BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

BOARD OF DIRECTORS' REGULAR MEETING

December 7, 2005

A meeting of the Bay Area Air Quality Management District Board of Directors will be held at 9:45 a.m. in the 7th floor Board Room at the Air District headquarters, 939 Ellis Street, San Francisco, California.

Questions About an Agenda Item	The name, telephone number and e-mail of the appropriate staff person to contact for additional information or to resolve concerns is listed for each agenda item.
Meeting Procedures	The public meeting of the Air District Board of Directors begins at 9:45 a.m. The Board of Directors generally will consider items in the order listed on the agenda. However, any item may be considered in any order. After action on any agenda item not requiring a public hearing, the Board may reconsider or amend the item at any time during the meeting.

BOARD OF DIRECTORS' REGULAR MEETING
A G E N D A

WEDNESDAY **BOARD ROOM**
DECEMBER 7, 2005 **7TH FLOOR**

9:45 A.M.

CALL TO ORDER

Opening Comments — Marland Townsend, Chairperson
Roll Call — Clerk of the Boards
Pledge of Allegiance
Commendations/Proclamations

PUBLIC COMMENT PERIOD

Public Comment on Non-Agenda Items, Pursuant to Government Code Section 54954.3 *Members of the public are afforded the opportunity to speak on any agenda item. All agendas for regular meetings are posted at District headquarters, 939 Ellis Street, San Francisco, CA, at least 72 hours in advance of a regular meeting. At the beginning of the regular meeting agenda, an opportunity is also provided for the public to speak on any subject within the Board's subject matter jurisdiction. Speakers will be limited to three (3) minutes each.*

CONSENT CALENDAR (ITEMS 1 - 4) **Staff/Phone (415) 749-**

1. Minutes of November 16, 2005 Meeting — **M. Romaidis/4965** mromaidis@baaqmd.gov

2. Communications — **J. Broadbent/5052** jbroadbent@baaqmd.gov

   Information only

3. Notice of Total Liabilities for Workers' Compensation reported for Fiscal Year 2004-2005 and Compliance with Government Accounting Standards for Self Funded Workers' Compensation Program — **J. Broadbent/5052** jbroadbent@baaqmd.gov

   Pursuant to Labor Code Section 3702.6(b), the District is required to notify its governing Board of the total liabilities reported and whether current funding of those liabilities is in compliance with the requirements of Government Accounting Standards Board Publication 10 (GASB 10).

4. Consider Approval of Agreement with Employees' Association and Recommendation that Allows Employees to Sell-Back Leave for Donations to Victims of Hurricane Katrina — **J. Broadbent/5052** jbroadbent@baaqmd.gov

   The Board of Directors will consider approval of a recommendation to allow employees on a voluntary basis to sell-back leave for donations to victims of Hurricane Katrina.

COMMITTEE REPORTS AND RECOMMENDATIONS

5. Report of the **Nominating Committee** Meeting of November 16, 2005

CHAIR: H. BROWN **J. Broadbent/5052**
jbroadbent@baaqmd.gov

Action(s): The Committee will recommend that the Board of Directors approve the Board of Director Slate of Officers for 2006.

6. Report of the **Joint Policy Committee** Meeting of November 23, 2005

CHAIR: M. TOWNSEND **J. Broadbent/5052**
jbroadbent@baaqmd.gov

7. Report of the **Stationary Source Committee** Meeting of November 28, 2005

CHAIR: M. DeSAULNIER **J. Broadbent/5052**
jbroadbent@baaqmd.gov

8. Report of the **Executive Committee Meeting** of November 30, 2005

CHAIR: M. TOWNSEND **J. Broadbent/5052**
jbroadbent@baaqmd.gov

Action(s): The Committee may recommend Board of Director approval of pursuing the creation of a self-insured retiree life insurance program.

9. Report of the **Budget & Finance Committee Meeting** of December 5, 2005

CHAIR: J. MILLER **J. Broadbent/5052**
jbroadbent@baaqmd.gov

Action(s): The Committee may recommend Board of Director approval of the following:

A) Amend of FY 2005/2006 Budget by transferring $102,000 from the Reserves for Contingencies to the Payroll Budget (Program 106) and authorize the Executive Officer/APCO to issue a purchase order not to exceed $102,000 to Ceridian Corporation to replace the District's current payroll system; and

B) Amend the FY 2005/06 budget by accepting a $278,935 EPA Grant from the National Environmental Information Exchange Network (NEIEN), and awarding a $278,935 contract to Sonoma Technology, Inc. for Phase II Development of a new Data Management System for Ambient Air Quality and Meteorological Data.

PUBLIC HEARINGS

10. Public Hearing to Consider Approval of Proposed Amendments to Regulation 8, Rule 44: Marine Vessel Loading Terminals; Rule 46: Marine Vessel to Marine Vessel Loading; District Manual of Procedures, Volume IV: Source Test Policy and Procedures, ST-34: Bulk and Marine Loading Terminals – Vapor Recovery Units; and approval of a California Environmental Quality Act (CEQA) Negative Declaration **J. Broadbent/5052**
jbroadbent@baaqmd.gov

The proposed amendments to Regulation 8, Rule 44 would reduce the standard allowable for organic vapor leaks for equipment and connections associated with loading activities, expand the applicability of the rule to include organic chemicals, require control of organic vapors during cleaning, purging and gas freeing of cargo tanks on vessels,

require collection and submission of data on low-volatility cargos not regulated by the rule, and consolidate the requirements of Rule 46 into Rule 44. The proposed amendments would delete Rule 46. The amendments to ST-34 include corrections to temperature and pressure standardization errors in some equations and incorporates a requirement to determine gas constituent average concentrations on a flow-weighted basis in some circumstances.

11. Public Hearing to Consider Approval of Proposed Amendments to Regulation 8, Rule 28: Episodic Releases from Pressure Relief Devices in Petroleum Refineries and Chemical Plants and approval of a California Environmental Quality Act (CEQA) Negative Declaration **J. Broadbent/5052**
jbroadbent@baaqmd.gov

The proposed amendments to Regulation 8, Rule 28 require that monitoring equipment be installed on each PRD, that a demonstration be made that this monitoring equipment is capable of detecting releases as defined by the rule, and that the required monitoring data be kept for two years and made available to District staff.

12. Public Hearing to Consider Report on Further Study Measure 8: Atmospheric Blowdown Systems **J. Broadbent/5052**
jbroadbent@baaqmd.gov

Staff has examined atmospheric blowdown systems at Tesoro Refinery and regulations applicable to various types of emission and recommends no amendments to District regulations at this time.

OTHER BUSINESS

13. Report of the Executive Officer/APCO

14. Chairperson's Report

15. Board Members' Comments

Any member of the Board, or its staff, on his or her own initiative or in response to questions posed by the public, may: ask a question for clarification, make a brief announcement or report on his or her own activities, provide a reference to staff regarding factual information, request staff to report back at a subsequent meeting concerning any matter or take action to direct staff to place a matter of business on a future agenda. (Gov't Code § 54954.2)

16. Time and Place of Next Meeting – 9:45 a.m. Wednesday, December 21, 2005 - 939 Ellis Street, San Francisco, CA 94109

17. Adjournment

CONTACT CLERK OF THE BOARD - 939 ELLIS STREET SF, CA 94109 **(415) 749-4965**
FAX: (415) 928-8560
BAAQMD homepage:
www.baaqmd.gov

- To submit written comments on an agenda item in advance of the meeting.
- To request, in advance of the meeting, to be placed on the list to testify on an agenda item.
- To request special accommodations for those persons with disabilities. Notification to the Clerk's Office should be given at least 3 working days prior to the date of the meeting so that arrangements can be made accordingly.

AGENDA: 1

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Memorandum

To: Chairperson Townsend and Members of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 28, 2005

Re: Board of Directors' Draft Meeting Minutes

RECOMMENDED ACTION:

Approve attached draft minutes of the Board of Directors meeting of November 16, 2005.

DISCUSSION

Attached for your review and approval are the draft minutes of the November 16, 2005 Board of Directors' meeting.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 ELLIS STREET – SAN FRANCISCO, CA 94109

Draft Minutes: Board of Directors' Regular Meeting – November 16, 2005

Call To Order

Opening Comments: Chairperson Marland Townsend called the meeting to order at 9:50 a.m.

Roll Call: Present: Marland Townsend, Chair, Harold Brown, Roberta Cooper, Chris Daly (10:08 a.m.), Mark DeSaulnier, Erin Garner, Scott Haggerty, Jerry Hill, Liz Kniss (10:09 a.m.), Nate Miley, Julia Miller, Mark Ross, Michael Shimansky, John Silva, Tim Smith, Pam Torliatt (10:08 a.m.), Gayle B. Uilkema (9:55 a.m.), Brad Wagenknecht, Shelia Young.

Absent: Dan Dunnigan, Patrick Kwok, Jake McGoldrick.

Chairperson Townsend noted *The Valley Times* and *The Contra Costa Times* both had articles on the Air District's 50 years of progress.

Pledge of Allegiance: Director Haggerty led the Board in the Pledge of Allegiance.

Commendations/Proclamation: There were none.

Public Comment Period: There were no speakers.

Director Gayle B. Uilkema arrived at 9:55 a.m.

Consent Calendar (Items 1 – 4)

1. Minutes of November 2, 2005 Meeting

2. Communications. Correspondence addressed to the Board of Directors

3. Monthly Activity Report for October, 2005.

4. Considered Approval of Resolution Adjusting the District's Maximum Medical Contribution Declared to California Public Employees Retirement System (CalPERS)

   The Board of Directors considered approval of a resolution adjusting the District's maximum medical contribution declared to CalPERS for management, confidential, represented, and miscellaneous employees and retirees.

   Board Action: Director Ross moved approval of the Consent Calendar; seconded by Director Miller; carried unanimously with the following Board members voting:

   AYES: Brown, Cooper, DeSaulnier, Garner, Haggerty, Hill, Miley, Miller, Ross, Shimansky, Silva, Smith, Uilkema, Wagenknecht, Young, Townsend.

   NOES: None.

   ABSENT: Daly, Dunnigan, Kniss, Kwok, McGoldrick, Torliatt.

Adopted Resolution No. 2005-14: A Resolution to Fix the District's Contribution Under the Public Employees' Medical and Hospital Care Act

Public Hearings

5. Public Hearing to Consider Adoption of Proposed Particulate Matter Implementation Schedule

Pursuant to SB 656 (Sher, 2003), the District has evaluated existing rules and programs to reduce particulate matter emissions in the Bay Area, and has identified additional control measures that could be implemented to further reduce particulate matter emissions in the region. Staff requested Board approval of the proposed particulate matter implementation schedule.

Henry Hilken, Director of Planning and Research, presented the report and reviewed the following:

- Background information on Particulate Matter (PM).
- The nature of PM in the Bay Area.
- Current District PM activities.
- SB 656 requirements.
- Evaluation of PM measures and the results of the District's evaluation.
- The proposed PM reduction implementation schedule.
- The proposed new rule for commercial broiling operations, such as chain-driven commercial broilers.
- Proposed rule amendments for stationary and portable Internal Combustion Engines (ICEs)
- Wood burning measures.
- Additional PM reduction measures

Directors Pamela Torliatt and Chris Daly arrived at 10:08 a.m.; Director Liz Kniss arrived at 10:09 a.m.

Mr. Hilken noted that a public workshop was held on October 11, 2005 and that comments from the public and the District responses are contained in Appendix B of the staff report. Mr. Hilken stated that the staff recommends that the Board of Directors adopt the proposed Particulate Matter Implementation Schedule in Table 3 of the staff report.

Chairperson Townsend opened the Public Hearing at 10:15 a.m.

Speakers: The following individuals spoke on this agenda item:

Dennis Bolt WSPA Concord, CA 94518	Jenny Bard American Lung Association Santa Rosa, CA 95404
Dr. Miriam Spross Marin County resident Novato, CA 94949	Ken Mandelbaum American Lung Association Clean Air Task Force Mill Valley, CA 94941

There was discussion on the health risks of wood burning; burning of wood pallets that are treated with chemicals; pursuing individuals that burn garbage in their fireplaces; and the Air District's regulatory authority. Peter Hess, Deputy APCO stated that the Air District works with the County Health Offices on the garbage burning issue.

Chairperson Townsend closed the Public Hearing at 10:53 a.m.

Board Action: **Director Haggerty moved that the Board of Directors approve the staff recommendation; seconded by Director Daly; carried unanimously without objection.**

There was further discussion on educating the public on what kind of wood to burn. Jack Broadbent, Executive Officer/APCO stated that there will be further discussion on all of the Board's concerns at the Board of Directors' retreat in January 2006.

6. Public Hearing to Consider Report on Further Study Measure 9: Refinery Wastewater Treatment Systems

Staff has examined the emissions from refinery wastewater treatment systems, potential control technologies, and costs of control, and recommended no regulatory amendments to District Regulation 8, Rule 8 at this time.

Mr. Broadbent stated that Further Study Measure 9 deals with refinery wastewater treatment systems and that the staff recommendation is to not make any changes or amendments to Regulation 8, Rule 8 at this time.

Virginia Lau, Senior Air Quality Specialist, presented the report and discussed the following:

- An overview of the basic refinery wastewater collection, separation and treatment systems.
- Information on the mechanics of collecting measurements.
- The total volatile organic compound (VOC) emissions are 0.24 tons per day (tpd) from all refineries with ConocoPhillips contributing approximately 0.11 tpd.
- Potential controls include a steam stripper, liquid phase carbon adsorption unit, or doming a tank.
- The costs were reviewed for each control measure.

Ms. Lau stated that there were four Technical Working Group meetings and a public workshop was held on October 27th in Martinez. Ms. Lau reviewed the comments that came out of the workshop. Ms. Lau stated that staff recommends that the Board of Directors

approve the staff recommendation that no additional amendments to Regulation 8, Rule 8 are needed at this time.

Mr. Broadbent noted that the Air District is working with ConocoPhillips on available treatment methods that will be cost effective.

Chairperson Townsend opened the Public Hearing at 11:21 a.m.

Speakers: The following individuals spoke on this agenda item:

Dennis Bolt	Greg Karras
WSPA	Communities for a Better Environment
Concord, CA 94518	Oakland, CA 94612

Chairperson Townsend closed the Public Hearing at 11:27 a.m.

Board Action: **Director Uilkema moved that the Board of Directors approve the staff recommendation and that, after working with ConocoPhillps, staff bring back any prospective modifications to this recommendation, if needed; seconded by Director Kniss. After a brief discussion, the motion passed unanimously without objection.**

Closed Session (The Board adjourned to Closed Session at 11:31 a.m.)

7. Conference with Legal Counsel

A. Existing Litigation:

Pursuant to Government Code Section 54956.9(a), a need existed to meet in closed session with legal counsel to consider the following cases:

***Arbitration Between Paul Mauriello, Grievant, and the Bay Area AQMD**, American Arbitration Association No. 74-300-600-04 LYMC*

B. Significant Exposure to Litigation

Pursuant to Government Code Section 54956.9(b), a need existed to meet in closed session to discuss one potential litigation matter against the District.

Open Session (The Board reconvened to Open Session at 11:52 a.m.)

Brian Bunger, District Counsel, reported that the Board met in Closed Session and received a report on items A and B of agenda item 7. The Board of Directors gave general direction to Counsel.

8. Report of the Executive Officer/APCO – Mr. Broadbent reported on the following:

    1. Fifty years ago today, the Board of Directors of the Air District held its first meeting in Richmond. A picture of the current and past Boards was presented to the Board of Directors.
    2. The 50th Anniversary party for the employees and retirees was a success and Mr. Broadbent recognized those staff members who helped put the event together.

9. Chairperson's Report: Chairperson Townsend reiterated the 50th Anniversary of the District is a memorable milestone. Chairperson Townsend also stated that he attended a meeting with Prince Charles where the work being done at Cambridge University was highlighted.

