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HEARING BOARD
BAY AREA AIR QUALITY
MANAGEMENT DISTRICT

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MANAGEMENT DISTRICT

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BEFORE THE HEARING BOARD
OF THE
BAY AREA AIR QUALITY MANAGEMENT DISTRICT
STATE OF CALIFORNIA

In the Matter of the Application of)
CHEVRON PRODUCTS COMPANY)
)
For a Variance from Regulation 9,)
Rule 9, Section 301.3; Regulation 2,)
Rule 1, Section 307 (Insofar as it)
Applies to Condition No. 6(a))
(Condition ID No. 1162) of the)
Richmond Refinery's Permit to)
Operate); Regulation 6, Section 301; and)
Health and Safety Code Section 41701.)

No. 3423

ORDER GRANTING VARIANCE

The above-entitled matter is an Application for Variance (Application) from the provisions of Bay Area Air Quality Management District (District) Regulation 9, Rule 9, Section 301.3; District Regulation 2, Rule 1, Section 307 (insofar as it applies to Condition No. 6(a) of Condition ID No. 1162 of the Permit to Operate) for the petroleum refinery located at 841 Chevron Way, Richmond, CA 94802 (Refinery) owned and operated by Chevron Products Company (Applicant)); District Regulation 6, Section 301; and Health and Safety Code Section 41701. The Application was filed on February 13, 2003, and was amended by letter to the Hearing Board filed on March 20, 2003.

ARB

1 John T. Hansen and Whitney E. Street of Pillsbury Winthrop LLP, Counsel,
2 appeared for Applicant.

3 Adan Schwartz, Senior Assistant Counsel, appeared for the Air Pollution Control
4 Officer (APCO).

5 The Clerk of the Hearing Board provided notice of the hearing on the Application in
6 accordance with the requirements of the California Health and Safety Code. The Hearing
7 Board heard the request for variance on April 3, 2003.

8 The Hearing Board provided the public an opportunity to testify at the hearing as
9 required by the California Health and Safety Code, but no members of the public testified.
10 The Hearing Board heard the Applicant's testimony. The APCO did not oppose the
11 granting of the variance.

12 The Hearing Board declared the hearing closed after receiving testimony and took
13 the matter under submission for decision.

14 **BACKGROUND**

15 Applicant operates a Cogeneration Unit at the Refinery. The Cogeneration Unit
16 supplies approximately 80% of the Refinery's electricity and 60% of its steam.

17 The Cogeneration Unit has two identical 50-MW trains: Train 1000 and
18 Train 2000. Each train emits nitrogen oxides (NOx) to the atmosphere through its own
19 stack. The NOx from each train is abated by the train's two NOx reduction systems: steam
20 injection and selective catalytic reduction (SCR). At operating loads of 20 MW or greater,
21 steam is injected into the train's gas turbine fuel combustor to cool the flame and thereby
22 limit NOx emissions. Steam cannot be injected at loads lower than 20 MW out of concern
23 that at such loads the steam will extinguish the gas turbine flame. In the SCR unit, injected
24 ammonia reacts with NOx in the presence of catalyst to convert the NOx into nitrogen and
25 water. This reaction only occurs when the temperature of the SCR is at least 590°F, a

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1 temperature normally reached when the operating load level reaches approximately
2 20 MW.

3 The Refinery is subject to District Regulation 9-9-301.3 and to a condition in its
4 Permit to Operate (Condition No. 6(a) of Condition ID No. 1162), which limit emissions of
5 NOx from each Cogeneration Unit train to 10 ppm. The Refinery is also subject to District
6 Regulation 6-301 and to Health and Safety Code Section 41701, which limit visible
7 emissions. Regulation 6-301 imposes a visible emissions limit of No. 1 on the Ringelmann
8 Chart, and Section 41701 imposes a visible emissions limit of No. 2 on the Ringelmann
9 Chart.

