

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING AND COMPLIANCE</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 7	PAGE 1
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RULE 1173 COMPLIANCE PLAN

COMPANY NAME AND ADDRESS

Chevron Products Company
324 W. El Segundo Blvd.
El Segundo, CA 90245

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EQUIPMENT LOCATION

Chevron Products Company
324 W. El Segundo Blvd.
El Segundo, CA 90245

Facility ID: 800030

Claim of Confidentiality: Yes

BACKGROUND

The Chevron Products Company (Chevron) currently operates a refinery located in the City of El Segundo. The South Coast Air Quality Management District (District) classifies the facility as being subject to Title V, and the requirements of the District's Regional Clean Air Incentive Market (RECLAIM) for Nitrous Oxides and Sulfur Oxides.

In December of 2008, Chevron submitted a Compliance Plan application, No. 494607, for Rule 1173 to comply with the latest amendment under the rule that was approved by the Governing Board on 1 June 2007. Chevron submitted this current application, Application No. 494607 on 31 December 2008 to revise or update its previous compliance plan applications that were never processed by the District. This latest application gives the current status of Chevron's progress in complying with the District's Rule 1173. The plan application updates the inventory of pressure relief valves (PRDs) that further breaks down the PRDs that have been connected to controls under Rule 1173 (h)(1)(F), have been exempted from Rule 1173 (l)(1)(D) because their service, and have been outfitted with electronic monitoring devices.

Under the District's latest revision for Rule 1173, Chevron does not only need to monitor all of its atmospheric process pressure relief valves (PRDs), but is also required to install automatic monitoring devices, tamper proof, that record the release, and its duration as well. Furthermore, Chevron needs to use the collected data to quantify the emissions that each PRD releases to the atmosphere. Some of the major changes in Rule 1173 requirements are as follows:

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Table No.1 Regulatory Citation

RULE 1173 SUBDIVISION (h)(1)	
Regulatory Citation	Rule Requirement
(A)	If a refinery has less than 50 atmospheric PRDs, it must install electronic valve monitoring devices on 50% of all PRDs in its inventory at a minimum by 1 January 2009. As for the remaining PRDs, all must be outfitted by 1 July 2009.
(B)	(i): If a refinery has more than 50 atmospheric PRDs, the facility must install electronic valve monitoring devices on at least 20% of PRDs in its inventory by 1 January 2009. (ii): Install electronic valve monitoring devices on atmospheric PRDs to reach 40% of its inventory by 1 July 2009. (iii): Install electronic valve monitoring devices on the remaining atmospheric PRDs in its inventory by 1 July 2010.
(C)	All atmospheric PRDs that are not outfitted with the electronic valve monitoring devices are required to be monitored for atmospheric releases by using the existing process instrumentation installed as part of the process control until such time as the requirements of (h)(1)(A) and (B) are met.
(D)	As an alternative to (h)(1)(A) and (B), a refinery may delay the installation of electronic valve monitoring devices on all atmospheric PRDs until the next refinery turnaround after 1 June 2007 provided the refinery operator demonstrates to the satisfaction of the District that outfitting the PRDs is not feasible or is a safety hazard. This alternative schedule, however, needs a written approval from the District.
(E)	A refinery may choose to use multiple devices in addition to electronic PRD monitoring devices to monitor releases and quantify the amount of release. However, if the operator chooses to use a combination of devices, it must still comply with the schedule in (h)(1)(A) and (B) whichever is applicable and needs the District's approval for employing the devices on its PRDs.
(F)	PRDs that are connected to an air pollution control or vapor recovery are exempted from the requirements under (h)(1)(A) and (B). The operator can also propose, as an alternative to install electronic valve monitoring devices, to connect its process PRDs to a vapor recovery system or air pollution control on the condition that the PRDs will be connected at the next refinery turnaround after 31 December 2008 and identify in the Compliance Plan before 31 December 2008.
(G)	PRDs in service of heavy liquids that releases to drains and are subject to Rule 1176 are exempt from the electronic valve monitoring requirements of Rule 1173.

