Components by Product Type:		
	Natural Gas	Light Crude (API >20°)	Heavy Crude (API <20°)
(1-inch and above):			
<input type="checkbox"/> Manual Valves	_____	_____	_____
<input type="checkbox"/> Flanges	_____	_____	_____
<input type="checkbox"/> Connectors	_____	_____	_____
<input type="checkbox"/> Open-ended Lines	_____	_____	_____
<input type="checkbox"/> Threaded Components	_____	_____	_____
Other Components:			
<input type="checkbox"/> Pump Seals	_____	_____	_____
<input type="checkbox"/> Pressure Relief Valves	_____	_____	_____
<input type="checkbox"/> Bursting Discs	_____	_____	_____
<input type="checkbox"/> Diaphragms	_____	_____	_____
<input type="checkbox"/> Hatches	_____	_____	_____
<input type="checkbox"/> Meters	_____	_____	_____
<input type="checkbox"/> Polished Rod Stuffing Boxes	_____	_____	_____
<input type="checkbox"/> Sight Glasses	_____	_____	_____
<input type="checkbox"/> Loading Arms	_____	_____	_____
<input type="checkbox"/> Dump Lever Arm	_____	_____	_____

1. If actual counts are not available please estimate. See instructions for details.

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Table 7: Automated Control Devices¹

Air District Facility ID:		
Controllers:		
Gas Actuated	Number:	Number on Gas Recovery²
Continuous Bleed	_____	_____
Intermittent Bleed	_____	_____
Low Bleed	_____	_____
No Bleed ³	_____	_____
Electronically Actuated	_____	_____
Air Actuated	_____	_____
Actuators:		
Gas Actuated		
Piston Valve Operator	_____	_____
Hydraulic Valve Operator	_____	_____
Turbine Valve Operator	_____	_____
Electronically Actuated	_____	_____
Air Actuated	_____	_____

1. If actual counts are unavailable, please estimate.

2. Includes units connected to a vapor recovery system or vented back into a system.

3. A "No Bleed" controller is not connected to a gas recovery system.

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**Table 8: Inspection and Maintenance Program¹
(For Table 6 and 7)**

Air District Facility ID:	
Does your facility follow an Inspection and Maintenance (I&M) Program? <input type="checkbox"/> Yes <input type="checkbox"/> No	
District Rule # for I&M Program (If Applicable):	
I&M Program Type:	
Stratum:	Leak Threshold (ppm):
<input type="checkbox"/> 0 – 500 ppm	_____
<input type="checkbox"/> 500 – 1,000 ppm	_____
<input type="checkbox"/> 1,000 – 2,000 ppm	_____
<input type="checkbox"/> 2,000 – 10,000 ppm	_____
<input type="checkbox"/> 10,000 – 50,000 ppm	_____
<input type="checkbox"/> > 50,000 ppm	_____
Is this test data available electronically? <input type="checkbox"/> Yes <input type="checkbox"/> No (If yes, please submit electronically)	

1. An Inspection and Maintenance Program is where the operator of a facility inspects their facility for leaks of organic gases and repairs the leaks.

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**Table 9: Natural Gas Dehydration
(Complete one for each piece of equipment)**

Air District Facility ID: _____			
Type: <input type="checkbox"/> Glycol <input type="checkbox"/> Desiccant <input type="checkbox"/> Other (Specify) _____			
Avg. Natural Gas Composition (Mole %):		Input Volume (SCF):	
Input:	Output:	Output Volume (SCF):	
_____ % Methane	_____ % Methane		
_____ % H ₂ S	_____ % H ₂ S		
_____ % CO ₂	_____ % CO ₂		
_____ HHV ¹ (Btu)	_____ HHV ¹ (Btu)	Volume of Liquids Removed (tons/year):	
For Glycol Units Only:			
Glycol Circulation Rate (Gallons/Hour): _____		Gas Assisted Pump?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Average Flash Tank Pressure (PSIA): _____		Electric Pump?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Average Contactor Pressure (PSIA): _____		Stripping Gas Used?	<input type="checkbox"/> Yes <input type="checkbox"/> No
		Flash Separator?	<input type="checkbox"/> Yes <input type="checkbox"/> No
For Desiccant Units Only:			
Volume of Dehydrator (ft ³): _____		% of Packed Vessel Volume that is Natural Gas ² : _____	
Vessel Pressure (PSIG): _____		Frequency of Desiccant Replacement (days): _____	
Vapor Recovery System:			
<input type="checkbox"/> Flare	<input type="checkbox"/> None	Control Efficiency: _____%	
<input type="checkbox"/> Incinerator	<input type="checkbox"/> Other (Specify) _____		
<input type="checkbox"/> Collection System			

