



**Valves, Fittings, Flanges, Pressure Relief Devices, Compressor, Pump Seals, and Other Components  
Application Form -31**

Santa Barbara County Air Pollution Control District  
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COMPLETE FORM -31 FOR ALL DEVICES WHICH FUGITIVE COMPONENT LEAKPATHS WILL BE ADDED, ALONG WITH AN APCD FORM -01 (PERMIT APPLICATION – GENERAL).

**REASON FOR APPLICATION**

- New Equipment                       Alteration                       Other: \_\_\_\_\_  
 Change Liquid Service Type       Non-Routine Replacement

**FACILITY TYPE**

- Production Field                       Refinery                      SCC No.: \_\_\_\_\_  
 Gas Processing Plant                   Offshore Platform              (See <http://www.sbcapcd.org/eng/tech/scc.htm>)

**TABLE 1 COMPONENT LEAKPATH COUNT SUMMARY TABLE**

| Component-Leakpath Type <sup>1</sup>          | BACT | Gas/Condensate Service | Oil Service |
|-----------------------------------------------|------|------------------------|-------------|
| Valves - Accessible/Inaccessible              |      |                        |             |
| Valves - Unsafe                               |      |                        |             |
| Valves - Bellows                              | X    |                        |             |
| Valves - Bellows / Background ppmv            | X    |                        |             |
| Valves - Category A                           |      |                        |             |
| Valves - Category B                           |      |                        |             |
| Valves - Category C                           |      |                        |             |
| Valves - Category D                           |      |                        |             |
| Valves - Category E                           |      |                        |             |
| Valves - Category F                           | X    |                        |             |
| Valves - Category G                           | X    |                        |             |
| Flanges/Connections - Accessible/Inaccessible |      |                        |             |
| Flanges/Connections - Unsafe                  |      |                        |             |
| Flanges/Connections - Category A              |      |                        |             |
| Flanges/Connections - Category B              |      |                        |             |
| Flanges/Connections - Category C              |      |                        |             |
| Flanges/Connections - Category D              |      |                        |             |
| Flanges/Connections - Category E              |      |                        |             |
| Flanges/Connections - Category F              | X    |                        |             |
| Flanges/Connections - Category G              | X    |                        |             |
| Compressor Seals - To Atmosphere              |      |                        |             |
| Compressor Seals - To Vapor Recovery System   |      |                        |             |
| PSV - To Atmosphere/Flare                     |      |                        |             |
| PSV - To Vapor Recovery System                |      |                        |             |
| Pump Seals – Single                           |      |                        |             |
| Pump Seals – Dual/Tandem                      |      |                        |             |
| <b>Total Leakpaths<sup>2</sup></b>            |      |                        |             |

<sup>1</sup> See Table 3, *Fugitive Hydrocarbon Control Factors* worksheet for a description of each component type.

<sup>2</sup> A Leakpath is not the same as a “component” as defined under APCD Rule 331.

For APCD use only: FID #: \_\_\_\_\_ App. #: \_\_\_\_\_ APCD Form -31 (9/2011)



**Application Form -31**  
**Table 2 Fugitive Emission Factors for Oil and Gas Facilities**  
**Using the Component Leakpath Count Method**  
**(P&P 6100.061.1998)**

| Component Type                  | FACILITY TYPE                         |                  |                                   |                  |                          |                  |                                |                  |
|---------------------------------|---------------------------------------|------------------|-----------------------------------|------------------|--------------------------|------------------|--------------------------------|------------------|
|                                 | Production Field <sup>1</sup>         |                  | Gas Processing Plant <sup>2</sup> |                  | Refinery <sup>3</sup>    |                  | Offshore Platform <sup>4</sup> |                  |
|                                 | THC EF <sup>5</sup><br>lb/day-Comp-lp | ROC/THC<br>Ratio | THC EF<br>lb/day-Comp-lp          | ROC/THC<br>Ratio | THC EF<br>lb/day-Comp-lp | ROC/THC<br>Ratio | THC EF<br>lb/day-Comp-lp       | ROC/THC<br>Ratio |
| <b>Gas/Condensate Service</b>   |                                       |                  |                                   |                  |                          |                  |                                |                  |
| Valve                           | 0.295                                 | 0.31             | 1.0580                            | 0.38             | 1.4200                   | 0.99             | 0.2230                         | 0.33             |
| Connection                      | 0.070                                 | 0.31             | 0.0580                            | 0.43             | 0.0134                   | 0.99             | 0.2230                         | 0.33             |
| Compressor Seal                 | 2.143                                 | 0.31             | 10.7940                           | 0.20             | 33.6000                  | 0.99             | 0.2230                         | 0.33             |
| Pump Seal                       | 1.123                                 | 0.31             | 3.3000                            | 0.79             | 6.0000                   | 0.99             | 0.2230                         | 0.33             |
| Pressure Relief                 | 6.670                                 | 0.31             | 9.9470                            | 0.07             | 8.6400                   | 0.99             | 0.2230                         | 0.33             |
| <b>Oil Service <sup>6</sup></b> |                                       |                  |                                   |                  |                          |                  |                                |                  |
| Valve                           | 0.0041                                | 0.56             | 0.4306                            | 0.33             | 0.0120                   | 0.99             | 0.0133                         | 0.33             |
| Connection                      | 0.0020                                | 0.56             | 0.0694                            | 0.33             | 0.0134                   | 0.99             | 0.0133                         | 0.33             |
| Pump Seal                       | 0.0039                                | 0.56             | 1.3080                            | 0.33             | 1.1040                   | 0.99             | 0.0133                         | 0.33             |
| Pressure Relief                 | 0.2670                                | 0.56             | 1.7400                            | 0.33             | 0.0000                   | 0.99             | 0.0133                         | 0.33             |