10 Each train has a gas turbine control system. During the period March through May
11 of last year, the Refinery replaced each train's obsolete Egatrol gas turbine control system
12 with a new, state-of-the-art Triconex system. After making this change, the Refinery
13 brought both trains back on line for a period of testing and tuning. As part of this process,
14 it was necessary for the Refinery to operate the trains at various load levels, including loads
15 less than 20MW, in order to assure safe and reliable operation of the new Triconex system,
16 and to satisfy Pacific Gas and Electric Company's requirements for cogenerators. For the
17 reasons explained above, the Refinery was unable to operate the trains' two NOx reduction
18 controls—steam injection and SCR—at load levels less than 20 MW. As a result, the trains
19 experienced intermittent exceedances of the 10 ppm NOx limit, and, at times, these
20 emissions became visible and exceeded the visible emissions limits as well. Because these
21 exceedances were beyond Applicant's reasonable control, it requested and was granted a
22 variance for this period of testing and tuning (Order Granting Variance, Docket No. 3382).

23 During the testing and tuning period that was the subject of the variance in Docket
24 No. 3382, the Refinery discovered that two components of the new Triconex gas turbine
25 control system were deficient. Specifically, the Refinery determined that two elements of
26 the system operate too slowly to handle an extreme system interruption, such as a circuit

1 breaker trip. The testing and tuning disclosed, however, that the new system is fully
2 adequate for normal operation.

3 Applicant could not have reasonably anticipated the two deficiencies discovered
4 during last spring's testing and tuning process because — based on representations of the
5 new system's supplier, Honeywell, Inc. — the system had been designed to perform
6 efficiently under the whole range of foreseeable operating conditions, including periods of
7 extreme system interruption. Moreover, Applicant testified to its understanding that
8 Triconex gas turbine control systems had been successfully installed in cogeneration units,
9 similar to the Cogeneration Unit at the facility, located throughout the United States as well
10 as throughout many foreign countries.

11 In response to these deficiencies, Applicant engaged ESA, Inc. (a consulting firm)
12 and Honeywell to assist it in determining the best corrective action option. Based on the
13 information that it collected from additional field tests and bench tests, Applicant identified
14 the best corrective action, and currently plans to take Train 2000 off line to implement these
15 measures at the beginning of the second week of April 2003. The Refinery plans to bring
16 Train 2000 back on line for the necessary testing and tuning at the end of that week. Once
17 Train 2000 is brought back on line, Train 1000 will be taken off line for similar corrective
18 action. Applicant's current best estimate is that Train 1000 will be brought back on line for
19 testing and tuning during the fourth week in April 2003. During testing and tuning,
20 Applicant expects to start up each train anywhere from three to five times for test runs, with
21 the runs (i) ranging from one to eight hours in the case of test loads less than 20 MW; and
22 (ii) running for 24 hours or longer in the case of test loads greater than 20 MW.

23 During these testing and tuning periods, it is expected that both trains will
24 experience intermittent exceedances of the 10 ppm NOx limit and the visible emissions
25 limit for the same reasons that they experienced exceedances during last year's testing and
26 tuning process. Specifically, these exceedances will result because it is necessary to test at

1 various load levels, including levels at which the trains' NO_x reduction controls are
2 inoperative (i.e., levels less than 20 MW).

3 Applicant is not considered a small business as described by California Health and
4 Safety Code Section 42352.5(b)(2), and the Refinery emits more than 10 tons per year of
5 air contaminants. The facility's annual NO_x emissions are approximately 750 tons. Annual
6 NO_x emissions from each train of the facility's Cogeneration Unit are approximately 140
7 tons.

8 DISCUSSION

9 The temporary noncompliance for Train 1000 and Train 2000 will result from
10 conditions beyond Applicant's reasonable control. To ensure that all components of the
11 modified Triconex gas turbine control system are operating properly and meet all Pacific
12 Gas and Electric Company requirements, each train must be tested at idle, minimum load
13 (1.5 MW), full load (50 MW) and various operating levels in between, including loads less
14 than 20 MW. During testing and tuning, there are periods during which steam and
15 ammonia, essential elements of each train's NO_x control systems, cannot effectively be
16 injected into the train's combustion gas stream. Specifically, steam cannot be injected at
17 loads less than 20 MW, and ammonia cannot be injected until the train's SCR unit has
18 heated to at least 590°F, a temperature normally reached when the load level reaches
19 approximately 20 MW. During such periods, NO_x exceedances are experienced, and at
20 times these emissions are visible. Thus, because the modified control system must be tested
21 at various load levels, including levels less than 20 MW, intermittent exceedances are an
22 unavoidable consequence of the testing and tuning process.