10. Board Members' Comments – Director Ross requested that, at the next Board meeting, staff provide an update on last week's incident at the Shell refinery.

11. Time and Place of Next Meeting –9:45 a.m., Wednesday, December 7, 2005 - 939 Ellis Street, San Francisco, CA 94109.

12. Adjournment – The meeting adjourned at 11:57 a.m.

Mary Romaidis
Clerk of the Boards

AGENDA: 2

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Memorandum

To: Chairperson Townsend and Members of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 29, 2005

Re: Board Communications Received from November 16, 2005 through December 6, 2005

RECOMMENDED ACTION:

Receive and file.

DISCUSSION

A list of Communications received by the Air District from November 16, 2005 through December 6, 2005, if any, will be at each Board member's place at the December 7, 2005 Regular Board meeting.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

AGENDA: 3

BAY AREA AIR QUALITY MANGEMENT DISTRICT
Memorandum

To: Chairperson Marland Townsend and Members of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 28, 2005

Re: Notice of Total Liabilities for Workers' Compensation Reported Fiscal Year 2004-2005 and Compliance with Government Accounting Standards for Self Funded Workers' Compensation Program

BACKGROUND

The District implemented a self funded workers' compensation program in Fiscal Year 2004-2005. Pursuant to Labor Code Section 3702.6(b), the District is required to notify its governing Board of the total liabilities reported and whether current funding of those liabilities is in compliance with the requirements of Government Accounting Standards Board Publication 10 (GASB 10).

SUMMARY

For Fiscal Year 2004/2005, the District reported nine (9) workers' compensation cases of which seven (7) were open claims. The liability was $3,300 for indemnity and $20,008 for medical. The total liability reported for Fiscal Year 2004-2005 was $23,308.

FINANCIAL IMPACT

For the fiscal year ending June 30, 2005, the District achieved approximately $700,000 in savings on workers' compensation costs. Of that amount, $620,000 was due to savings on insurance premiums and $80,000 was due to the District's demand that State Compensation Insurance Fund re-audit the District's payroll for FY 2004-05 due to staff's discovery of major errors in the original audit; the re-audit resulted in a refund on the premiums paid for FY 2003-04.

Funding for the reported liabilities has already been considered in the budget and is in compliance with the requirements of GASB 10.

Respectfully Submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Michael Rich

AGENDA: 4

BAY AREA AIR QUALITY MANGEMENT DISTRICT
Memorandum

To: Chairperson Marland Townsend and Members of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 28, 2005

Re: Consider Approval of Agreement with Employees' Association and Recommendation that Allows Employees to Sell-Back Leave for Donations to Victims of Hurricane Katrina

RECOMMENDATION

Approve recommendation to allow employees on a voluntary basis to sell-back leave for donations to victims of Hurricane Katrina.

BACKGROUND

Hurricane Katrina caused great devastation to the Gulf Coast region of the United States of America. As part of the overall charitable response to the disaster, the federal government has facilitated donation of accrued leave for relief efforts by providing a statutory mechanism that allows employees to sell back accrued leave and donate the proceeds tax free. In the immediate aftermath of Hurricane Katrina, several employees expressed a desire to help with charitable contributions. In addition, Board Member Haggerty made staff aware of efforts by other local agencies to facilitate employee donations of sold back leave.

DISCUSSION

The District has agreed with the Employees' Association, subject to approval of the Board of Directors, to allow represented employees the ability to sell-back any of their accrued leave for the purpose of donating the money to charitable relief efforts directed toward the victims of Hurricane Katrina. Staff is also recommending that the Board of Directors approve the same arrangement for unrepresented employees.

The Human Resources Office will be responsible for facilitating the transfer of all donations. Donations will only be made to recognized tax-exempt relief organizations under the auspices of IRS Code 170(c). Employees would be allowed to sell back their leave for donation until December 31, 2006. Employees would not be taxed on the cash value of the donations.

BUDGET CONSIDERATION/FINANCIAL IMPACT

Accrued leave is reflected as a liability in the District's budget and is not separately funded. However, since employees currently have the ability to utilize accrued leave, the direct financial impact of allowing employees to sell back leave for this limited purpose for a limited period of time is likely to be minimal. While it is difficult to estimate the amount of leave that will be sold back for donation, if each employee sold back 8 hours at an average hourly rate of $38.02, it would equate to $98,852, for example. The proceeds from the sell back would come out of undesignated reserves, and the District's liability for accrued leave would be reduced by the same amount.

Respectfully Submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Michael Rich

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Marland Townsend and
Members of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: December 1, 2005

Re: Report of the Nominating Committee Meeting of November 16, 2005

RECOMMENDED ACTION:

Approve Committee recommendation of Board Officers for the 2006 term of office.

DISCUSSION

The Committee met on November 16, 2005. The Committee recommends Gayle B. Uilkema as Chairperson, Mark Ross as Vice Chairperson, and Jerry Hill as Secretary.

The term of office for the new slate of officers for 2006 will be effective February 1, 2006.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

AGENDA: 6

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Townsend and Members of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: December 1, 2005

Re: Report of the Joint Policy Committee Meeting of November 23, 2005

RECOMMENDED ACTION

Receive and file.

DISCUSSION

The Joint Policy Committee met on Wednesday, November 23, 2005.

Air District staff provided an overview of the Bay Area 2005 Ozone Strategy, and highlighted its linkage to other regional planning activities JPC has addressed. JPC voted unanimously to endorse the Bay Area 2005 Ozone Strategy.

Chairperson Townsend will give an oral report of the meeting.

BUDGET CONSIDERATION/FINANCIAL IMPACT

None.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Henry Hilken

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Townsend and Members of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: December 1, 2005

Re: Report of the Stationary Committee Meeting of November 28, 2005

RECOMMENDED ACTION

Receive and file.

BACKGROUND

The Stationary Source Committee met on November 28, 2005. Staff reported on the following items:

A) Status Report on Regulation 12, Rule 12: Flares at Petroleum Refineries. The report included a comparison of the Bay Area AQMD and South Coast AQMD flare control rules; staff's ongoing analysis of flare emissions; and a timeline for completion of emissions and cost analyses. Based on these analyses, staff recommended and the Committee concurred that a rule development process to amend the causal analysis requirement of the rule should be initiated.

B) Status Report on scheduled 2005 Refinery Further Study Measures. Staff presented a status report on scheduled 2005 refinery rule development efforts for Further Study Measure 11 regarding Marine Tank Vessels and Further Study Measure 8 regarding Atmospheric Blowdown Systems and Pressure Relief Devices. Public hearings on these items are scheduled for December 7th. Direction was given to staff on several discussion items and information on these regulatory amendments will be discussed at the December 7th Board meeting.

Attached are the staff reports presented to the Committee for your review.

Chairperson DeSaulnier will give an oral report of the meeting.

BUDGET CONSIDERATION/FINANCIAL IMPACT

None.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Mary Romaidis
Reviewed by: Mary Ann Goodley

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson DeSaulnier and
Members of the Stationary Source Committee

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 18, 2005

Re: Status Report on Regulation 12, Rule 12: Flares at Petroleum Refineries

RECOMMENDED ACTION:

Receive and file.

BACKGROUND

On September 26, 2005 staff presented background information to the Stationary Source Committee on certain aspects of Regulation 12, Rule 12, specifically, how the issues of a 160 ppm hydrogen sulfide standard and the threshold for causal analysis were addressed during the rule development process and in the adopted rule. Staff summarized additional information gathered to date on these issues, and outlined next steps for further analysis.

The Committee directed staff to continue to report back on these issues and include information concerning the recently amended South Coast Air Quality Management District Flare Rule 1118 and a timeline for completion of analysis of the emissions and costs.

DISCUSSION

At the November 28, 2005 meeting, staff will present the following items:

- A summary of South Coast AQMD Rule 1118: Control of Emissions from Refinery Flares;
- Staff's ongoing analysis of flare emissions;
- A timeline for completion of emissions and cost analyses.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Alex Ezersky
Reviewed by: Daniel Belik

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson DeSaulnier and
Members of the Stationary Source Committee

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 21, 2005

Re: Status Report on scheduled 2005 Refinery Further Study Measures

RECOMMENDED ACTION:

Receive and file.

BACKGROUND

The 2001 Ozone Attainment Plan contained four further study measures that addressed emissions from refinery sources in addition to seven stationary source control measures. In settlement of a lawsuit, the District committed to complete the evaluations of the further study measures and present to the Board of Directors, at a public hearing, either proposed regulatory language or a report on why further controls are not recommended at this time. The hearings must be completed by December 31, 2005.

To satisfy this commitment, staff has presented the following items at public hearings:

- Amendments to Regulation 8, Rule 8: Wastewater Collection and Separation Systems;
- Regulation 12, Rule 12: Flares at Petroleum Refineries; and
- A staff recommendation not to further amend Reg. 8-8 to address other aspects of refinery wastewater treatment systems.

The Board of Directors has adopted staff recommendations related to these three items.

DISCUSSION

At the November 28, 2005 meeting, staff will present a status report on the remaining study measures:

- Further Study Measure 8, concerning pressure relief devices, and proposed regulatory amendments to Regulation 8, Rule 28: Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants;
- Further Study Measure 8, concerning atmospheric blowdown systems, and a recommendation that no regulatory amendments be adopted at this time regarding blowdown systems;
- Further Study Measure 11 concerning marine tank vessel activities, and proposed regulatory amendments to Regulation 8, Rule 44: Marine Vessel Loading Terminals.

Public hearings are scheduled for December 7, 2005 for the two proposed regulatory amendments and the report on atmospheric blowdown systems. These hearings will complete the requirements of the settlement agreement.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Daniel Belik
Reviewed by: Henry Hilken

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Townsend and Members of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: December 1, 2005

Re: Report of the Executive Committee Meeting of November 30, 2005

RECOMMENDED ACTION

The Committee recommends that the staff continue to explore creation of a self-insured retiree life insurance program.

BACKGROUND

The Executive Committee met on Wednesday, November 30, 2005. Tom Dailey, M.D., Chairperson of the Hearing Board, presented the Hearing Board Quarterly Report for the third quarter of 2005.

The Committee received a report from the Advisory Council, Chairperson Brian Zamora. Mr. Zamora announced that Kraig Kurucz is the incoming Council Chairperson for 2006. Mr. Zamora also summarized three key accomplishments of the Council this year: 1) a Resolution on Climate Change; 2) Indoor Air Pollution and suggestions on the Air District's role; and 3) the establishment of a Code of Conduct for the Advisory Council.

Ted Droettboom, Regional Planning Program Director of the Joint Policy Committee provided an update on the activities of the Joint Policy Committee.

Staff presented updates and reports on the following items:

- The potential creation of a self-insured retiree life insurance program.
- A status report on the progress being made regarding the installation of teleconferencing equipment in the 4th floor conference room.
- An update on the ongoing work on the Production System replacement.

Attached are the staff reports presented to the Committee for your review.

Chairperson Townsend will give an oral report of the meeting.

BUDGET CONSIDERATION/FINANCIAL IMPACT

With a change in insurance carriers for the retiree life benefit, the Air District will save approximately $180,000 on benefits costs this fiscal year, and there would be an ongoing savings of approximately $240,000 annually.

For the installation of the teleconferencing equipment, the FY 2004/2005 Capital Budget was increased by $28,653 and the ISS Budget was increased by $8,400 with a transfer from the Reserve for Contingency to fund this project. These funds have been carried over into the FY 2005/2006 Budget.

A transfer of $140,000 from the Reserve for Production System was approved in the 2004/2005 fiscal year. For the current fiscal year, the Board approved a transfer of $250,000 out of the Reserve for Production System. $1,710,000 remains in the Reserve for Production System.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Mary Romaidis
Reviewed by Mary Ann Goodley

AGENDA: 4

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

TO: **Chairperson Marland Townsend and Members of the Executive Committee**

FROM: **Chairperson Thomas M. Dailey, M.D., and Members of the Hearing Board**

DATE: **November 14, 2005**

RE: **Hearing Board Quarterly Report – JULY 2005 – SEPTEMBER 2005**

RECOMMENDED ACTION:

This report is provided for information only.

DISCUSSION:

COUNTY/CITY	PARTY/PROCEEDING	REGULATION(S)	STATUS	PERIOD OF VARIANCE	ESTIMATED EXCESS EMISSIONS
Alameda/Newark	**PECHINEY PLASTIC PACKAGING, INC. (Appeal – Docket No. 3495)** – *Appeal regarding Reopening for Cause of Specific Terms and Conditions of the Revised MFR Permit for Facility # A0273*	**Title V**	**Withdrawn**	**===**	**===**
Alameda/San Leandro	**BEACON SERVICE STATION (Variance – Docket No. 3501)** – *Variance from regulation limiting emissions of organic compounds from gasoline dispensing facilities (APCO not opposed.)*	**8-7-302.3**	**Granted**	**8/12/05-9/25/05**	**===**
Contra Costa/Antioch	**TRC (CONTRA COSTA SANITARY LANDFILL) (Variance - Docket No. 3499) –** *Variance from regulation requiring compliance with permit conditions and from regulation limiting emissions of non-methane organic compounds and methane from the waste decomposition process at solid waste disposal sites (APCO opposed.)*	**8-34-301, 303 & 305 2-1-307 (Condition ID # 2112, Item Nos. 1 & 11a)**	**Withdrawn**	**===**	**(VOC) and (NMOC)**
Contra Costa/Byron	**UNIMIN CORPORATION-BYRON PLANT (Variance – Docket No. 3502) –** *Variance from regulation requiring compliance with permit conditions.*	**2-1-307**	**Withdrawn. Applicant made modifications to its facilities which resulted in compliance with its permit**	**===**	**===**

COUNTY/CITY	PARTY/PROCEEDING	REGULATION(S)	STATUS	PERIOD OF VARIANCE	ESTIMATED EXCESS EMISSIONS
Santa Clara/Mountain View	**SHORELINE LANDFILL, CITY OF MOUNTAIN VIEW, CA. (Variance – Docket No. 3498)** – *Variance from regulation requiring compliance with MFR permit conditions and from regulation limiting emissions of non-methane organic compounds and methane from the waste decomposition process at solid waste disposal sites (APCO not opposed.)*	**8-34-301.1, 301.2, 303 & 305 MFR Permit Condition No. 16065, Parts 2, 3 & 5C**	**Granted**	**7/26/05 to 7/25/06 * See explanation below**	**1700 # (VOC) 13 # (TAC)**

*** Limited to 120 hrs.of actual downtime and 12 hrs. maximum downtime per day. Applicant will have an additional 180 hrs. maximum per shutdown event. Total downtime & total time to regain compliance is 300 hrs, or 12.5 days**

NOTE: During the third quarter of 2005, the Hearing Board dealt with two Dockets on two hearing days. A total of $3,058.31 was collected as excess emission fees during this quarter.

EXCESS EMISSION DETAILS

COMPANY NAME	DOCKET NO.	TOTAL EMISSIONS	TYPES OF EMISSIONS	PER UNIT COST	TOTAL AMT COLLECTED
International Paint, Inc.	**3431**	683 lbs.	VOC	$ 1.25/lb	$ 853.75
Shoreline Landfill, City of Mountain View	**3498**	1700 lbs 12.75 lb	VOC/NMOC TAC	$ 1.25/lb $ 6.24/lb	$2,125.00 $ 79.56
				TOTAL COLLECTED:	**$3,058.31**

Respectfully submitted,

Thomas M. Dailey, M.D.
Chair, Hearing Board

Prepared by: Neel Advani
Reviewed by: Mary Romaidis

FORWARDED:_____
NA:na (11/14/05HBEXQURT)

AGENDA: 5

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Townsend and Members of the Board of Directors Executive Committee

From: Brian Zamora, Advisory Council Chairperson

Date: November 17, 2005

Re: Report of the Advisory Council: August 18 – November 8, 2005

RECOMMENDED ACTION:

Receive and file.