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PROPOSED RULE 1173 COMPLIANCE PLAN AND EVALUATION

As required by the District's Rule 1173, Chevron has completed its inventory of all PRDs that must comply with the requirement of Rule 1173, which requires electronic monitoring devices. The company's latest inventory shows that its refinery has thirty one PRDs that are subject to Rule 1173. This latest number excludes the PRDs that are exempt or are no longer subject to Rule 1173 requirements. Based on the total PRDs, Chevron needs to follow the schedule as outlined by Rule 1173 (h)(1)(B) (The Attachment gives the current PRD inventory at Chevron's El Segundo refinery).

Under the District's Rule 1173 (h)(4), an inventory of Rule 1173 components subject to the rule must be clearly identified. The Chevron's revised atmospheric PRD inventory complies with the identification requirements: It clearly tags each PRD with an unique identification number, the location of the PRD, size of valve, pressure setting, and the option for each device.

APPLICABLE RULE ANALYSIS

Rule 1173 (h)(1)(A) and (B) : Compliance Schedule Requirement

The District's Rule 1173 (h)(1) gives two schedules for complying with the new electronic monitoring and recording device requirements for atmospheric PRDs. These devices must also be able to quantify the emissions of each release. The compliance schedules are divided into two groups, one for facilities with fifty or less PRDs, and one for facilities with more than fifty PRDs. Chevron falls under the fifty PRDs or more schedule.

Rule 1173 (h)(1)(A) and (B) Analysis

Expect to Comply. Under the group with fifty or more atmospheric PRDs, Chevron must install monitoring devices on at least fifty percent of its PRDs by 1 January 2009, and the remaining PRDs by 1 July 2009 as required by (h)(1)(A). The following calculations show how many devices must be outfitted with monitoring devices by the required deadlines:

Total Number of Atmospheric PRDs: 31 (Updated Inventory, Table in Attachment)

Minimum Number of PRDs by 1 January 2009 = $31 \times .5 =$ = 16 atmospheric PRDs

Number of PRDs required by 1 July 2009 = 31 atmospheric PRDs

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The number of valves to be outfitted by the two given dates will be incorporated as plan conditions for the District's approval of the Chevron's Rule 1173 Compliance Plan. Chevron as of date has completed the required installation of electronic monitoring devices and is therefore in compliance (Please see attachment for email from Chevron that states that the company has completed all of its installations.)

Rule 1173 (h)(1)(C): Monitoring with Process Instrumentation and Control Requirements

In paragraph (h)(1)(C), refineries are required to monitor their atmospheric PRDs that are not outfitted with electronic monitoring devices by using process control instrumentation or other indicators until all PRDs comply with the requirements of (h)(1).

Rule 1173 (h)(1)(C) Analysis

Expect to Comply. Chevron has proposed process controls and indicators to monitor releases from its PRDs. The specific methods are listed in the Attachment. In all of its PRDs, the company will use the combination of pressure sensor readings and the newly installed electronic monitoring devices.

Rule 1173 (h)(1)(D): Alternative Schedule for Installing Electronic Monitoring Devices

Not Applicable. (h)(1)(D) gives refineries the option of delaying the compliance schedule for installing PRD monitoring devices until the next turnaround after 1 June 2007 if the companies provide sufficient justification that it can not be done without jeopardizing safety. Chevron in its application did not request to be placed under the alternative schedule.

Rule 1173 (h)(1)(E): Combination of Monitoring

Paragraph (h)(1)(E) gives refineries the option to use a combination of devices or methods to demonstrate compliance with monitoring. Under Rule 1173 (h)(1)(A) and (B), refineries are required to install electronic monitoring devices, tamper-proof, that are capable of recording a release, the duration, and the amount of release.

Rule 1173 (h)(1)(E) Analysis

Expect to Comply. Chevron decided to use a the combination of existing pressure sensors installed on its processes, pressure relief valve design or equations to determine the release, new electronic monitoring devices and existing data acquisition systems at the refinery that will measure and record the duration or the release.

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Specifically, Chevron will use an approved ultrasonic/acoustic or pressure monitoring devices, or other District approved devices and receivers. The new electronic monitoring devices will send signals to the receivers, which will convert the signals, if a PRD release has occurred, to be recorded on the Chevron's existing distribution control system (DCS) plant data historian. All data recorded will be time stamped (Please see Chevron's submittal in the file).