Notes:

- 1 Eaton, W.S. et al., "Fugitive Hydrocarbon Emissions From Petroleum Operations", American Petroleum Institute, Rockwell International, March 1980, See Attachment 1 for the methodology used to consolidate the API emission factors.
- 2 Harris, G.E. et al., "Frequency of Leak Occurrence and Emission Factors for Natural Gas Factors for Natural Gas Liquid Plants", EPA DCN 82-222-018-04-48, July 1982. For oil service components, see page 3 of Attachment 1.
- 3 United States Environmental Protection Agency, *Assessment of Atmospheric Emissions from Petroleum Refining*, EPA-600/2-80-075a through -075d, U.S. Environmental Protection Agency, Research Triangle Park, NC, 1980.
- 4 Santa Barbara County APCD, "Modeling of Fugitive Hydrocarbon Emissions", Tecolote Research Inc., January 1986. Assumes the facility is primarily a crude oil site with a significant portion of gas components. For ROC/THC ratios for other facility types, please see page 63.
- 5 "lb/day-Comp-lp" = pound of pollutant per day for each component Comp-lp, "THC" = total hydrocarbons (includes methane and ethane), "ROC" = reactive organic compounds (non-methane, non-ethane).
- 6 Oil service includes water, oil, and gas emulsions.



**Application Form -31**  
**Table 3 Fugitive Hydrocarbon Control Factors Using the**  
**Component Leakpath Count Method**  
**(P&P 6100.061.1998)**

| Item | Description <sup>5</sup>                      | Notes | BACT | Vapor Recovery | Monthly Inspections | LDAR 100 ppmv | LDAR 500 ppmv | Control Efficiency % |
|------|-----------------------------------------------|-------|------|----------------|---------------------|---------------|---------------|----------------------|
| 1    | Valves - Accessible/Inaccessible              | 1     |      |                |                     |               |               | 80%                  |
| 2    | Valves - Unsafe                               |       |      |                |                     |               |               | 0%                   |
| 3    | Valves - Bellows                              |       | x    |                |                     | x             |               | 90%                  |
| 4    | Valves - Bellows / Background ppmv            | 2     | x    |                |                     |               |               | 100%                 |
| 5    | Valves - Category A                           | 3     |      |                | x                   |               |               | 84%                  |
| 6    | Valves - Category B                           | 3     |      |                |                     |               | x             | 85%                  |
| 7    | Valves - Category C                           | 3     |      |                |                     | x             |               | 87%                  |
| 8    | Valves - Category D                           | 3     |      |                | x                   |               | x             | 87%                  |
| 9    | Valves - Category E                           | 3     |      |                | x                   | x             |               | 88%                  |
| 10   | Valves - Category F                           | 4     | x    |                |                     | x             |               | 90%                  |
| 11   | Valves - Category G                           | 4     | x    |                | x                   | x             |               | 92%                  |
| 12   | Flanges/Connections - Accessible/Inaccessible |       |      |                |                     |               |               | 80%                  |
| 13   | Flanges/Connections - Unsafe                  |       |      |                |                     |               |               | 0%                   |
| 14   | Flanges/Connections - Category A              | 3     |      |                | x                   |               |               | 84%                  |
| 15   | Flanges/Connections - Category B              | 3     |      |                |                     |               | x             | 85%                  |
| 16   | Flanges/Connections - Category C              | 3     |      |                |                     | x             |               | 87%                  |
| 17   | Flanges/Connections - Category D              | 3     |      |                | x                   |               | x             | 87%                  |
| 18   | Flanges/Connections - Category E              | 3     |      |                | x                   | x             |               | 88%                  |
| 19   | Flanges/Connections - Category F              | 4     | x    |                |                     | x             |               | 90%                  |
| 20   | Flanges/Connections - Category G              | 4     | x    |                | x                   | x             |               | 92%                  |
| 21   | Compressor Seals - To Atm                     |       |      |                |                     |               |               | 80%                  |
| 22   | Compressor Seals - To VRS                     |       |      | x              |                     |               |               | 100%                 |
| 23   | PSV - To Atm/Flare                            |       |      |                |                     |               |               | 80%                  |
| 24   | PSV - To VRS                                  |       |      | x              |                     |               |               | 100%                 |
| 25   | Pump Seals - Single                           |       |      |                |                     |               |               | 80%                  |
| 26   | Pump Seals - Dual/Tandem                      |       |      |                |                     |               |               | 100%                 |

**Notes:**

1. "Standard" valves and connections/flanges subject to Rule 331 (1000 ppmv/quarterly inspection) = 80% control
2. Bellows valves with 100% control have a minor leak threshold of any OVA reading above background.
3. Categories A through E are defined by lower leak threshold limits and/or increased monitoring frequency of standard components.
4. Categories F and G are BACT approved components that have been designed to perform at a lower leak threshold.
5. Emissions can be calculated using the *Fugitive Hydrocarbon Leakpath Method Calculation* worksheet available online at: <http://www.sbcapcd.org/eng/tech/software.htm>