DISCUSSION:

At the November 9, 2005 Regular meeting of the Advisory Council, the calendar year Council Officers were elected. Chairperson Brian Zamora will announce the slate of Advisory Council Officers for 2006 at the November 30th meeting.

Attached for your review are the minutes of the following Advisory Council meetings:

a) Executive Committee Meeting of September 14, 2005.

The Committee reviewed the progress of the Standing Committees in their work plans.

b) Regular Meeting of September 14, 2005.

The Council received a presentation on urban sprawl and land-use planning by Dr. Richard Jackson, former California State Health Director.

c) Joint Air Quality Planning & Technical Committee Meeting of October 12, 2005.

The Committee received an update on the Community Air Risk Evaluation (CARE) program.

d) Public Health Committee Meeting of October 24, 2005.

The Committee discussed topics for its work plan in 2006.

Respectfully submitted,

Brian Zamora
Advisory Council Chairperson

Prepared by: James N. Corazza

FORWARDED BY:_____

G:Acreports/2005

AGENDA: 5a

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, California 94109

DRAFT MINUTES

Advisory Council Executive Committee Meeting
9:00 a.m., Wednesday, September 14, 2005

1. Call to Order – Roll Call. 9:15 a.m. Present: Brian Zamora, Chairperson, Elinor Blake, Stan Hayes, John Holtzclaw, Ph.D., Victor Torreano. Absent: Fred Glueck.

2. Public Comment Period. There were no public comments.

3. Approval of Minutes of July 13, 2005. Mr. Torreano moved approval of the minutes; seconded by Ms. Blake; carried unanimously.

4. Work Plan Review with Committee Chairs. Dr. Holtzclaw reported that the Air Quality Planning Committee and Technical Committees met jointly last month to receive a presentation on the California Climate Action Registry. The Committees hope to jointly review the forth-coming Ozone Strategy and accompanying Environmental Impact Report documentation, as well as staff guidelines for California Environmental Quality Act (CEQA) that are scheduled for development in the near future. The Committees could review this early on. Mr. Torreano reported that the Public Health Committee has been revising its recommendations on Indoor Air Quality (IAQ) and these will be considered today by the full Advisory Council. Mr. Hayes reported that the Technical Committee has reviewed issues jointly with the Air Quality Planning Committee, including greenhouse gas emissions and climate change. The Technical Committee will jointly meet with the Air Quality Planning Committee in October to receive a staff presentation on the Community Air Risk Evaluation (CARE) program. Peter Hess, Deputy Air Pollution Control Officer, indicated that staff will be prepared to deliver the presentation on the CARE program at the October 12, 2005 joint committee meeting.

5. Committee Member Comments. Mr. Hayes expressed appreciation to Ms. Blake for her years of service on the Advisory Council.

6. Time and Place of Next Meeting. 9:00 a.m., Wednesday, November 9, 2005, 939 Ellis Street, San Francisco, CA 94109.

7. Adjournment. 9:58 a.m.

James N. Corazza
Deputy Clerk of the Boards

AGENDA: 5b

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

939 ELLIS STREET - SAN FRANCISCO, CALIFORNIA 94109

Draft Minutes: Advisory Council Regular Meeting – September 14, 2005

CALL TO ORDER

Opening Comments: Chairperson Zamora called the meeting to order at 10:00 a.m.

Roll Call: Present: Brian Zamora, Chair, Cassandra Adams, Sam Altshuler, P.E., Diane Bailey, Louise Bedsworth, Ph.D., Elinor Blake, Bob Bornstein, Ph.D., Jeffrey Bramlett, Harold M. Brazil, Irvin Dawid, Emily Drennen, William Hanna, Stan Hayes, John Holtzclaw, Ph.D., Kraig Kurucz, Victor Torreano, Linda Weiner.

Absent: Fred Glueck, Kevin Shanahan.

PUBLIC COMMENT PERIOD: There were no public comments.

CONSENT CALENDAR:

1. Approval of Minutes of July 13, 2005. Mr. Dawid requested "and" replace the dash mark on page five, Item No. 9, line two, and moved approval of the minutes as corrected; seconded by Dr. Holtzclaw; carried unanimously.

Chairperson Zamora called Item No. 9 out of order.

COMMENDATION/PROCLAMATION

9. Resolution in Honor of Outgoing Advisory Council "Public Health Agency"

category member Elinor Blake. Chairperson Zamora presented Ms. Blake with Resolution No. 90, in the Matter of Expressing Esteem and Appreciation to Elinor Blake for her Outstanding Service on the Advisory Council from April 1996 to October 2005. Council members proffered their congratulations on her year of service to the District. Ms. Blake expressed her appreciation for the opportunity to serve.

PRESENTATION:

2. Public Health and Land-use Patterns. Dr. Richard Jackson, former California State Health officer, presented "Urban Sprawl and Public Health." Dr. Jackson opined that the purpose of public health is to fulfill society's interest in assuring the conditions in which people live can be healthy. After having observed an elderly woman in Atlanta carrying a heavy shopping bag on a hot day without access to public transportation, he concluded that had she died of heat stroke, the official cause of death would have been heat stroke without any reference to the lack of public transportation or other references to the environment in which one lives.

He noted that as a former member of the Center for Disease Control in the 1990's, he reviewed public health issues for the current millennium. The diseases of the 21st century include the costs of care for aging populations, excess weight, diabetes, heart disease, mental disorders such as depression, anxiety, developmental problems and substance abuse. From a systemic perspective, the management of wealth is a key problem, since Americans "supersize" and over-consume everything and create threat to their health. During Saturday morning cartoons, there are 200 food advertisements in first four hours. California children are in desperate physical shape, such that only one quarter of the state's ninth graders can run a 12-minute mile. The supersizing of homes creates a tremendous burden on electric utilities. This over burdening also occurs with larger cars and the creation of sound walls to mitigate the additional noise. Sound walls cost $1.5 million per mile to construct.

There is a similar supersizing of capital investments in roadways and highways now occurring, along with a corresponding increased consumption of land (equivalent in size to the State of Georgia) that has been rendered impervious due to paving and other covering. In 1946, Los Angeles was the leading agricultural county in California. The pressure to develop primary agricultural land has not abated. This may lead to the scenario in which California will become an importer of fruits and vegetables one day.

Rapid development in the Central Valley in California will increase that region's population beyond the City of New York by 2040. This will create even greater bottlenecks on California highways entering into the Bay Area. Four of the ten most polluted cities in the United States are in the Central Valley in California. The large building developments in these areas without corresponding health and government services shows a lack of a long-term view, and this adversely influences air quality simultaneously. As to considerations of causal analysis, in Atlanta in 1996 people

were asked not to drive, and traffic volume decreased by 30% while air pollution improved by the same amount. A dramatic drop off occurred in hospital visits during this same time period.

With regard to the issue of asthma prevalence in California, one person in six has asthma. The rapid paving over of the United States and California has also had a major impact on temperature increases. If this trend continues, temperatures will be six to eight degrees higher in the summer and three to four degrees higher in the winter within the next generation. Similarly, reductions are forecasted in the Sierra Snowpack under such circumstances will mean the loss of this natural reservoir and the need to rebuild the entire water system in the state. This will have extremely significant economic impacts.

Mothers now drive their cars twice as much as in the past, and children do not walk or bike to school but instead are driven under current land-use patterns. The removal of such physical exercise bodes ill for health considerations, and entails the questionable spending of more money on sound walls than on sidewalks. Supersized schools are replacing the smaller schools. Dr. Jackson added that in his view the consumption of Ritalen—which reduces hyperactivity—by today's youth may be related to the withdrawal of a regular physical activity regiment from schools.

The most prevalent disease among Americans is depression. Exercise works as well as chemical treatment for this condition, and creating environments in which walking and biking is discouraged is self-defeating. Obesity is also epidemic in America. In 1990, less than 10% of residents in California were obese. In 1993, that figure rose to 10-14%, and by 2001 that figure rose further to 20-25%. This is a high risk factor for high blood pressure, gall bladder disease, cancer, and many other adverse health conditions. Obesity puts strain on hospitals, which have had to purchase heavier, more study and more costly gurneys, given the increased average weight that Americans have in the last ten years.

An indirect effect of increased 10 pounds of weight in Americans has increased consumption of jet fuel by 350,000 million gallons, and the emissions from this increase may be easily estimated. The most rapidly growing surgery is stomach stapling, including in children. Insurance will pay for this surgery, but a doctor's prescription of health club regimen would not be covered. The distinction between disease response versus prevention cannot be sufficiently emphasized. The epidemic of obesity is linked with diabetes, in which a major increase has been observed. Risks of Type II diabetes increase in particular. In 1993-94, 6-8% of Californians had Type II diabetes, and by 2001, over 10% of the state's population has been diagnosed with this disease. Most instances of adult onset diabetes in children are obesity related. One third to one half of all Type II diabetes in children comes from obesity, and there are children in significant numbers diagnosed with liver disease. Increasing physical activity within the population is as important as reducing obesity.

On the positive side, speculations on the epidemic of heart disease in the 1960's were

proven wrong, by changes in diet, reduced smoking and improved medical care. Cigarette consumption in the state has also decreased from 1980 in 130 million packs a year of cigarettes to 44 million. The change has been due to environmental factors, such as taxes on cigarettes, and anti-tobacco advertising and no-smoking regulations in buildings. Lung cancer has decreased 19.5% in 25 years.

Americans need to change the general pattern of diet and reduce their consumption of high fructose corn sugar. High fructose corn sugar should be taxed, just like cigarettes are taxed. This would generate significant funds that could be applied to programs consonant with the themes developed in this presentation. A strong program of in-fill development should be aggressively sought for the development of healthy living environments.

Increases in incidental exercise need to be achieved in American life. Europeans walk or bike in almost half of their routine errands. Average weight differs by six pounds in sprawl and non-sprawl areas. The Fruitvale model in California, with its emphasis on designing transit oriented development, should be carefully studied and advocated. There are excellent air quality reasons, even as there are sound mental and physical reasons, to create healthy living environments.

AIR DISTRICT OVERVIEW:

3. Report of the Executive Officer/APCO. Jack P. Broadbent, Executive Officer/Air Pollution Control Officer (APCO), stated:

a) This year's smog season registered one federal and seven state ozone exceedances. One Spare the Air Day was called, and no ozone exceedances were registered.

b) In July the Board adopted a flare control rule, which is the first of its kind in the country. Four additional regulations are scheduled to be heard in a public hearing before the Board. These concern pressure relief valves, wastewater systems, tanks and marine vessels.

c) The District has completed its update of the Ozone Control strategy and will bring this document before the Board for adoption later this year.

d) The District recently issued a report on potential control measures for particulate matter, in conformity with SB 656.

e) Public Information & Outreach Director Teresa Lee has announced her retirement at the end of this month after 31 years of service at the Air District.

f) Information on toxic emission inventories for the Community Air Risk Evaluation (CARE) program will be presented at the next joint meeting of the Advisory Council Air Quality Planning and Technical Committees.

COMMITTEE REPORTS AND RECOMMENDATIONS

4. Joint Technical & Air Quality Planning Committee Meeting of August 16, 2005. Dr. Holtzclaw stated the Joint Committee received a presentation from Diane Wittenberg of the California Climate Action Registry on the Registry's purpose and work. The Joint Committee will next review the CARE program and the environmental review documentation for the District's Ozone Strategy.

5. Public Health Committee Meeting of August 15, 2005. Mr. Torreano presented the Committee's recommendations on Indoor Air Quality (IAQ), stating the Committee re-affirmed its previous recommendations and has added several new ones. MR. Bramlett moved the Council adopt the Committee's recommendations for forwarding to the Board Executive Committee; seconded by Dr. Holtzclaw; carried unanimously.

6. Executive Committee Meeting of July 13, 2005. Chairperson Zamora stated the Standing Committees provided reports on their current work plans and future agenda items.

OTHER BUSINESS

7. Report of Advisory Council Chair. Chairperson Zamora stated application period for the "Regional Park District" and "Public Health Agency" categories on the Council will close today.

8. Council Member Comments/Other Business. Ms. Drennen recommended that the categories of gender and racial diversity be looked to in selecting new Council members. Mr. Dawid expressed interest in receiving a report on the proliferation of hybrid and diesel cars, as well as on remote sensing emissions monitoring the South Coast AQMD. Chairperson Zamora suggested that become a part of the Council's work plan for the next year, starting at the Air Quality Planning Committee level.

10. Time and Place of Next Meeting. 10:00 a.m., Wednesday, November 14, 2005, 939 Ellis Street, San Francisco, CA 94109.

11. Adjournment. The meeting was adjourned at 11:52 a.m.

James N. Corazza
Deputy Clerk of the Boards

939 Ellis Street
San Francisco, California 94109

DRAFT MINUTES

Joint Air Quality Planning & Technical Committees
9:30 a.m., Wednesday, October 12, 2005

1. Call to Order – Roll Call. Chairperson Holtzclaw called the meeting to order at 9:42 a.m. Air Quality Planning Committee (AQPC) Members Present: John Holtzclaw, Ph.D., Harold Brazil, Irvin Dawid, Emily Drennen, Kraig Kurucz, Fred Glueck. AQPC Members Absent: Emily Drennen, Kevin Shanahan. Technical Committee Members Present: Sam Altshuler, P.E., Louise Bedsworth, Ph.D., Robert Bornstein, Ph.D., William, Hanna, John Holtzclaw, Ph.D. Technical Committee Members Absent: Diane Bailey, Stan Hayes, Chairperson.

2. Public Comment Period. There were no public comments.

3. Approval of Joint Committee Meeting Minutes of August 16, 2005. Chairperson Holtzclaw deferred this item until the latter part of the meeting.

4. Update on the District's Community Air Risk Evaluation (CARE) Program. Janet Stromberg, CARE Program Manager, stated that the CARE program objectives are to investigate exposure to air toxics emissions in the Bay Area from outdoor emissions and to reduce the risk associated with them. The focus will be on exposure to toxic air contaminants (TAC) throughout the Bay Area by evaluating the TAC inventory and evaluating supplementary particulate matter (PM) air monitoring analysis. The cumulative risk analysis for a small sub-area that was originally planned will be deferred in order to partner with the California Air Resources Board (CARB) to develop a comprehensive study of the region for all source types. Emission inventory grids will be overlayed on demographic maps in order to assess exposure.

Ms. Stromberg introduced Steven Reid of Sonoma Technologies, Inc. Mr. Reid indicated that the first-draft of the TAC emission inventory uses readily available information for a screening-level assessment of population exposures and the subsequent selection of a study community. A "top down" method will be used that examines activities on a regional scale rather than evaluating individual emitters. The approach begins by using existing criteria pollutant emission inventories, and then applies available chemical speciation profiles along with available cancer and non-cancer unit risk factors to a spatial allocation of emissions on gridded maps.

The study area includes the nine Bay Area counties. Various inventories will be used: the 2000 area- and non-road Total Organic (TOG) compound and PM10 emissions at a county level and an annualized level (in tons per year in a given county). On-road TOG emissions for 2000 were gridded to a 2 km x 2 km grid cell domain from a different data base that contained a summer and winter averaged inventory. These

were averaged in turn to obtain an annualized total. Another inventory for point sources contained TAC emissions by individual facility, including benzene from such point sources as petroleum processing operations and auto body shops.

For area-, on- and off-road sources, the study will extrapolate from criteria to toxic emissions using chemical speciation profiles for given source types. These were obtained from CARB, the US Environmental Protection Agency (EPA) and Desert Research Institute (DRI). Once these are applied, a TAC emission inventory for all source types is created. The next step is to perform a risk weighting procedure for purposes of conducting modeling. Risk factors are used for cancer risk estimation involving a dose-response type of dynamic with a linear relationship. For non-cancer risks, reference concentrations are used: these identify a level below which no health effects are expected. There are two safety margins employed in this context: one for ranges of uncertainty, and another for expert judgment on the part of toxicologists.