1. HHV is Higher Heating Value.

2. See instructions.

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Table 11: Other Natural Gas Processing
(Complete one for each piece of equipment)

Air District Facility ID:	
Unit Type: <input type="checkbox"/> Fractionation <input type="checkbox"/> Mercury Removal <input type="checkbox"/> Nitrogen Removal <input type="checkbox"/> Other (Specify) _____	
Avg. Natural Gas Composition (Mole %):	
Input: _____ % Methane _____ % H ₂ S _____ % CO ₂ _____ HHV ¹ (Btu)	Output: _____ % Methane _____ % H ₂ S _____ % CO ₂ _____ HHV ¹ (Btu)
Input Volume (SCF):	
Output Volume (SCF):	
Volume of Liquids Removed (tons/year):	
Vapor Recovery System: <input type="checkbox"/> Flare <input type="checkbox"/> Other (Specify) _____ Control Efficiency: _____% <input type="checkbox"/> Incinerator <input type="checkbox"/> None <input type="checkbox"/> Collection System	

1. HHV is Higher Heating Value.

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**Table 12: Natural Gas Compressors
(Complete one for each piece of equipment)**

Air District Facility ID: _____		
Type: <input type="checkbox"/> Centrifugal ○ # Wet Seals _____ ○ # Dry Seals _____ <input type="checkbox"/> Reciprocating ○ # Cylinders _____ <input type="checkbox"/> Rotary <input type="checkbox"/> Other (Specify) _____	Primary Driver: Compressor ID ¹ _____ Type: <input type="checkbox"/> Electric <input type="checkbox"/> Turbine <input type="checkbox"/> Piston Engine <input type="checkbox"/> Integral	Starter Type (For Primary Driver): <input type="checkbox"/> Gas Expansion ○ Natural Gas ○ Instrument Air <input type="checkbox"/> Electric <input type="checkbox"/> Hydraulic <input type="checkbox"/> Other (Specify) _____
Manufacturer: _____	Model Year: _____	Annual Usage (Hours): _____
Inspection Frequency (Daily, Monthly, Annually, ect.): _____		Maintenance Frequency ² : _____
Discharge Pressure (PSIA) _____	Discharge Temperature (°F) _____	Idle Pressure (PSIA) _____
Blow-downs: Total Number: _____ Total Volume of Gas for Blow-downs (SCF): <input type="checkbox"/> Vented _____ <input type="checkbox"/> Flared _____ <input type="checkbox"/> Recovered _____		Start-ups: Total Number: _____ Total Volume of Gas for Start-ups (SCF): <input type="checkbox"/> Vented _____ <input type="checkbox"/> Flared _____ <input type="checkbox"/> Recovered _____

1. Enter the compressor engine ID number from Table 5. If the compressor engine is electric, leave this field blank.
 2. The maintenance frequency is the number of times the unit had to be disassembled to replace valves, seals, or packing.

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Table 13: Pipelines

Air District Facility ID: _____			
Natural Gas: Extraction Facility Gathering System (Prior to Gas Meter) Estimated Length (miles): _____			
Natural Gas Gathering System Maintenance Activites (SCF):			
	Pipeline Gas	Associated Gas ¹	Produced Gas ²
Vented	_____	_____	_____
Flared	_____	_____	_____
Recovered ³	_____	_____	_____
Pigging Operations:			
Number of Launchers/Receivers	Crude Oil _____	Natural Gas _____	
Number of Launcher/Receiver Openings	Crude Oil _____	Natural Gas _____	
Are Launchers/Receivers Purged with Inert Gas Prior to Opening? <input type="checkbox"/> Yes <input type="checkbox"/> No			

1. Associated Natural Gas is gas produced with crude oil extraction.
2. Produced Natural Gas is gas extracted from a gas well.
3. Recovered is any volume of gas that is not either vented or flared.