Chevron's new monitoring devices, however, only monitor and record the opening of the PRDs and their release durations. To actually determine the amount of release, Chevron will program its programmable logic control to automatically calculate the amount of release. To calculate the PRDs' releases, Chevron will use the time measured and recorded by the District approved electronic monitoring devices, existing pressure sensor, and the PRD pressure setting as data inputs for the American Petroleum Institute's (API) pressure relief valve equation for design or sizing in API RP 521. Because all the PRDs in Chevron's inventory are in gas or liquid service, the appropriate equations are the ones for the sizing of relief valves in gas and liquid service. Those equations are as follows (API RP 521, Section 3.6.2.1.1).

PRD Equation for Vapor or Gas Service

$$W_s = \frac{(ACK_d K_b K_c)(P+14.7)}{3600 \sqrt{\frac{(T+460)Z}{M}}}$$

$$W_{voc} = W_s * VOC * t$$

$$W_{TVOC} = \sum W_{voc}$$

Where:

A = Relief Valve Orifice Size

$$C = \text{Sizing Coefficient} = 520 \sqrt{k \left(\frac{2}{k+1} \right)^{\frac{k+1}{k-1}}}$$

k = Cp/Cv = Specific Heat Ratio for the released gas

Kd = Effective Coefficient of Discharge (use Kd = 0.975 in absence of manufacturer's PRD specific data)

Kb = Capacity Correction Factor

Kc = Combination Correction Factor. (Kc = 1 if no rupture disk; Kc = 0.9 if rupture disk)

M = Molecular Weight of the released gas

P = Pressure (psig), as measured with Continuous Process Monitoring System

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T = Temperature (°F)
 t = Recorded Duration of Release in Seconds by Electronic Monitoring Device
 VOC = weight percent VOC in the released gas
 Ws = Flow through the PRD, lb/sec
 Wvoc = Flow of VOCs through the PRD
 W_{TVOC} = Total VOC Released during the Event, lbs
 Z = Compressibility Factor

PRD Equation for Liquid Service

$$Q = 0.63 AK_d K_w K_v \sqrt{\frac{P}{G}}$$

$$M = Q * 8.34 * G * t$$

Q = flow rate, (U.S. gallon per second)
 K_d = Rated Coefficient of Discharge (use K_d = 0.65 in absence of manufacturer's PRD specific data)
 K_w = Capacity Correction Factor (K_w = 1 for atmospheric back pressure)
 K_v = Correction Factor due to Viscosity (assume = 1)
 P = Pressure (psig), as measured with Continuous Process Monitoring System
 G = Specific Gravity of the liquid at flowing temperature
 M = Release per Event in lbs
 t = Recorded Duration of Release in Seconds by Electronic Monitoring Device

Rule 1173 (h)(1)(F): PRD Connection to Air Pollution Control or Vapor Recovery

Applicable and Expect to Comply. (h)(1)(F) allows refinery operators to connect any of its PRDs to either an air pollution control device or vapor recovery provided that the connections are made during the first refinery turnaround after 31 December 2008. Chevron has chosen this option for some of its PRDs. The ones that have been connected to vapor recovery or control are identified in the attachment. The table in the attachment includes the date that connections are made, the tag number of the PRD, and its service.

Rule 1173 (h)(1)(G): Exemption for Liquid PRDs

Expect to Comply. (h)(1)(G) exempts atmospheric PRDs in liquid service from (h)(1)(A) and (B) if they are connected to drains or are part of a system subject to Rule 1176. A condition will be imposed in Chevron's Rule 1173 plan for the PRDs identified as in heavy liquid service. Compliance is therefore expected.

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RECOMMENDATIONS AND CONDITIONS

Because Chevron chooses to use a combination devices to monitor, record, and quantify its PRD releases, the company has submitted a Rule 1173 Compliance Plan for the District's approval as required by the amended Rule 1173 (h)(1)(E). After a review of the Chevron's plan, the District recommends approval with the following conditions:

CONDITIONS

See plan approval letter.