The sources of information used to assemble risk factors and reference concentrations include CARB-approved risk assessment health values, EPA Office of Environmental Health Hazard Assessment (OEHHA), EPA integrated risk information system (IRIS) and risk assessment information system. Concentrations were selected, risk-weighted emissions were calculated and uncertainty ranges were identified. A database of risk-weighted emissions by TAC and source category was prepared.

The method of calculating risk-weighted emissions for a variety of compounds and variety of risks attempts to normalize the risk for modeling purposes. The calculation began with a mass-based emission for a given compound, to which a unit risk factor was applied for calculating cancer risk, or a reference concentration for calculating non-cancer risk. This method allows for weighting emissions to assess the greatest risk. Subsequently, exposure to population densities is evaluated in the context of the spatial allocation of emissions over a given area.

Each inventory is handled differently. Spatial allocation factors are used for area and non-road sources. For on-road mobile sources, a gridded emissions inventory was already available, and for point sources the geographic coordinates of facilities were also readily available. For the spatial allocation factors, geographic information systems (GIS) databases were used, including demographic data/population density, land-use/land-cover data sets to distinguish residential from agricultural use, line length (railroad tracks), facility locations and other GIS information. All of these were assembled and overlaid on a gridded domain. With each polygon in the grid, it is then possible to assign emissions to a grid cell based on an appropriate spatial surrogate.

The next step involved the application of the risk-weighted inventory on the gridded map for all source types. For cancer risk weighted emissions in the entire study domain, an estimated 16 pounds per day for all TAC species is emitted, 90% of which is chromium and diesel PM. However, there is a large uncertainty associated with this estimate of chromium insofar as the data assumes it is entirely the more toxic (VI) rather than more benign (III) type. Primary sources of chromium include fugitive

dust from construction as chromium is a constituent in cement. Ambient measurements suggest that the allocation of chromium VI and III is approxi-mately 30/70%, respectively. Mr. Reid added that aircraft are also a large source of chromium.

In discussion, Dr. Bornstein cautioned that taking a conservative approach for chromium may produce overly-dramatic data. Mr. Kurucz urged that chemical speciation profiles be accurate, taking into account regulatory work in this region. Peter Hess, Deputy Air Pollution Control Officer, noted that these will be accounted for in the Quality Assurance-Quality Control (QA/QC) phase. Mr. Reid displayed a map showing where hot spots are for diesel PM emissions from heavy-duty truck traffic near shipping lanes and primary road networks.

For the estimated 25 tons per day of chronic risk-weight emissions, acrolein (which derives mainly from aircraft, on-road sources and combustion processes), phosphorous and formaldehyde constituted approximately 2/3 of the risk-weighted emissions. Source types include on-road mobile sources, construction and demolition, construction equipment, aircraft, livestock waste, fugitive windblown dust, paved road dust and farm equipment.

The strength of the TAC inventory for on-road mobile sources are that estimates were made with EPA-recommended methods and California-specific chemical speciations. Emissions from point sources were directly reported and spatial allocations applied to the modeling grid at a 2km x 2km resolution. Potential weaknesses of the TAC inventories include omission of some TACs, the extent to which uncertainty emerges from the application of chemical speciation profiles which themselves contain uncertainties, and the application of conservative assumptions about chromium emissions as being exclusively the more toxic VI than the benign III type.

Recommendations from these preliminary results include the prioritization of TACs, continued emission inventory development, adding emissions for any omitted TACs, and further investiga-tion of emissions of chromium VI and IV from sources of fugitive dust.

Other geographic analyses can be conducted, such as emission inventory-based site evaluation in which diesel PM is selected and assessed in terms of specific population in a grid. The location of roadways and schools can be plotted for an initial analysis of a sub-region.

Dr. Saffet Tanrikulu, Modeling & Planning Section Manager, stated that staff will investigate the completeness of the data to ensure that all sources and source categories are included. Staff will perform QA/QC of the data, and will look at seasonal variations, annual averages and data variations. Staff will also evaluate uncertainty in the upper and lower bounds in the emission inventory and thereby improve the emission inventory.

Cuong Tran, Atmospheric Modeler, member of the staff's emission inventory

evaluation group, provided examples of QA/QC for the distribution of wood burning fireplace emissions, and on-road exhaust $PM_{2.5}$ in the Bay Area. He compared a plot of $PM_{2.5}$ emissions from fireplaces in the nine Bay Area counties using survey data and CARB methodology with a second plot based on 2000 Census data concerning homes where the primary heating fuel is wood. The two plots are at rather considerable variance. A separate illustration of different plots of exhaust $PM_{2.5}$ emissions from on-road sources leads to the conclusion that the use of the same vehicle miles traveled (VMT) fleet mix for all roadway links is suspect. It is necessary to improve VMT analysis of roadway types. Ms. Stromberg added that six months have been allocated to staff for QA/QC.

Mr. Tran displayed maps plotting population groups most sensitive to poor air quality (over age 64 and under age 18, and homes with incomes less than 185% of the federal poverty level) based on 2000 Census data. The areas with the greatest concentration of sensitive receptors are San Francisco, San Jose and a few areas in the East Bay. When income is included, some parts of East Bay are prominent, and again in the Chinatown and Tenderloin areas of San Francisco. Emission density data for various TACs will be superimposed on these demographic maps in order to study the impact of TACs on public health in the Bay Area.

Mr. Altshuler suggested that the modeling in the study be compared with ambient measure-ments. Ms. Stromberg replied that this will occur when further analysis is conducted of the District's PM filters by DRI, which is in the process of obtaining new equipment that can read filters for their hydrocarbon content. Gary Kendall, Technical Division Director, stated that the map plotted for San Francisco on $PM_{2.5}$ emissions from woodsmoke, based on survey data and the CARB methodology with its assumptions on the amount of wood burned, showed San Francisco with the highest concentration, whereas PM filter samples show San Francisco contributing little to filter mass from wood combustion. The observations do not corroborate estimates on the emission density map. A more extensive survey will be conducted this winter on wood burning in the Bay Area. Mr. Altshuler inquired about whether the program will address asthma, and Mr. Hess replied that the data will be submitted to county health officers.

In reply to questions, Amir Fanai, Senior Atmospheric Modeler, stated that the fleet mix for the motor vehicle emission inventory is not the same for every link in the Bay Area. According to available data, San Francisco has the highest truck level activity in the Bay Area. When areas of secondary concentration are opened up in further detail on the maps, additional areas of interest emerge, and provide a clearer idea of vehicle activity.

Chairperson Holtzclaw noted that elected officials from San Francisco and Oakland ought to take particular note of these preliminary results, as it suggests diesel bus emissions may be of greater importance than hitherto known. Mr. Altshuler replied that the installation of particulate traps, which reduce soot emissions, may also create an acute health problem with nitric oxide emissions on streets. Recent literature published in "Atmospheric Environment" has addressed this issue. This may be a

subject for future Advisory Council discussion.

3. Approval of Joint Committee Meeting Minutes of August 16, 2005. Mr. Dawid requested that "clean diesel and hybrids" replace "diesel hybrids" in paragraph two on page five. Dr. Bedsworth requested that "severity" be replaced with "potency" in line eight of paragraph four on page two, with the sentence to end at "measured." Chairperson Holtzclaw requested that "Dr. Wittenberg stated that" be inserted after "Registry" on line two of paragraph six on page three. Mr. Dawid moved adoption of the minutes, as corrected; seconded by Dr. Bedsworth; carried; with Mr. Altshuler abstaining.

5. Committee Member Comments/Other Business. Mr. Dawid noted that AB 694 was passed by the Legislature. It allows the District's Transportation Fund for Clean Air (TFCA) funds to be allocated to private fleets. He added that Council member Drennen has asked the Council to look into how the TFCA process could better support walking and non-motorized transportation. Mr. Kurucz stated that this month the 2006 Dow Jones Sustainability Index Review identified Intel as a leader for semi-conductors in the field of environmentalism and pollution prevention.

6. Time and Place of Next Meeting. Air Quality Planning & Technical Committees Joint Meeting, 9:30 a.m., Wednesday, December 14, 2005, 939 Ellis Street, San Francisco, CA 94109.

7. Adjournment. The meeting was adjourned at 11:46 a.m.

James N. Corazza
Deputy Clerk of the Boards
:jc

AGENDA: 5d

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, California 94109

DRAFT MINUTES

Advisory Council Public Health Committee Meeting
1:30 p.m., Monday, October 24, 2005

1. Call to Order – Roll Call. Chairperson Torreano called the meeting to order at 1:50 p.m. Present: Victor Torreano, Chairperson, Cassandra Adams, Jeffrey Bramlett Linda Weiner.

2. Public Comment Period. There were no public comments.

3. Approval of Minutes of August 15, 2005. Chairperson Torreano moved approval of the minutes; seconded by Ms. Weiner; carried unanimously.

4. Discussion of Work Plan Topics for 2006. The Committee conducted a preliminary discussion of topics for consideration by the Council and the Public Health Committee for calendar year 2006. The Committee will recommend the following issues to the Council:

- Construction equipment and their impact on health.

- Heating, air-conditioning and refrigeration – evacuation of chloro-fluoro carbons (CFCs). It was suggested that Steven Moss, one of the 2005 Clean Air Champions, who founded the San Francisco Community Power Cooperative, make a presentation to the Committee since he is very knowledgeable on this subject.

- Aspects of Particulate Matter.

- Have a joint meeting with the other Committees to receive updates on the CARE Program.

- Receive updates on the status of the District's role on Indoor Air Quality (IAQ).

The Committee will also discuss Work Plan Topics for 2006 at the Council's Retreat in January, 2006, to receive additional ideas from other Council members.

5. Committee Member Comments/Other Business. Ms. Adams and Ms. Weiner stated that they will not be able to attend the Advisory Council Regular Meeting on November 9, 2005.

6. Time and Place of Next Meeting. The meeting for Monday, December 19, 2005 was cancelled. The Committee will meet next in January, 2006 at the Council's Retreat.

7. Adjournment. 2:35 p.m.

Neel Advani
Deputy Clerk of the Boards

AGENDA: 6

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Townsend and Members of the Executive Committee

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 16, 2005

Re: Joint Policy Committee Update

RECOMMENDED ACTION:

Receive and file.

DISCUSSION

At the November 30, 2005, meeting of the Executive Committee, Ted Droettboom will provide an update on the activities of the Joint Policy Committee.

BUDGET CONSIDERATION/FINANCIAL IMPACT

None.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

AGENDA: 7

BAY AREA AIR QUALITY MANGEMENT DISTRICT
Memorandum

To: Chairperson Townsend and Members of the Executive Committee

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 16, 2005

Re: Consider Recommending To The Board Of Directors Creation Of A Self-Insured Retiree Life Insurance Program

RECOMMENDED ACTION:

Recommend to the Board of Directors that the Human Resources Officer move forward with implementation of a self-insured retiree life insurance benefit.

BACKGROUND

The District provides a life insurance benefit for retirees 70 years and older that is equivalent to one times their annual salary as an active employee. The insurance has been provided under the same vendor contract for nearly twenty years. The contract is currently with AIG. Under that contract, the District contributes money into a "pre-retirement" fund so that when the retiree (or active employee if they have not retired) reaches age 70 there is sufficient money set aside to move into a "post-retirement" account for the purpose of purchasing term life insurance. The District conducted an actuarial study that indicates that the same benefit could be provided at far less expense if the District simply held the contributions in an interest-bearing account and paid the death benefit rather than using the contributions to purchase term life insurance. This would amount to self-insuring the benefit.

DISCUSSION

There are at least three issues that would need to be addressed in order for the District to self-insure the retiree life insurance benefit: 1) Current State law is ambiguous as to the ability of public sector employers to self-insure a death benefit and might need to be changed; 2) the current contract with AIG includes a provision that would require the District to surrender up to 10% of the pre-retirement account balance upon cancellation of the policy; 3) the District would need to set up administration of a self-funding model, to include a means for properly investing the contributions.

In recognition of these issues and the length of time it would take to resolve them, staff has in the meantime pursued a more traditional cost-saving approach that involved the District's broker, Driver Alliant, going out to bid for the retiree life insurance, as well as the regular life insurance and the long-term disability insurance. After receiving bids, the District opted to move all three insurances to Metropolitan Life Insurance, which offered to match the District's coverage at an annual savings in premium costs of $240,000. Driver Alliant was able to get a commitment from AIG to not invoke the cancellation charge except on amounts in the pre-retirement account that

are actually withdrawn by the District. Since the pre-retirement account is currently earning 5.25% interest with AIG, withdrawals sufficient to pay Met Life's premiums for retiree life insurance can be withdrawn each year with the expectation that the fund will replenish by the time a subsequent withdrawal is made the following year, thus making the retiree life insurance program self-sustaining using current assumptions.

Update on Self-Insurance for Workers' Compensation

For the fiscal year ending June 30, 2005, the District achieved approximately $700,000 in savings on workers' compensation costs. Of that amount, $620,000 was due to savings on insurance premiums and $80,000 was due to the District's demand that State Compensation Insurance Fund re-audit the District's payroll for FY 2004-05 due to staff's discovery of major errors in the original audit; the re-audit resulted in a refund on the premium's paid for FY 2004-05. All District staff is to be commended for working safely last fiscal year.

BUDGET CONSIDERATION/FINANCIAL IMPACT

The change in insurance carriers will result in approximately $180,000 in savings on benefit costs this fiscal year, and an ongoing savings of approximately $240,000 annually. Self-insuring the retiree life insurance program could realize additional savings of as much as $3 million on the value of the benefit for the current population of employees.

SUMMARY

Staff has achieved significant savings moving to a self-insurance model for workers' compensation. An actuarial study indicates that significant savings are possible by using a self-insurance model for retiree life insurance. Certain issues would need to be addressed that would involve an investment of staff and consultant time to move forward with the self-insurance model. In the meantime, staff has re-worked the District's traditional insurance to save money. Staff is asking the Executive Committee to consider recommending to the Board of Directors that staff proceed to attempt implement a self-insurance model for the retiree life insurance benefit.

Respectfully submitted,

Jack P. Broadbent
Executive Office/APCO

Prepared by: Michael K. Rich

AGENDA: 8

BAY AREA AIR QUALITY MANGEMENT DISTRICT
Memorandum

To: Chairperson Marland Townsend and Members of the Executive Committee

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 18, 2005

Re: Status of Phase One Implementation of Video-Conferencing Equipment and Installation in the 4th Floor Conference Room

RECOMMENDED ACTION:

Informational report. Receive and file.

BACKGROUND

At its February 16, 2005 meeting, the Board of Directors approved phase one implementation of video-conferencing in the 4th floor conference room, including approval of a purchase order not to exceed $28,653 to Commercial Video.

The Budget and Finance Committee at its October 28, 2005 meeting requested that this item be referred to the Executive Committee for review once the proposed plans were received by staff. The phase one plan includes two 50" display panels mounted on the West walls, with the camera mounted over one of the panels. The equipment and switchgear will be contained in existing cabinetry and in closet space.

DISCUSSION

Upgrades to the room's lighting are complete and acoustical upgrades will follow with a total cost of approximately $3,000 out of already budgeted general facilities and maintenance expense. This is a requirement to obtain the best possible video and audio. These costs are additional and not part of the bid.

Additionally, the room requires a dedicated T1 line. The cost of the line is approximately $700 per month - $8,400 annually. The monthly fee will apply whether the line is used or not as it will be a dedicated line.

BUDGET CONSIDERATION/FINANCIAL IMPACT

The FY 2004/2005 Capital Budget was increased by $28,653 and the ISS Budget was increased by $8,400 with a transfer from the Reserve for Contingency to fund this project. As transfers from reserves, these funds have been carried over into the FY 2005/2006 Budget.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Jeff McKay

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Townsend and Members of the Executive Committee

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 16, 2005

Re: Replacement of DataBank and IRIS

RECOMMENDED ACTION:

Receive and file.