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**Table 14: Crude Oil or Natural Gas Separation Units
(Complete one per piece of equipment)**

Air District Facility ID: _____																	
Type: <input type="checkbox"/> Free Water Knockout <input type="checkbox"/> Heater/Treater <input type="checkbox"/> Horizontal Separator <input type="checkbox"/> Vertical Separator <input type="checkbox"/> Flow Splitter <input type="checkbox"/> Wemco <input type="checkbox"/> Emulsion Treater <input type="checkbox"/> Condensate Tank <input type="checkbox"/> Other (Specify) _____	Subtype: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded	Size (Barrels/SCF): _____															
		Number of Degassing Events: _____															
		Throughput (Barrels/year or SCF/year): _____															
		Avg. Crude Oil API: _____															
<table border="0"> <tr> <td></td> <td style="text-align: center;">ROG (tons/year)</td> <td style="text-align: center;">TOG (tons/year)</td> </tr> <tr> <td>Working Loss</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>Breathing Loss</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>Flashing Loss</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>Avg. Methane _____ %</td> <td></td> <td>Avg. CO₂ _____ %</td> </tr> </table>		ROG (tons/year)	TOG (tons/year)	Working Loss	_____	_____	Breathing Loss	_____	_____	Flashing Loss	_____	_____	Avg. Methane _____ %		Avg. CO ₂ _____ %	Components: <input type="checkbox"/> Access Hatch <input type="checkbox"/> Pressure Relief Valve Are hatches and pressure relief valves included in Table 6? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	ROG (tons/year)	TOG (tons/year)															
Working Loss	_____	_____															
Breathing Loss	_____	_____															
Flashing Loss	_____	_____															
Avg. Methane _____ %		Avg. CO ₂ _____ %															
Vapor Recovery System: <input type="checkbox"/> Flare <input type="checkbox"/> None Control Efficiency: _____% <input type="checkbox"/> Incinerator <input type="checkbox"/> Other (Specify) _____ <input type="checkbox"/> Collection System																	

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**Table 15: Crude Oil Separation Sumps or Pits
(Complete one per piece of equipment)**

Air District Facility ID: _____	
Level: <input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Tertiary	Usage: <input type="checkbox"/> Crude Oil API _____ <input type="checkbox"/> Number of Days in Use _____
Dimensions: Area (Square Feet) _____ Depth (Feet) _____	Vapor Recovery System: <input type="checkbox"/> Flare <input type="checkbox"/> Cover <input type="checkbox"/> Incinerator <input type="checkbox"/> None <input type="checkbox"/> Collection System <input type="checkbox"/> Other (Specify) _____ Control Efficiency _____%

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**Table 16: Crude Oil Storage Tanks
(Complete one per piece of equipment)**

Air District Facility ID: _____			
Type: <input type="checkbox"/> Fixed Roof <input type="checkbox"/> Internal Floating Roof <input type="checkbox"/> External Floating Roof <input type="checkbox"/> Open Top Roof	Subtype: <input type="checkbox"/> Bolted Tank <input type="checkbox"/> Welded Tank	Size (Barrels): _____	
		Number of Degassing Events: _____	
		Avg. Crude Oil API: _____	
	ROG (tons/year)	TOG (tons/year)	Components: <input type="checkbox"/> Access Hatch <input type="checkbox"/> Pressure Relief Valve Are hatches and pressure relief valves included in Table 6? <input type="checkbox"/> Yes <input type="checkbox"/> No
Working Loss	_____	_____	
Breathing Loss	_____	_____	
Flashing Loss	_____	_____	
Avg. Methane _____ %		Avg. CO ₂ _____ %	
Floating Roof Tanks Only:			
Deck Leg Height (ft): _____		Tank Diameter (ft): _____	
Primary Seal:		Secondary Seal:	
<input type="checkbox"/> Metallic Shoe o Liquid Mounted o Vapor Mounted <input type="checkbox"/> Resilient Toroid o Liquid Mounted o Vapor Mounted <input type="checkbox"/> Wiper <input type="checkbox"/> Other (Specify) _____		<input type="checkbox"/> Wiper <input type="checkbox"/> Resilient Toroid o Liquid Mounted o Vapor Mounted <input type="checkbox"/> Other (Specify) _____	
Vapor Recovery System:			
<input type="checkbox"/> Flare <input type="checkbox"/> Incinerator <input type="checkbox"/> Collection System		<input type="checkbox"/> None <input type="checkbox"/> Other (Specify) _____	
		Control Efficiency: _____%	