23 The hardship that would be created if Applicant were denied variance protection and
24 required to comply continuously with the NO_x and visible emissions limitations would be
25 without a corresponding benefit in reducing air contaminants because the only way the
26 Refinery could avoid the temporary exceedances would be to refrain altogether from

1 starting up the trains for testing and tuning after having made the necessary modifications to
2 the new \$6,250,000 Triconex gas turbine control system. This is not a viable option
3 because the trains cannot be returned to normal operation until they have undergone this
4 testing and tuning process. Preventing the Refinery from returning the Cogeneration Unit
5 to normal operations would result in a substantial hardship to the Refinery, as it relies on
6 the Cogeneration Unit for approximately 80% of its electricity and 60% of its steam.

7 Curtailment of Cogeneration Unit operation during testing and tuning also is not a
8 viable option because the NO_x and visible emissions exceedances only occur at reduced
9 load levels, i.e., at levels less than 20 MW. Therefore, running the trains at reduced (i.e.,
10 curtailed) load would exacerbate the exceedances and prevent proper testing of the new
11 control system under a range of operating conditions, including full load operation. In
12 short, the result would be to increase NO_x emissions and defeat the purpose of the entire
13 test process.

14 During the testing and tuning of each train, Applicant will reduce excess NO_x
15 emissions to the maximum extent feasible by limiting the number of startups and the
16 aggregate time of low load test runs by conducting multiple tests in uninterrupted sequence.
17 During the higher load test periods, Applicant will push the temperature of each train's
18 SCR Unit up to 590°F as quickly as possible. Finally, the Refinery will shut each train
19 down between test runs and perform any tests that can be done with the train off line at that
20 time.

21 During the term of the variance, Applicant will continue to abide by the Permit to
22 Operate's requirements (Condition No. 12 of Condition ID No. 1162) to operate a
23 continuous emissions monitoring system (CEMS) for NO_x, carbon monoxide (CO) and
24 oxygen (O₂) in each train's stack and to maintain appropriate records for at least two years
25 to verify compliance with all Permit to Operate conditions (i.e. CEMS data, fuel usage
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1 rates, gas turbine load levels, hours of operation, ratio of steam injected to fuel fired, etc.).
2 Applicant estimates that the excess NOx emissions from the testing and tuning of each train
3 will be between 0.3 tons (if three test runs are conducted) and 0.8 tons (if five test runs are
4 conducted).

5 **SPECIFIC FINDINGS**

6 The Hearing Board finds pursuant to Health and Safety Code Section 42352 that:

7 1. During the testing and tuning of Train 1000 and Train 2000, Applicant will be in
8 intermittent violation of District Regulation 9-9-301.3; District Regulation 2-1-307 (insofar
9 as it applies to Condition No. 6(a) of Condition ID No. 1162 of the Refinery's Permit to
10 Operate); District Regulation 6-301; and Health and Safety Code Section 41701.

11 2. To ensure that all components of the modified Triconex gas turbine control
12 system are operating properly and meet all Pacific Gas and Electric Company requirements,
13 each train must be tested at various operating levels, including loads less than 20 MW,
14 before the train is returned to normal service. During testing and tuning, steam and
15 ammonia, essential elements of each train's NOx control systems, cannot be injected at
16 loads less than 20 MW. During such periods, NOx and visible emissions exceedances are
17 experienced. Therefore, due to conditions beyond the reasonable control of Applicant,
18 requiring compliance with the aforesaid District regulations, permit condition and statute
19 would prevent required testing and tuning and result in an arbitrary and unreasonable taking
20 of property.