BACKGROUND

The Air District is in the process of replacing its legacy software applications, DataBank and IRIS. These systems carry out business processes in Planning, Permitting, Inspection and Emission Inventory.

The Air District first implemented the DataBank application in 1977. This application pre-dates relational database technology, and stores information in flat files. In 2001 the District implemented the IRIS application, partially relieving Databank of some function. The migration to modern technology must continue for the District to fulfill its mission.

In prior presentations, the Executive Committee has reviewed the early general direction of this work and approved a pilot process.

DISCUSSION

A review of architectural options produced a "360" view of these options. Expertise was sought from an industry vertical perspective, a Web Services Perspective, and from a Business Process/Document Management perspective.

A review of the District's functional needs resulted in substantial documentation on the functional capabilities to be sought in vendor products. The resulting field of eight vendors was invited to reply to a Request For Information (RFI).

Based upon the responses to the RFI, four of the eight responding vendors were invited to move to the next step. Each was provided with a detailed District business process scenario script and asked to present a four-hour demonstration of that script with their toolset. Based upon these presentations, two of the vendors, Hyland and Opentext, have been selected to proceed with the Pilot implementations.

Beginning in the first quarter of 2006, these vendors will each build a pilot system based upon specifications provided by the District. These systems will be built within the District facility to ensure that District staff participate in the work and become familiar with the products. Once built, the systems will be used as demonstration platforms for District staff to illustrate the features and functions, as well as any strengths or weaknesses of the products. At the end of this evaluation period the final product will be selected and the final implementation phase will begin. The product selection processes will include contract and financial negotiation with the vendors, and the creation of an implementation schedule.

Simultaneously the District has been working to re-architect its database structure. This work is necessary to facilitate the migration from Databank. The Databank system predates relational database technology.

In a third parallel track, the District has been working on business process re-engineering. This process documentation forms both a key component of the Pilot scenario and also a necessary adjunct to the database architecture design process.

BUDGET CONSIDERATION/FINANCIAL IMPACT

In the 04/05 fiscal year the Board approved a transfer of $140,000 out of the Reserve for Production System. In the current fiscal year, the Board has approved a transfer of $250,000 out of the Reserve for Production System. $1,710,000 remains in the Reserve for Production System.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Jeff McKay

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Marland Townsend and
Members of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 30, 2005

Re: Report of the Budget & Finance Committee Meeting of December 5, 2005

RECOMMENDED ACTION

The Budget and Finance Committee may recommend Board of Director approval

BACKGROUND

The Budget & Finance Committee will meet on December 5, 2005. Staff will present recommendations on the following items:

- Amendments to the FY 2005/2006 Budget by transferring $102,000 from the Reserve for Contingencies to the Payroll Budget (Program 106), and authorize the Executive Officer/APCO to issue a purchase order not to exceed $102,000 to Ceridian Corporation to replace the District's payroll system; and
- The Committee will consider recommending that the Board of Directors amend FY 2005/2006 Budget by accepting a $278,935 EPA grant from the National Environmental Information Exchange Network and awarding a $278,935 contract to Sonoma Technology, Inc. for Phase II Development of a new Data Management System for Ambient Air Quality and Meteorological Data.

Attached are the staff reports presented to the Committee for your review.

Chairperson, Julia Miller will give an oral report of the meeting.

BUDGET CONSIDERATION/FINANCIAL IMPACT

The FY 2005/2006 Payroll Budget (Program 106) will be increased by $102,000 with a transfer from the Reserve for Contingency, leaving $298,000 in that Reserve fund.

The FY 2005/2006 Technical Division Budget will be increased by $278,935 with approval of the NEIEN grant contract with Cal/EPA. The grant will be spent entirely through the vendor contract with Sonoma Technology, Inc. The project will not require any funding from the General Fund.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

AGENDA: 4

BAY AREA AIR QUALITY MANGEMENT DISTRICT
Memorandum

To: Chairperson Julia Miller and Members of the Budget and Finance Committee

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 18, 2005

Re: Replacement of the District Payroll System

RECOMMENDED ACTION:

Consider recommending that the Board of Directors amend the FY 2005/2006 Budget by transferring $102,000 from the Reserve for Contingencies to the Payroll Budget (Program 106), and authorize the Executive Officer/APCO to issue a purchase order not to exceed $102,000 to Ceridian Corporation.

BACKGROUND

The District has been notified by its Payroll service provider, Automatic Data Processing, Inc, (ADP), that ADP will stop supporting the Payroll product in use at the District as of July 1, 2006. After determining that no other ADP product was available to the District, a Request for Proposal (RFP) was issued. Three vendors responded to the RFP.

DISCUSSION

A summary table of the three RFP responses is provided below. The JD Edwards implementation cost is the greatest because it is a full in-house solution. The Ceridian implementation cost is the least because it is an entirely hosted solution. JD Edwards has no general ledger integration cost because the District already uses JD Edwards Financials and Human Resources. The hosted Ceridian solution has the highest yearly fee (current yearly fees for ADP are $37,140). JD Edwards is owned by Oracle and Ceridian is the second largest Payroll service provider (after ADP). MUNIS is a relatively small firm, however, their product is tailored for the Public Sector. The MUNIS and JD Edwards solutions do not provide outsourced services such as hard-copy payroll checks, direct deposits, W-2s, or quarterly tax reporting.

	Cost to Implement	Cost to Integrate	Yearly Cost	Ten_Year Cost	Vendor Viability	Vendor Fit	Services	Support Costs
Ceridian	$41,529	$60,000	$30,132	$402,849	Excellent	Good	Yes	Unchanged
JDEdwards	$330,958	$0	$9,840	$429,358	Excellent	Good	No	Increased
MUNIS	$109,140	$60,000	$13,040	$299,540	Good	Excellent	No	Increased

The selection committee has determined that the Ceridian solution is clearly the best choice for the District. Although the MUNIS solution as proposed shows a lower cost, it does not include services and is provided by a small company and requires increased staff support. The JD Edwards solution is higher cost and requires additional staff support for functions that do not enhance the District's mission.

BUDGET CONSIDERATION/FINANCIAL IMPACT

The FY 2005/2006 Payroll Budget (Program 106) will be increased by $102,000 with a transfer from the Reserve for Contingency, leaving $298,000 in that Reserve fund.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Jeff McKay

AGENDA: 5

BAY AREA AIR QUALITY MANGEMENT DISTRICT
Memorandum

To: Chairperson Julia Miller and
Members of the Budget and Finance Committee

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 28, 2005

Re: Phase II Development of a New Data Management System for Ambient Air Quality and Meteorological Data: Consider Approval of Contract Accepting EPA Grant Money and a Second Contract Awarding Grant Money to Subcontractor

RECOMMENDED ACTION:

Recommend that the Board of Directors amend the FY 2005-06 budget to recognize a $278,935 EPA Grant from the National Environmental Information Exchange Network (NEIEN), via a Cal/EPA contract, and award a $278,935 contract to Sonoma Technology, Inc. for Phase II development of a new data management system for ambient air quality and meteorological data.

DISCUSSION

Using EPA Grant funding, the District completed Phase I development of a new Data Management System (DMS) to replace several antiquated air quality and meteorological databases. The District chose Sonoma Technology, Inc. for the Phase I work based on their experience with similar database structures developed for EPA's AirNOW program and various California Air Resources Board special studies. The District is ready to begin Phase II which will be completed with NEIEN Grant funding. Upon completion of Phase II development, the new DMS will automatically collect, quality-check, and distribute real-time hourly and sub-hourly data to Air District web pages, AirNOW, and other public venues. The DMS will also reduce staff time and resources needed to prepare final regulatory data and allow earlier submittal to EPA's Air Quality System. In order to produce a quality product and avoid delays and increased costs, an understanding of the complex specifications and knowledge of the District's new DMS is required. Sonoma Technology, Inc. acquired this knowledge and experience working on Phase I of the project, and as a result, staff recommends Sonoma Technology, Inc. be the sole source vendor for continued DMS development work.

BUDGET CONSIDERATION/FINANCIAL IMPACT

The FY 2005/2006 Technical Division Budget will be increased by $278,935 with approval of the NEIEN grant contract with Cal/EPA. The grant will be spent entirely through the vendor contract with Sonoma Technology, Inc. The project will not require any funding from the General Fund.

Respectfully submitted,

Jack P. Broadbent
Executive Officer/APCO

Prepared by: Dick Duker and Mark Stoelting
Reviewed by: Gary Kendall

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Marland Townsend
and Members of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 30, 2005

Re: Public Hearing to Consider Adoption of Proposed Amendments to Regulation 8, Rule 44: Marine Vessel Loading Terminals; Regulation 8, Rule 46: Marine Tank Vessel to Marine Tank Vessel Loading; Manual of Procedures, Volume IV, Source Test Method ST-34: Bulk and Marine Loading Terminals – Vapor Recovery Units; and Adoption of a CEQA Negative Declaration

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RECOMMENDED ACTION

Staff recommends that the Board of Directors take the following actions:

- Adopt proposed amendments to Regulation 8, Rule 44: Marine Tank Vessel Loading Terminals;
- Adopt proposed amendments to Regulation 8, Rule 46: Marine Tank Vessel to Marine Tank Vessel Loading;
- Adopt proposed amendment to Manual of Procedures, Volume IV, Source Test Method ST-34: Bulk and Marine Loading Terminals – Vapor Recovery Units; and
- Adopt a Negative Declaration pursuant to the California Environmental Quality Act (CEQA) for this rule-making activity.

BACKGROUND

The District regulates emissions associated with loading of organic liquid cargoes on and off of marine tank vessels under Regulation 8, Rule 44: Marine Vessel Loading Terminals and between marine vessels under Regulation 8, Rule 46: Marine Tank Vessel to Marine Tank Vessel Loading. The proposed amendments are the result of an extensive rule development process that began with Further Study Measure FS-11: Marine Tank Vessel Operations from the Bay Area 2001 Ozone Attainment Plan. The primary question addressed by the further study was whether controls on low-volatility cargoes like distillate oils (such as diesel #2) and residual oils (such as fuel oil #6) would produce significant emission reductions. The evidence developed during the study does not suggest that significant emission reductions would result from controls on these cargoes. However, data from the further study has helped identify a category of cargoes – low flash point "organic chemicals" such as naptha, benzene, and alcohols – for which controls are appropriate. As a result, the proposed amendments will impose a new control requirement for all cargoes with a flash point less than 100˚F. This new control requirement will expand the existing control requirements to include all high-volatility materials with significant marine traffic in the Bay Area. In addition, the proposed amendments make other improvements to the rule, including more stringent gaseous leak standards and improved monitoring and recordkeeping requirements.

The proposed rule was developed with significant public input. The District formed a technical working group that met on six occasions between 2002 and 2004 and held public workshops in 2002, 2003, and on October 19, 2005 in Benicia, CA, and made the proposed amendments and staff report available for public comment. In addition, staff met numerous times with interested parties.

DISCUSSION

The proposed amendments to Rule 44 will reduce emissions caused by the loading of organic liquids into marine vessels, and by related activities such as marine vessel tank cleaning. These amendments will:

- Continue to require controls for the five liquid categories listed in the current rules (gasoline, gasoline blending stock, aviation gas, JP-4 jet fuel, and crude oil) and add requirements to control all other organic liquids with a flash point below 100˚F;
- Apply more stringent gaseous leak standards for equipment that is not already subject to the very stringent gaseous leak standards in Regulation 8, Rule 18: Equipment Leaks;
- Clarify and extend control requirements for various activities – ballasting, tank washing, purging, and gas freeing - that can vent tank emissions to the atmosphere;
- Consolidate requirements found in Rule 46 into Rule 44, since both rules apply the same control requirements for loading at terminals and for ship to ship loading; and
- Make minor amendments to Source Test Method ST-34, which is the procedure used to verify compliance with the emission control system standards in Rule 44.

ISSUES

The most recent public workshop was held at the Benicia City Council Chambers the evening of October 19, 2005. The primary concern expressed by the regulated community was that marine terminals must continue to know in advance of loading whether emission controls are required for any particular loading event. The current rule provides this certainty by specifying the materials for which controls are required, rather than by specifying a parameter (e.g., organic vapor concentration at the emission point) that can only be determined during loading. Staff concludes that the proposed amendments will continue to provide certainty because the flash point of any loaded material is known by operators or can be readily determined prior to loading.

Another concern expressed by the regulated community is that equipment on marine vessels may not be capable of achieving a lower leak limit than is currently required by the rule (10,000 ppm), particularly for large hatches, because marine vessels are subject to variable stresses caused by sea conditions, ship movement and cargo distribution. Because sufficient data is not available to establish that a leak limit lower than 10,000 ppm is achievable for all potential emission points on marine vessels, District staff has proposed to lower the leak limit (to 1,000 ppm) only for marine terminal sources and not for marine vessels.

Finally, environmental groups expressed a concern that testing performed by the District during the marine loading further study suggests that emission factors published by U.S. EPA may substantially underestimate emissions during loading of low-vapor pressure petroleum liquids such as kerosene-based fuels, diesel and other distillate fuels and residual fuels. During the rule development process, the District carefully analyzed the EPA emission

factors and the District's source tests. The EPA emission factors predict that uncontrolled emissions from loading low-volatility liquids should be much lower than the control standard in Rule 44 (2 pounds of emissions per thousand barrel of loaded material). However, the District's analysis of the EPA emission factors showed that the factors for these liquids were derived from a very limited set of data and are probably not accurate for low-volatility liquids. The District tests measured uncontrolled emissions that were all very close to the Rule 44 control standard, with the exception of one test result of 4.7 pounds of emissions per thousand barrel of loaded material. District staff has interpreted this single test result as perhaps the result of carryover of vapors from prior cargoes or other cargoes being loaded and, in any case, within the normal variation in test results. District staff believes that the available data do not justify control requirements for these low-vapor pressure materials. Nevertheless, District staff analyzed potential emissions reductions and cost effectiveness for controlling these cargoes and concluded that emission reductions would be insignificant and not cost effective.

CHANGES TO THE RULE SINCE PUBLICATION

District staff have made minor changes in the proposed amendments to Regulation 8, Rule 44 since publication. The first sentence of Section 502 of Rule 44 (relating to record keeping by marine vessel operators) makes the section applicable beginning on January 1, 2007. In the published version of the rule, the same applicability date was included in some of the subsections of Section 502. In the attached rule proposed for adoption, these applicability phrases are deleted in order to avoid any redundancy and also to avoid any implication that the other subsections apply upon adoption. In addition, a January 1, 2007 applicability date has been added to Section 8-44-501.1.5 for clarification. These changes are shown in double strikethrough and double underline format. The changes are minor and non-substantive and do not require that the public hearing be continued to adopt the proposed amendments.

BUDGET CONSIDERATION/FINANCIAL IMPACTS

There will be an increase in costs associated with staff time to inspect additional monitoring records required by the proposed amendments. On June 15, 2005, the Board adopted amendments to Regulation 3 ("Fees"), including an increase in fees for "Loading and/or Unloading Operations – Marine Berths" (Schedule G-3). This increase will help to offset the costs of the projected increased staff time.

Respectfully submitted,

Jack P. Broadbent
Executive Officer / Air Pollution Control Officer

Prepared by: Julian Elliot
Reviewed by: Henry Hilken

Attachments:

Proposed Amendments to:

Regulation 8, Rule 44: Marine Vessel Loading Terminals
Regulation 8, Rule 46: Marine Tank Vessel to Marine Tank Vessel Loading
Manual of Procedures, Volume IV, Source Test Method ST-34: Bulk and Marine Loading Terminals – Vapor Recovery Units

Staff Report
Socioeconomic Analysis
CEQA Initial Study and Negative Declaration

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Marland Townsend
and Members of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 30, 2005

Re: Public Hearing to Consider Adoption of Proposed Amendments to Regulation 8, Rule 44: Marine Vessel Loading Terminals; Regulation 8, Rule 46: Marine Tank Vessel to Marine Tank Vessel Loading; Manual of Procedures, Volume IV, Source Test Method ST-34: Bulk and Marine Loading Terminals – Vapor Recovery Units; and Adoption of a CEQA Negative Declaration

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BUDGET CONSIDERATION/FINANCIAL IMPACTS

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Respectfully submitted,

Jack P. Broadbent
Executive Officer / Air Pollution Control Officer

Prepared by: Julian Elliot
Reviewed by: Henry Hilken

Attachments:

Proposed Amendments to:

Regulation 8, Rule 44: Marine Vessel Loading Terminals
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REGULATION 8
ORGANIC COMPOUNDS
RULE 44
MARINE TANK VESSEL ~~LOADING~~ OPERATIONS~~TERMINALS~~

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~~8-44-304 Equipment Maintenance~~
~~8-44-305 Ozone Excess Day Prohibition~~

8-44-400 ADMINISTRATIVE REQUIREMENTS

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REGULATION 8
ORGANIC COMPOUNDS
RULE 44
MARINE TANK VESSEL ~~LOADING~~ OPERATIONS~~TERMINALS~~

(Adopted January 4, 1989)

8-44-100 GENERAL

8-44-101 Description: The purpose of this rule~~Rule~~ is to limit emissions of ~~precursor~~ organic compounds into the atmosphere from marine tank vessel operations~~the loading of organic liquid or the loading into tank vessels with prior cargo of organic liquid at marine terminals~~.

8-44-110 Exemption, Small Loading Events: Sections 8-44-301 through 305 of this rule~~Rule~~ shall not apply to loading events of less than 159 cubic meters (1,000 barrels~~bbls~~).

8-44-111 Exemption, Marine Vessel Fueling: Sections 8-44-301 through 305 of this rule~~Rule~~ shall not apply to the loading of organic liquids associated with the fueling (bunkering) of marine vessels.

~~**8-44-112 Exemption, Lightering:** This Rule shall not apply to the transfer of organic liquids from one marine vessel to another marine vessel.~~

~~**8-44-113 Delayed Compliance, Limited Trade Vessel:** Until July 1, 1992, sections 8-44-301 through 304 of this Rule shall not apply to the loading of organic liquids into vessels making infrequent visits.~~

~~**8-44-114 Delayed Compliance, Small Terminals:** Until July 1, 1992, sections 8-44-301 through 304 of this Rule shall not apply to small terminals.~~

8-44-115 Exemption, Safety/Emergency Operations: Nothing in this rule shall be construed to:

115.1 Require any act or omission that would be in violation of any regulation or other requirement of the United States Coast Guard; or

115.2 Prevent any act or omission that is necessary to secure the safety of a vessel or for saving life at sea.

8-44-116 Limited Exemption, Equipment Leaks: The requirements of Section 8-44-305 shall not apply to any source that is subject to the leak standards of Regulation 8, Rule 18.

8-44-200 DEFINITIONS

8-44-201 Aviation Gas: Gasoline suitable for use in piston-driven aircraft.

8-44-202 Background: The ambient concentration of total organic compounds determined at least 3 meters (10 feet) from the equipment to be inspected and not influenced by any specific emission point.

8-44-203 Ballasting: To load seawater into a marine tank vessel cargo tank to obtain proper propeller, rudder and hull immersion or to provide clearance under bridges or other potential obstacles.

8-44-204 California Coastal Waters: That area between the California coastline and a line starting at the California-Oregon border at the Pacific Ocean:

thence to 42.0°N	125.5°W
thence to 41.0°N	125.5°W
thence to 40.0°N	125.5°W
thence to 39.0°N	125.0°W
thence to 38.0°N	124.5°W
thence to 37.0°N	123.5°W
thence to 36.0°N	122.5°W
thence to 35.0°N	121.5°W
thence to 34.0°N	120.5°W
thence to 33.0°N	119.5°W
thence to 32.5°N	118.5°W

and ending at the California-Mexico border at the Pacific Ocean.

8-44-20510 Crude Oil: A naturally occurring mixture consisting predominantly of hydrocarbons and/or sulfur, nitrogen and oxygen derivatives of hydrocarbons thatwhich is removed from the earth in a liquid state or is capable of being so removed.

8-44-206 District Waters: The water bodies within the District's boundaries, including San Francisco Bay, San Pablo Bay, Suisun Bay, and Grizzly Bay and, in addition, the Pacific Ocean area beginning at the intersection of the Pacific Ocean and the Marin-Sonoma County boundary; and extending three miles westward to the California coastal boundary as defined in Article XXI of the California Constitution and Government Code section 170; then southeasterly along said California coastal boundary to a point due west of the intersection of the Pacific Ocean and the San Mateo-Santa Cruz boundary; then easterly to said intersection.

8-44-20705 Emission Control Equipment: Any equipment, machinery, apparatus or device used to recover or reduce emissions of organic vapors from escaping into the atmosphere.

8-44-208 Gas Freeing: The introduction of fresh air into a tank to lower the level of any flammable, toxic, or inert gas to that required for a specific purpose such as tank entry or hot work.

8-44-209 Gasoline: Any petroleum-derived, volatile mixture of hydrocarbons suitable for use as a fuel in a spark-ignited, internal combustion engine.

8-44-210 Gasoline Blending Stocks: Any organic liquid used as a component of gasoline, including, but not limited to aromatic or alcohol octane boosters and oxygenates, isomerate, reformate, alkylate, straight run gasoline, cat gasoline, pyrolysis gasoline, FCC gasoline and light hydrocrackate.

8-44-211 Inert Gas: A gas or a mixture of gases, such as flue gas, containing insufficient oxygen to support the combustion of hydrocarbons.

8-44-212 Inerting: The introduction of inert gas into a tank to lower the level of oxygen throughout the atmosphere of a tank below that necessary to support the combustion of hydrocarbons.

8-44-213 JP-4 Fuel: A naphtha and kerosene-based fuel used primarily as a military fuel that meets the specifications of MIL-T-5624, MIL-PRF-5624 or MIL-DTL-5624.

8-44-214 Lightering: The loading of organic liquid into a marine tank vessel from another marine tank vessel.

8-44-21507 Loading Event: An incident or occurrence beginning with the connecting of a marine terminal storage tanks or a marine tank vessel cargo tank to a receiving marine tank vessel by means of piping or hoses, the transferring of organic liquid cargo from the storage or cargo tank into the receiving marine tank vessel and ending with the disconnecting of the pipes or hoses.

8-44-21603 Marine Tank Vessel: Any marine vessel that transports or storeswhich is specially constructed or converted to carry liquid bulk cargo in tanks.

8-44-21701 Marine Terminal: Any facility or structure constructed to load or unload organic liquid bulk cargo into marine tank vessels.

8-44-21802 Marine Vessel: Any tugboat, tanker, freighter, passenger ship, barge or other boat, ship or watercraft (as defined in Section 39037.1 of the California Health and Safety Code) except those used primarily for recreation.

8-44-21906 Organic Compound, Precursor: Any organic compound as defined in Regulation 1 excepting the non-precursor organic compounds in Regulation 1-234.

8-44-220 Prior Cargo: The last cargo that was held in a marine tank vessel cargo tank before the current loading event. A cargo tank is no longer considered to have held a prior cargo of a regulated organic liquid once it has been vented of organic gases and cleaned with an unregulated organic liquid or with an inorganic liquid.

8-44-221 Purging: The introduction of inert gas into a tank already in the inert condition with the object of (1) further reducing the existing oxygen content, or (2) reducing the existing hydrocarbon gas content to a level below which combustion cannot be supported if air is subsequently introduced into the tank, or (3) accomplishing both of the foregoing objects.

8-44-22204 Regulated Organic Liquid: For the purpose of this ruleRule, regulated organic liquid is:

222.1 Until January 1, 2007:~~defined as~~ all gasoline, gasoline blending stocks, aviation gas~~,~~ ~~and aviation fuel (~~JP-4 fuel~~type)~~ and crude oil.

222.2 Effective January 1, 2007: all gasoline, gasoline blending stocks, aviation gas, JP-4 fuel, crude oil, and any other organic compound or mixture of organic compounds that exists as a liquid at actual conditions of use or storage that has a flash point less than 100 degrees F.

8-44-223 Tank Cleaning: The process of removing hydrocarbon vapors, liquid, or residue from a tank, generally to allow entry for inspection or hot work or to allow a change of cargo.

8-44-224 Unregulated Organic Liquid: Any organic compound or mixture of organic compounds that exists as a liquid at actual conditions of use or storage and that is not a regulated organic liquid.

8-44-225 Vent: To release hydrocarbon gases from a marine tank vessel cargo tank through the manual or automatic opening of tank vents, hatches, or other openings for the purpose of reducing tank internal pressure or in connection with inerting, purging, tank cleaning, or gas freeing.

~~**8-44-208 Leak Free:** A liquid leak of less than four drops per minute.~~

~~**8-44-209 Gas Tight:** A condition that exists when the concentration of precursor organic compounds, measured 1 centimeter from any source, does not exceed 10,000 ppm (expressed as methane)~~~~,~~ ~~above background.~~

~~**8-44-211 Loading of Organic Liquid:** The loading of an organic liquid or the loading into a tank vessel where the prior cargo was an organic liquid.~~

~~**8-44-212 Infrequent Visits:** Not more than two loading events for any tank vessel in the District in any calendar year.~~

~~**8-44-213 Small Terminal:** Any marine terminal with a total organic liquid loading of less than 159,000 cubic meters (1,000,000 bbls) in any calendar year after 1985. Any marine terminal that loads more than 159,000 cubic meters (1,000,000 bbls) in any calendar year after 1985 cannot qualify for the small terminal exemption.~~

8-44-300 STANDARDS

~~**8-44-301 Marine Terminal Loading Limit**: By July 1, 1991, a person shall not load or permit the loading of an organic liquid into a marine tank vessel within the District unless:~~

~~301.1 The emissions of precursor organic compounds are limited to 5.7 grams per cubic meter (2 lbs per 1000 bbls) of organic liquid loaded, or~~

~~301.2 The emissions of precursor organic compounds are reduced at least 95 percent by weight from uncontrolled conditions.~~

8-44-301 Limitations on Marine Tank Vessel Loading and Lightering: A person shall not conduct either of the following loading operations within the District or District Waters unless emissions from the loading event are controlled in accordance with the requirements of Section 8-44-304:

301.1 Loading a regulated organic liquid into a cargo tank of a marine tank vessel; or

301.2 Loading any liquid into a cargo tank of a marine tank vessel when the tank's prior cargo was a regulated organic liquid.

~~**8-44-302 Emission Control Equipment:** The emission control equipment shall be designed and operated to collect and process all organic compound emissions from the loading of organic liquids into marine vessels.~~

8-44-302 Limitations on Marine Tank Vessel Ballasting: Within District waters, a person shall not ballast into a cargo tank for which the prior cargo was a regulated organic liquid unless either of the following requirements is met:

302.1 Emissions are controlled in accordance with the requirements of Section 8-44-304; or

302.2 Emissions are limited to the extent possible through the use of any combination of segregated ballast tanks, dedicated clean ballast tanks, internal vapor balancing, and compression ballasting.

~~**8-44-303 Operating Practice:** Effective July 1, 1991, all hatches, pressure relief valves, connections, gauging ports and vents associated with the loading of organic liquid~~

~~into marine vessels at a marine terminal shall be maintained to be leak free and gas tight. The owner or operator of any equipment associated with the loading of organic liquid into tank vessels at a marine terminal shall maintain that equipment to be leak free and gas tight.~~

8-44-303 Limitations on Marine Tank Vessel Venting: Within the District or District Waters, a person shall not vent a cargo tank containing a regulated organic liquid or for which the prior cargo was a regulated organic liquid unless either of the following requirements is met:

303.1 Emissions are controlled in accordance with the requirements of Section 8-44-304; or

303.2 The venting occurs through (1) the automatic operation of a pressure relief valve (PRV), or other pressure relieving device intended to protect the integrity of the tank, set at the highest setpoint approved by the United States Coast Guard, or (2) manual venting to avoid an automatic release through such a PRV or device with such a setpoint when tank pressure has reached 90% of such setpoint and an automatic release is imminent.

~~**8-44-304 Equipment Maintenance:** Effective July 1, 1991, a person shall not load or permit the loading of organic liquid into a marine vessel unless:~~

~~304.1 The owner or operator of the tank vessel loading organic liquid certifies to the terminal that the vessel is leak free, gas tight and in good working order, and~~

~~304.2 Loading ceases any time gas or liquid leaks as defined by Section 8-44-208 or 209 are discovered. Loading may continue only after leak(s) have been repaired.~~

8-44-304 Emission Control Requirements: A person conducting an operation from which emissions must be controlled pursuant to Section 8-44-301, 302 or 303 shall:

304.1 Limit emissions of organic compounds to 5.7 grams per cubic meter (2 lbs per 1000 bbls) of organic liquid loaded, or reduce emissions by at least 95 percent by weight from uncontrolled conditions; and

304.2 Use emission control equipment that is designed and operated to collect and process all organic compound emissions from the loading, ballasting, or venting operation.

~~**8-44-305 Ozone Excess Day Prohibition:** Effective July 1, 1989, and thereafter, loading of organic liquid into any marine tank vessel shall not be allowed on any day that the District predicts an excess of any Federal Ambient Air Quality Standard for ozone unless the emissions of precursor organic compounds are reduced at least 95% by weight from uncontrolled conditions, or they are limited to 5.7 grams per cubic meter (2 lbs/1000 barrels).~~

8-44-305 Equipment Leaks: The following requirements apply to any loading or lightering operation subject to Section 8-44-301, and, if conducted at a marine terminal, any ballasting operation subject to Section 8-44-302 or venting operation subject to Section 8-44-303.1:

305.1 Except as allowed by Section 8-44-305.4, the owner or operator of a marine terminal shall maintain all equipment associated with the operation up to, but not including, the first connection at the vessel being loaded such that the following limits are not exceeded:

1.1 Three drops per minute for any liquid leak; and

1.2 1,000 ppm (expressed as methane, above background) for any gaseous leak as determined pursuant to Section 8-44-603.

305.2 Except as allowed by Section 8-44-305.4, the owner or operator of a marine vessel shall maintain all hatches, pressure relief valves, connections, gauging ports and vents, and any other equipment associated with the operation up to and including the first connection at the vessel to a loading terminal or to another vessel such that the following limits are not exceeded:

2.1 Three drops per minute for any liquid leak; and

2.2 10,000 ppm (expressed as methane, above background) for any gaseous leak as determined pursuant to Section 8-44-603.

305.3 Effective January 1, 2007, the owner or operator of any marine terminal or marine tank vessel engaging in an operation subject to Section 8-44-305

shall inspect the marine terminal equipment or marine tank vessel equipment for compliance with the applicable requirements of Section 8-44-305.1 or 305.2 during the operation. Vessels shall be inspected prior to loading more than 20% of the cargo.

305.4 If an owner or operator discovers a leak that exceeds the limits of Section 8-44-305.1 or 305.2, the owner or operator shall immediately tag the liquid or gas leak, shall minimize the leak within 4 hours of discovery, and shall repair the leak prior to commencement of the next operation subject to the control requirements of Section 8-44-304. If the APCO discovers a leak that exceeds the limits of Section 8-44-305.1 or 305.2, the leak shall constitute a violation of this rule.