21 3. The hardship that would be created if Applicant were required to comply
22 continuously with the aforesaid District regulations, permit condition and statute would be
23 without a corresponding benefit in reducing air contaminants because (i) the testing and
24 tuning of each train prior to return to normal service are essential to the proper operation
25 of the Cogeneration Unit, which provides approximately 80% of the Refinery's electricity

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1 and 60% of its steam; and (ii) excess emissions are expected to be small compared to the
2 overall NO_x emissions from the refinery during the variance period.

3 4. Applicant considered curtailing operations in lieu of obtaining a variance.
4 Curtailment would not bring the Applicant into compliance since the NO_x and visible
5 emission exceedances occur only at reduced load levels. Moreover, testing must include
6 reduced load levels to demonstrate proper operation of the gas turbine control system and
7 demonstrate compliance with all Pacific Gas and Electric Company requirements. In
8 addition, the NO_x emission limits are concentration limits, not mass limits, so reducing the
9 load levels during testing would not bring the Applicant into compliance.

10 5. During the testing and tuning of each train, Applicant will reduce excess NO_x
11 emissions to the maximum extent feasible by limiting the number of startups and the
12 aggregate time of low load test runs by conducting multiple tests in uninterrupted sequence.
13 During the higher load test periods, Applicant will push the temperature of each train's
14 SCR Unit up to 590° F as quickly as possible. Finally, the Refinery will shut each train
15 down between test runs and perform any tests that can be done with the train off line at that
16 time.

17 6. In the Refinery's Permit to Operate, the District has required Applicant to
18 monitor or otherwise further quantify actual NO_x, CO and O₂ emissions by operating a
19 CEMS in the respective stacks of Trains 1000 and 2000, and Applicant will do so.

20

21 **THEREFORE, THE HEARING BOARD ORDERS:**

22 A. A variance is granted from District Regulation 9-9-301.3; District
23 Regulation 2-1-307 (insofar as it applies to Condition No. 6(a) of Condition ID No. 1162 of
24 the Refinery's Permit to Operate); District Regulation 6-301; and Health and Safety Code
25 Section 41701. In the case of Train 2000, the variance shall be for a single, consecutive 14-
26 day period occurring between April 3 and April 30, 2003. In the case of Train 1000, the

1 variance shall be for a single, consecutive 14-day period occurring between April 15 and
2 May 15, 2003. The variance is subject to the following conditions:

3 1. Prior to commencing the testing and tuning of each train, Applicant shall so
4 notify the District's Enforcement Division.

5 2. Within five (5) business days following completion of the testing and tuning of
6 each train, Applicant will advise the Hearing Board of the beginning and ending dates of
7 the variance for that train. The notification will be in writing, in an original and eight
8 copies, and will be addressed to: Ms. Mary Romaidis, Clerk, Hearing Board, Bay Area Air
9 Quality Management District, 939 Ellis Street, San Francisco, California 94109.

10 Notification to other offices or individuals at the District are not notifications to the Hearing
11 Board.

12 3. During the variance term for each train, visible emissions from that train shall
13 not, for a period or periods aggregating more than three minutes in any hour, be darker than
14 No. 3 on the Ringelmann Chart, or of such opacity as to obscure an observer's view to an
15 equivalent or greater degree.

16 4. Applicant shall pay excess emissions fees for NOx and visible emissions as
17 required by, and in accordance with, District Regulation 3.

18 B. The APCO shall advise the Hearing Board in writing, in an original and eight
19 copies, of any violation of this Order.

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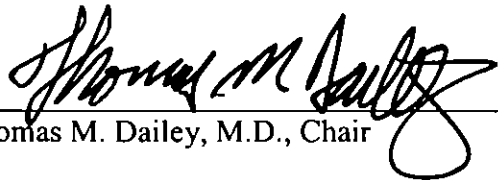
Moved by: Terry A. Trumbull, Esq.

Seconded by: Allan R. Saxe, Esq.

AYES: Julio A. Magalhães, Ph.D.; Allan R. Saxe, Esq.;
Joseph L. Shilts, P.E.; Terry A. Trumbull, Esq.; and Thomas M.
Dailey, M.D.

NOES: None.

NON-PARTICIPATING: None.



Thomas M. Dailey, M.D., Chair

April 24, 2003
Date