8-44-400 ADMINISTRATIVE REQUIREMENTS

~~**8-44-401 Compliance Schedule**: Any owner or operator of a marine terminal subject to Sections 8-44-301 through 305 of this Rule shall comply with the following increments of progress:~~

~~401.1 By July 1, 1989, submit to the APCO a control plan which describes the steps and schedule that will be taken to achieve compliance with the requirements of this Rule. This plan must be updated annually until final compliance with Section 8-44-301 is achieved.~~

~~401.2 By January 1, 1990, submit to the APCO an application for an authority to construct any shore side equipment required to comply with the requirements of Section 8-44-301.~~

~~Failure to meet any provision of the plans submitted in accordance with Section 8-44-401 is considered a violation.~~

~~**8-44-402 Safety/Emergency Operations:** Nothing in this rule shall be construed as to~~ require ~~the following as long as the provisions of Section 8-44-502.3 are followed~~:

~~402.1 Require any act or omission that would be in violation of any regulation or other requirement of the United States Coast Guard or;~~

~~402.2 Prevent any act or omission that is necessary to secure the safety of a vessel or for saving life at sea.~~

8-44-403 Notifications Regarding Safety/Emergency Exemption: Effective January 1, 2007, whenever the owner or operator of a marine terminal or marine tank vessel determines that compliance with this rule would (1) require an act or omission that would be in violation of any regulation or other requirement of the United States Coast Guard or (2) prevent an act or omission that is necessary to secure the safety of a vessel or for saving life at sea and therefore invokes the exemption in Section 8-44-115, the APCO shall be notified in writing within 48 hours. The notification shall include a complete description of the circumstances that require the use of the exemption.

8-44-404 Notifications for Operations Conducted Other Than at Marine Terminals: Effective January 1, 2007, the owner or operator of a marine tank vessel that will conduct (1) a lightering operation subject to Section 8-44-301, (2) a ballasting operation subject to Section 8-44-302, or (3) cleaning within District Waters of tanks that contain a regulated organic liquid or had a prior cargo of a regulated organic liquid, shall provide written notice to the APCO no less than 24 hours prior to beginning the operation and, in addition, shall provide the following information:

404.1 The name of the marine tank vessel:

404.2 The San Francisco Bay Area agent for the vessel;

404.3 A description of the operation;

404.4 The location of the operation;

404.5 For lightering, the type (common name and trade designation), the amount of each organic liquid cargo to be loaded and the means to be used to comply with Section 8-44-301.

404.6 For ballasting, the amount of ballast water to be loaded into cargo tanks, the prior cargo (common name and trade designation) in the tanks, and the means to be used to comply with Section 8-44-302.

404.7 For tank cleaning, the approximate combined capacity of the tanks to be cleaned, the prior cargo (common name and trade designation) of each tank, and a description of the method to be used to clean each tank.

8-44-500 MONITORING AND RECORDS

~~**8-44-501 Record Keeping**: Effective February 1, 1989, a person subject to Sections 8-44-110, 111, 113, 114, 301 through 305 of this Rule shall maintain operating records regarding each loading event. The records shall be maintained at the terminal for at least two years and shall be made available to the APCO upon request. The records shall include but are not limited to:~~

~~501.1 The name and location of the marine terminal at which the loading event occurred.~~

~~501.2 The company responsible for the operation of the marine terminal.~~

~~501.3 The date(s) and times at which the tank vessel arrived and departed from the marine terminal.~~

~~501.4 The name, registry of the vessel loaded and legal owner of the vessel.~~

~~501.5 The prior cargo carried by that tank vessel.~~

~~501.6 The type and amount of organic liquid cargo loaded into the tank vessel.~~

~~501.7 The condition of the tanks prior to being loaded, i.e., cleaned, crude oil washed, gas freed, etc.~~

8-44-501 Record Keeping – Marine Terminals: The owner or operator of a marine terminal subject to this rule shall maintain the following records. The records shall be maintained at the terminal for at least five years and shall be made available to the APCO upon request.

501.1 For each loading event of any organic liquid, records that include the following information:

1.1 The name of the vessel loaded;

1.2 The owner, country of registration, operator or charterer (if applicable), and San Francisco Bay Area agent for the vessel;

1.3 The arrival and departure dates and times for the vessel;

1.4 For each cargo tank loaded, the tank identifying number or designation, the type (common name and trade designation) and amount of each organic liquid cargo loaded;

1.5 Effective January 1, 2007, for each cargo tank loaded with an organic liquid cargo other than gasoline, gasoline blending stocks, aviation gas, JP-4 fuel, or crude oil, the flash point of the organic liquid cargo loaded and the temperature of the liquid as loaded;

1.6 For each cargo tank loaded, the prior cargo (common name and trade designation) carried by the tank and, for prior cargo other than gasoline, gasoline blending stocks, aviation gas, JP-4 fuel, or crude oil, the flash point of the prior cargo;

1.7 For any required flash point data, the source of the data and a copy of the source document or analysis;

1.8 The condition of each tank prior to being loaded (inerted, gas freed, crude oil washed, water washed, organic liquid flushed (including flushing liquid), etc.)

1.9 The means used to comply with Section 8-44-304;

1.10 Effective January 1, 2007, date and time of inspections required by Section 8-44-305.3, and identification of equipment discovered to have a liquid or gas leak in excess of the limits in Section 8-44-305.1, including time of discovery, measured liquid leak rate or organic concentration, measures taken to minimize or repair the leak, repaired leak rate and the time these measures were completed.

501.2 For each ballasting operation subject to Section 8-44-302 conducted at a marine terminal, records that include the following information:

2.1 The information specified in Sections 8-44-501.1.1 through 501.1.3;

2.2 For each cargo tank loaded with ballast water, the tank identifying number or designation, and amount of ballast water loaded;

2.3 For each cargo tank loaded with ballast water, the prior cargo (common name and trade designation) carried by the tank;

2.4 The means used to comply with Section 8-44-302.

2.5 Effective January 1, 2007, date and time of inspections required by Section 8-44-305.3, and identification of equipment discovered to have a liquid or gas leak in excess of the limits in Section 8-44-305.1, including time of discovery, measured liquid leak rate or organic concentration, measures taken to minimize or repair the leak, repaired leak rate and the time these measures were completed.

501.3 For each venting operation subject to Section 8-44-303.1 conducted at a marine terminal, records that include the following information:

3.1 The information specified in Sections 8-44-501.1.1 through 501.1.3;

3.2 For each cargo tank vented, the tank identifying number or designation and the prior cargo (common name and trade designation) carried by the tank;

3.3 For each cargo tank vented, the activity leading to the venting (inerting, purging, gas freeing, tank cleaning, or other specified activity);

3.4 The means used to comply with Section 8-44-303.

3.5 Effective January 1, 2007, date and time of inspections required by Section 8-44-305.3, and identification of equipment discovered to have a liquid or gas leak in excess of the limits in Section 8-44-305.1, including time of discovery, measured liquid leak rate or organic concentration, measures taken to minimize or repair the leak, repaired leak rate and the time these measures were completed.

8-44-502 Record Keeping – Marine Tank Vessels: Effective January 1, 2007, the San Francisco Bay Area owner, operator, or agent for a marine tank vessel shall maintain the following records. The records shall be maintained by the owner, operator, or agent for at least five years and shall be made available to the APCO upon request.

502.1 For each lightering operation subject to Section 8-44-301, records that include the following information:

1.1 The name of the vessels involved;

1.2 The owner, country of registration, operator or charterer (if applicable), and San Francisco Bay Area agent for each vessel;

1.3 The beginning and ending dates and times for operation;

1.4 The location of the operation;

1.4 For each cargo tank loaded, the tank identifying number or designation, the type (common name and trade designation) and amount of each organic liquid cargo loaded;

1.5 For each cargo tank loaded, the prior cargo (common name and trade designation) carried by the tank;

1.6 The condition of each tank prior to being loaded (inerted, gas freed, crude oil washed, water washed, organic liquid flushed (including flushing liquid), etc.)

1.7 The means used to comply with Section 8-44-301;

1.8 ~~Effective January 1, 2007,~~ Date and time of inspections required by Section 8-44-305.3, and identification of equipment discovered to have a liquid or gas leak in excess of the limits in Section 8-44-305.2, including time of discovery, measured liquid leak rate or organic concentration, measures taken to minimize or repair the leak, repaired leak rate and the time these measures were completed.

502.2 For each ballasting operation subject to Section 8-44-302, records that include the following information:

2.1 The name of the vessel;

2.2 The owner, country of registration, operator or charterer (if applicable), for the vessel;

2.3 The beginning and ending dates and times for operation;

2.4 The location of the operation;
2.5 The amount of ballast water loaded into cargo tanks and the prior cargo (common name and trade designation) for the tanks;
2.6 The means used to comply with Section 8-44-302.
2.7 ~~Effective January 1, 2007, -~~Date and time of inspections required by Section 8-44-305.3, and identification of equipment discovered to have a liquid or gas leak in excess of the limits in Section 8-44-305.2, including time of discovery, measured liquid leak rate or organic concentration, measures taken to minimize or repair the leak, repaired leak rate and the time these measures were completed.

502.3 For each venting operation subject to Section 8-44-303.1, records that include the following information:
3.1 The name of the vessel;
3.2 The owner, country of registration, operator or charterer (if applicable), for the vessel;
3.3 A description of the venting operation;
3.4 The beginning and ending dates and times for operation;
3.5 The location of the operation;
3.6 The prior cargo (common name and trade designation) for the tanks;
3.7 The means used to comply with Section 8-44-303.
3.8 ~~Effective January 1, 2007, -~~Date and time of inspections required by Section 8-44-305.3, and identification of equipment discovered to have a liquid or gas leak in excess of the limits in Section 8-44-305.2, including time of discovery, measured liquid leak rate or organic concentration, measures taken to minimize or repair the leak, repaired leak rate and the time these measures were completed.

502.4 For each tank cleaning operation involving tanks that contain a regulated organic liquid or that had a prior cargo of a regulated organic liquid and that was conducted (1) within District Waters or (2) within California Coastal Waters by a vessel on a voyage that involved a call at a port or marine terminal within the District or District Waters:
4.1 The name of the vessel;
4.2 The owner, country of registration, operator or charterer (if applicable), for the vessel;
4.3 The beginning and ending dates and times for operation;
4.4 The location of the operation;
4.5 The designation or number of each tank cleaned, the volume of each tank, the prior cargo (common name and trade designation) of each tank, and a description of the method used to clean each tank.

8-44-503 Record Keeping - Exemptions: Effective January 1, 2007, a person that performs an operation and that seeks exemption for that operation under Sections 8-44-110 or 111 shall maintain the following records. These records shall be retained for at least five years and shall be made available to the APCO upon request.

503.1 For Section 8-44-110: The date of the loading event, names of loading and receiving vessels, location of the event, type of material loaded (common name and trade designation), and volume of load.
503.2 For Section 8-44-111: The date of the loading event, names of loading and receiving vessels, location of the event, type of material loaded (common name and trade designation), and volume of load.
503.3 For Section 8-44-115: The date of the operation, names of any vessels involved, location of the operation, and description of the operation.

8-44-504~~2~~ Burden of Proof: Persons seeking to demonstrate compliance with S~~ubs~~ection 8-44-304~~1.1~~ must maintain adequate test data and provide verification opportunities to the APCO on request.

8-44-600 MANUAL OF PROCEDURES

8-44-601 Determination of Emissions~~s~~ Factors and Emission Control Equipment Efficiencies: Emission~~s~~ factors of ~~precursor~~ organic compounds, or the emission reduction efficiency of a control device, as specified in Section 8-44-304.1,~~301~~ shall be determined during the final 50% of the loading event, or for at least 6 hours during the final 50% of the loading event. Emissions shall be determined in accordance with one of the following methods: 1) BAAQMD Manual of Procedures, Volume IV, ST-34; 2) U.S. EPA Method 25; 3) U.S. EPA Method 25A; 4) an alternate method approved in writing by the APCO and U.S. EPA.~~measured as prescribed in the Manual of Procedures, Volume IV, ST-34. This test shall be conducted so that the emissions from at least the last 50 percent of the total organic liquid loaded are included.~~

~~**8-44-602 Efficiency and Mass Emission Determination (Vapor Processing System)**: The means by which mass emission rates of vapor processing systems are determined is set forth in the Manual of Procedures, Volume IV, ST-4.~~

8-44-603 ~~Leak Tests And Gas Tight~~Leak Determinations: ~~The m~~Measurements of ~~precursor~~ organic compounds ~~from equipment~~ to determine whether equipment is~~they are leak free and gas tight~~ leaking in violation of Section 8-44-305.1 or 305.2 shall be made in accordance with EPA Reference Method 21 (40 CFR 60, Appendix A), or by an alternate method approved in writing by the APCO and U.S. EPA~~the provisions contained in EPA reference method 21~~.

8-44-604 Flash Point Determinations: Measurements of flash point required by this rule shall be in accordance with ASTM Standard Test Method D56 ("Standard Test Method for Flash Point by Tag Closed Cup Tester") or ASTM Standard Test Method D93 ("Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester"), whichever is applicable, or by an alternate method approved in writing by the APCO and U.S. EPA.

~~REGULATION 8~~
~~ORGANIC COMPOUNDS~~
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REGULATION 8
ORGANIC COMPOUNDS
RULE 46
MARINE TANK VESSEL TO MARINE TANK VESSEL LOADING

(Adopted July 12, 1989)

8-46-100 GENERAL

8-46-101 Description: The purpose of this Rule is to limit emissions of precursor organic compounds into the atmosphere resulting from the loading of liquid into a marine tank vessel from another marine tank vessel.

8-46-110 Exemption, Loading Events: Sections 8-46-301 through 305 of this Rule shall not apply to loading events of less than 159 cubic meters (1,000 bbls).

8-46-200 DEFINITIONS

8-46-201 Crude Oil: A naturally occurring mixture consisting predominantly of hydrocarbons and/or sulfur, nitrogen and oxygen derivatives of hydrocarbons which is removed from the earth in a liquid state or is capable of being so removed.

8-46-202 Emission Control Equipment: Any equipment, machinery, apparatus or device used to recover or reduce emissions of precursor organic compounds from escaping into the atmosphere.

8-46-203 Gas Tight: A condition that exists when the concentration of precursor organic compounds, measured 1 centimeter from any source, does not exceed 10,000 ppm (expressed as methane) above background.

8-46-204 Leak Free: A liquid leak of less than four drops per minute.

8-46-205 Loading Event: An incident or occurrence beginning with the connecting of a marine tank vessel to a marine tank vessel by means of pipes or hoses, the transferring of liquid cargo from one marine tank vessel to the other marine tank vessel and ending with the disconnecting of the pipes or hoses. In addition, emissions resulting from venting of precursor organic compounds within the District prior to or after a loading event are included in that loading event.

8-46-206 Marine Tank Vessel: Any marine vessel which is specially constructed or converted to carry liquid bulk cargo in tanks.

8-46-207 Marine Terminal: Any facility or structure constructed to load or unload organic liquid bulk cargo into or out of marine tank vessels.

8-46-208 Marine Vessel: Any tugboat, tanker, freighter, passenger ship, barge or other boat, ship or watercraft (as defined in Section 39037.1 of the California Health and Safety Code) except those used primarily for recreation.

8-46-209 Organic Compound, Precursor: Any organic compound as defined in Regulation 1, Section 233 excepting the non-precursor organic compounds in Regulation 1, Section 234.

8-46-210 Organic Liquid: For the purpose of this Rule, organic liquid is defined as all gasoline, gasoline blending stocks, aviation gas and aviation fuel (JP-4 type) and crude oil.

8-46-300 STANDARDS

8-46-301 Marine Tank Vessel To Marine Tank Vessel Loading Limit: By July 1, 1991, a person shall not conduct a loading event within the District unless:

301.1 The emissions of precursor organic compounds are limited to 5.7 grams per cubic meter (2 lbs per 1000 bbls) of liquid loaded into a marine tank vessel from another marine tank vessel, or

301.2 The emissions of precursor organic compounds are reduced at least 95 percent by weight from uncontrolled conditions.

8-46-302 Emission Control Equipment: The emission control equipment shall be designed and operated to collect and process all emissions of precursor organic compounds resulting from a loading event.

8-46-303 Operating Practice: Effective July 1, 1991, all hatches, pressure relief valves, connections, gauging ports and vents associated with a loading event shall be maintained to be leak free and gas tight. The owner or operator of any equipment associated with the loading event shall maintain that equipment to be leak free and gas tight.

8-46-304 Equipment Maintenance: Effective July 1, 1991, a person shall not initiate or continue a loading event unless:

304.1 The owners or operators of the marine tank vessels certify that the marine tank vessels are leak free, gas tight and in good working order, and

304.2 Loading ceases any time gas or liquid leaks as defined by Sections 8-46-203 and 204, respectively, are discovered. Loading may continue only after leak(s) have been repaired.

8-46-305 Ozone Excess Day Prohibition: Effective July 15, 1989, and thereafter, loading events shall not be allowed on any day that the District predicts an excess of any Federal Ambient Air Quality Standard for ozone unless the emissions of precursor organic compounds meet the standards of Section 8-46-301.

8-46-400 ADMINISTRATIVE REQUIREMENTS

8-46-401 Compliance Schedule:

401.1 Any owner or operator of a marine tank vessel to be used in lightering operations subject to Sections 8-46-301 through 305 of this Rule shall, by January 1, 1990, submit to the APCO a control plan which describes the steps and schedule that will be taken to achieve compliance with the requirements of this Rule.

401.2 Any owner or operator of a marine terminal shall, by January 1, 1990, submit to the APCO a control plan which describes the steps and schedule that will be taken to achieve compliance with the requirements of this Rule.

401.3 This plan must be updated annually until final compliance with Section 8-46-301 is achieved.

401.4 Failure to meet any provision of a plan submitted in accordance with Section 8-46-401 is considered a violation.

8-46-402 Safety/Emergency Operations: Nothing in this rule shall be construed as to:

402.1 Require any act or omission that would be in violation of any regulation or other requirement of the United States Coast Guard or;

402.2 Prevent any act or omission that is necessary to secure the safety of a vessel or for saving life at sea.

8-46-403 Notification: Until July 1, 1993, the operator of a marine tank vessel intending to engage in a loading event shall notify the APCO. Notification should be in writing although notification by telephone or in person may be made during normal District business hours. Notification must be received by the APCO at least 24 hours prior to the loading event and include names of marine tank vessels, operators, cargo, location, plus estimated start and duration of loading event.

8-46-500 MONITORING AND RECORDS

8-46-501 Record Keeping: Effective January 1, 1990, a person subject to Sections 8-46-110, and 301 through 305 of this Rule shall maintain operating records regarding each loading event. The records shall be maintained for at least two years and shall be made available to the APCO upon request. The records shall include but are not limited to:

501.1 The location of each loading event.

501.2 The company responsible for the operation of the loading event.

501.3 The date(s) and times at which the marine tank vessels arrived and departed from location of the loading event.

501.4 The name, registry of the vessels and legal owner of the marine tank vessels participating in the loading event.

501.5 The prior cargo carried by the receiving marine tank vessel.

501.6 The type and amount of liquid cargo loaded into the receiving marine tank vessel.

501.7 The condition of the receiving tanks prior to being loaded,(i.e., cleaned, crude oil washed, gas freed, etc).

501.8 Equipment maintenance certification required in accordance with Section 8-46-304.

501.9 Amount of ballast water added to unsegregated ballast tanks.

501.10 Description of operating procedure to prevent venting while ballasting into unsegregated ballast tanks.

501.11 The departure and arrival ports or marine terminals for all the marine tank vessels participating in a loading event.

8-46-502 Burden of Proof: Persons seeking to demonstrate compliance with Subsection 8-46-301 must maintain adequate test data and provide verification opportunities to the APCO on request.

8-46-600 MANUAL OF PROCEDURES

8-46-601 Determination of Emissions: Emissions of precursor organic compounds as specified in Section 8-46-301 shall be measured as prescribed in the Manual of Procedures, Volume IV, ST-34. This test shall be conducted so that the emissions from at least the last 50 percent of the total liquid loaded are included.

8-46-602 Efficiency and Mass Emission Determination (Vapor Processing System): The means by which mass emission rates of vapor processing systems are determined is set forth in the Manual of Procedures, Volume IV, ST-4.

8-46-603 Leak Tests And Gas Tight Determinations: The measurement of precursor organic compounds from equipment to determine whether they are leak free and gas tight shall be in accordance with the provisions contained in EPA Reference Method 21.

Source Test Procedure **ST-34**

BULK AND MARINE LOADING TERMINALS VAPOR RECOVERY UNITS

(Adopted October 7, 1987)

REF: Regulations 8-33-301, 308, 309, 8-6-302.1 and 8-44-301

1. APPLICABILITY

1.1 This procedure is applicable for quantifying the non-methane organic carbon (NMOC) emissions from organic compound bulk distribution and marine loading terminals that utilize refrigeration, carbon adsorption, or incineration vapor recovery systems (VRS). It is applicable for the determination of compliance with Regulation 8-33-301, 308, and 309 and Regulation 8-6-302.1, and 8-44-301.

2. PRINCIPLE

2.1 For refrigeration or carbon adsorption units, the exhaust gas volume and NMOC outlet concentrations are continuously monitored at the VRS outlets. From these parameters, and the total volume of organic liquid loaded, the emission factor of the VRS is determined. In some instances, the exhaust gas volume cannot be accurately measured. Using carbon vessel volume, purge and back flow volume, carbon density, loading information, and inlet and outlet NMOC concentrations, the outlet volumes can be calculated.

2.~~2~~1.1 A Flame Ionization Detector (FID) may be used for the measurement of Total Organic Carbon (TOC) provided that the product of the percentages of CO_2 and H_2O vapor in the gas stream do not exceed 100. In this event, the applicable EPA Reference Method shall be used.

2.2 For incineration units, the TOC concentration and inlet volume to the incinerator are monitored. The TOC, carbon dioxide, and carbon monoxide concentrations in the exhaust gas are also continuously measured and recorded. From these parameters, and the total volume of organic liquid loaded, the emission factor of the VRS is determined.

2.3 The methane content of the sample shall be determined by either (a) integrated sampling and GC/FID analysis using EPA Method 18 or BAAQMD Laboratory Method 17 or (b) directing a potion of the conditioned sample through a bed of activated carbon, for NMOC adsorption, prior to the hydrocarbon analyzer.

2.4 The NMOC concentration and exhaust volume from the vapor storage tank (VST) are continuously monitored and recorded during the test. From these parameters, the average NMOC concentration and mass emission rate are determined.

2.5 When the volume flow rate over the test duration varies by more than 10% from the average volume flow rate, the gas constituent average concentrations shall be determined on a flow-weighted basis. Flow-weighted averages shall be determined from data points that are not more than 20 seconds apart. The total mass flow of any given component shall be calculated from that component's flow-weighted average concentration and the total gas flow. Equations in sections 13, 14 and 15 shall use the flow-weighted averages in place of the applicable average concentration otherwise specified.

3. RANGE AND SENSITIVITY

3.1 The minimum and maximum measurable concentrations, as C_4, with the Non-Dispersive Infrared analyzers (NDIR) are 5 ppm and 100 percent, respectively.

3.2 The sensitivity of the NDIR analyzers shall not exceed one percent of full scale. The zero drift and calibration drift shall not exceed two percent of the span value. The calibration error shall not exceed three percent of the calibration gas value.

3.3 The minimum and maximum measurable concentrations, as C_1, with the Flame Ionization Detection hydrocarbon analyzer (FID) are 5 ppm and 100,000 ppm, respectively.

3.4 The sensitivity of the FID hydrocarbon analyzer shall not exceed one percent of full scale. The zero drift and calibration drift shall not exceed two percent of the span value. The calibration error shall not exceed three percent of the calibration gas value.

4. INTERFERENCES

4.1 The presence of vapor or liquid leaks in the collection, or vapor processing, system may preclude the use of this method. These leaks shall be repaired prior to start of the test.

5. APPARATUS - CARBON ADSORPTION AND REFRIGERATION UNITS

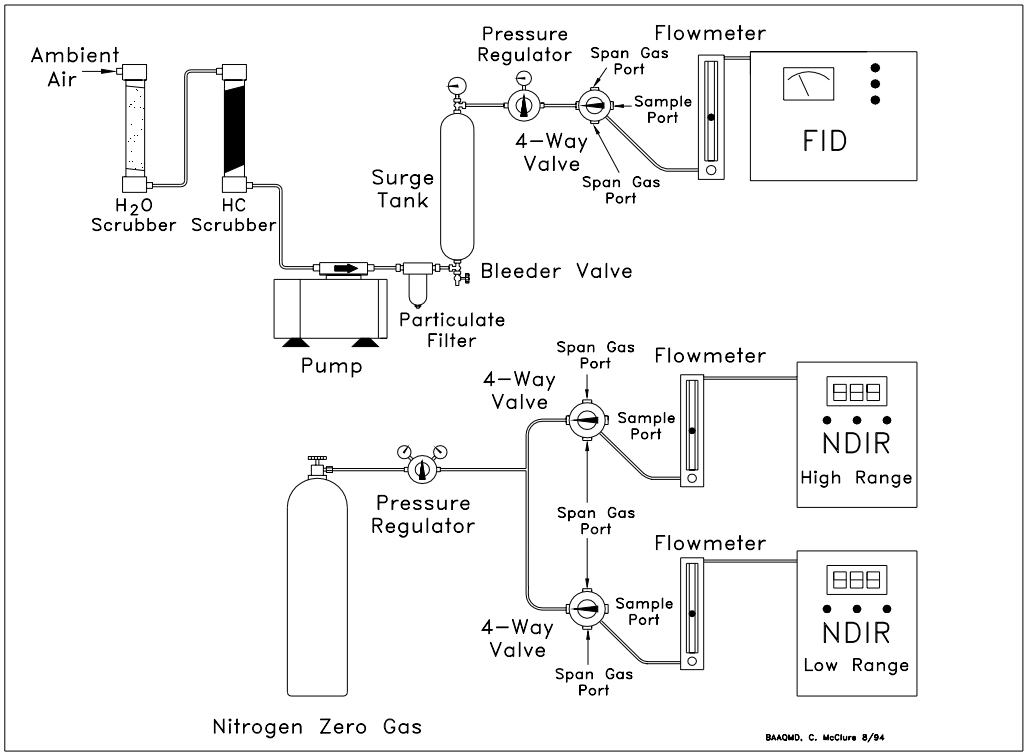
5.1 Non-Dispersive Infrared Hydrocarbon Analyzers. Use two Summit Analyzers Inc, model 703, or equivalent, to continuously monitor the outlet concentrations at the carbon adsorption or refrigeration units. A third NDIR analyzer shall be used to continuously monitor the NMOC concentration at the inlet to the units.

5.2 Turbine Meters. Use two appropriately sized Rockwell Turbine Meters, model Mark II Turbo-Meter, or equivalent, to measure the exhaust volumes from the outlet of the carbon beds or refrigeration units. The meters shall be equipped with temperature sensors and pressure gauges on the inlet side and a sample port on the outlet side. Each meter shall also be equipped with a pulse generator, or equivalent, for remote flow monitoring. The pressure drop across the meter shall not exceed two inches of water column (inches H_2O) at a flowrate of 1,000 cubic feet per minute.

5.2.1 Pitot Tube and Pressure Transducer. Some installations preclude the use of turbine meters. In this case, use an appropriately sized pitot tube in conjunction with a pressure transducer, Viatran Corporation Model 219, or equivalent, to determine the velocity heads at the centerline of the outlet duct during the test using BAAQMD Source Test Methods 17 and 18. The output of the transducer shall be continuously recorded on the strip chart recorder. In addition, the transducer/strip chart recorder shall differentiate and record the direction of flow.

Figure 34-1

Zero Air Systems



5.3 Rotary Gas Meter. Use a Roots Meter model 3M125, or equivalent, to measure the volume of purge air introduced into each carbon bed during the regeneration cycles.

5.4 Strip Chart Recorder. Use a six channel strip chart recorder, or equivalent, to continuously record the inlet and outlet NMOC concentrations, outlet temperatures, and flowrates from the turbine meters or pitot tube/transducer set-up.

5.5 Sample Pumps. Use leak-free Teflon lined, or equivalent, diaphragm pumps capable of maintaining a 14.3 liter per minute (0.5 CFM) flowrate at 380 millimeters of mercury (15 inches of mercury).

5.6 Zero-Air System. This system provides nitrogen for zeroing the NDIR analyzers and is assembled as shown in Figure 34-1.

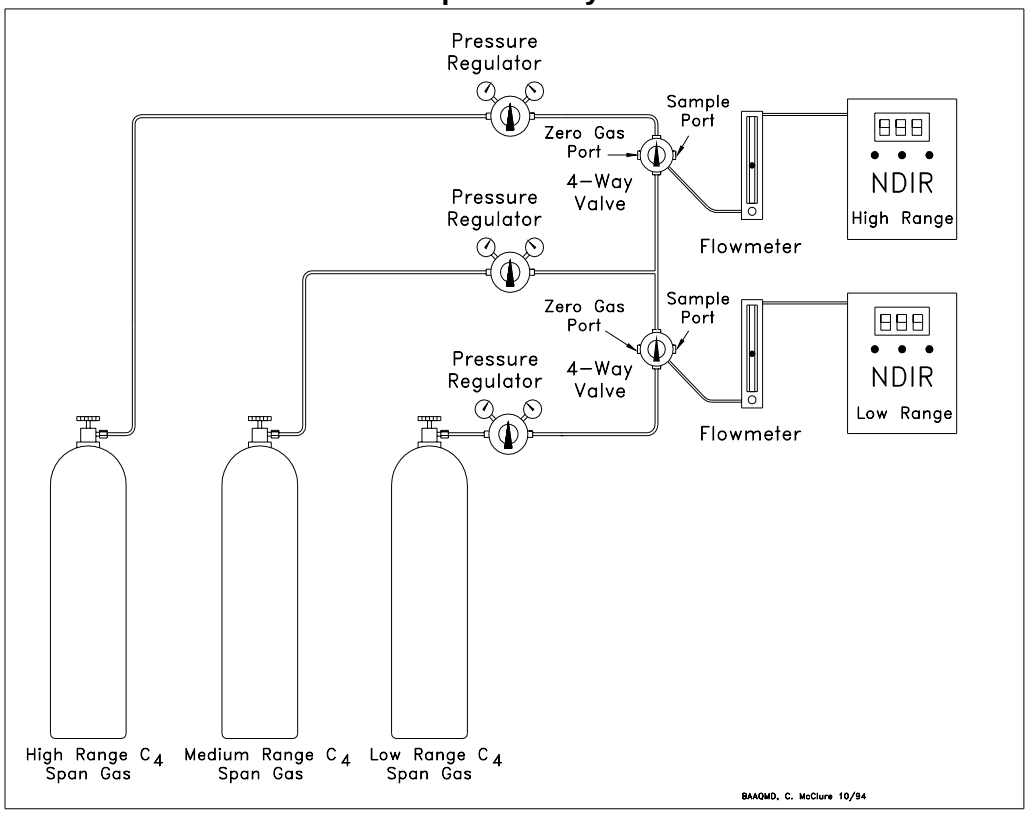
5.7 Span Gas System. This system delivers appropriate mixtures of span gas, in nitrogen, for the purpose of calibrating the NDIR analyzers during the test. The span gas system is assembled as shown in Figure 34-2.

5.8 Barometer. Use a mercury, aneroid, or other barometer accurate to within 1 millimeter of mercury (0.04 inches of mercury).

5.9 Combustible Gas Detector. Use an explosion-proof Bacharach Instrument Company model 0023-7356, or equivalent, calibrated with methane. This instrument shall be used to determine the vapor tightness of the collection system and pressure relief valves during the test.

Figure 34-2

NDIR Span Gas System



5.10 Vapor System Pressure Assembly. Use OPW 633-F and 633-D quick connect couplers, or equivalent, and Dwyer magnehelic gauge 2025, or equivalent, to measure the system pressure. The pressure gauge shall be installed as shown in Figure 34-7.

6. APPARATUS - THERMAL INCINERATION UNITS

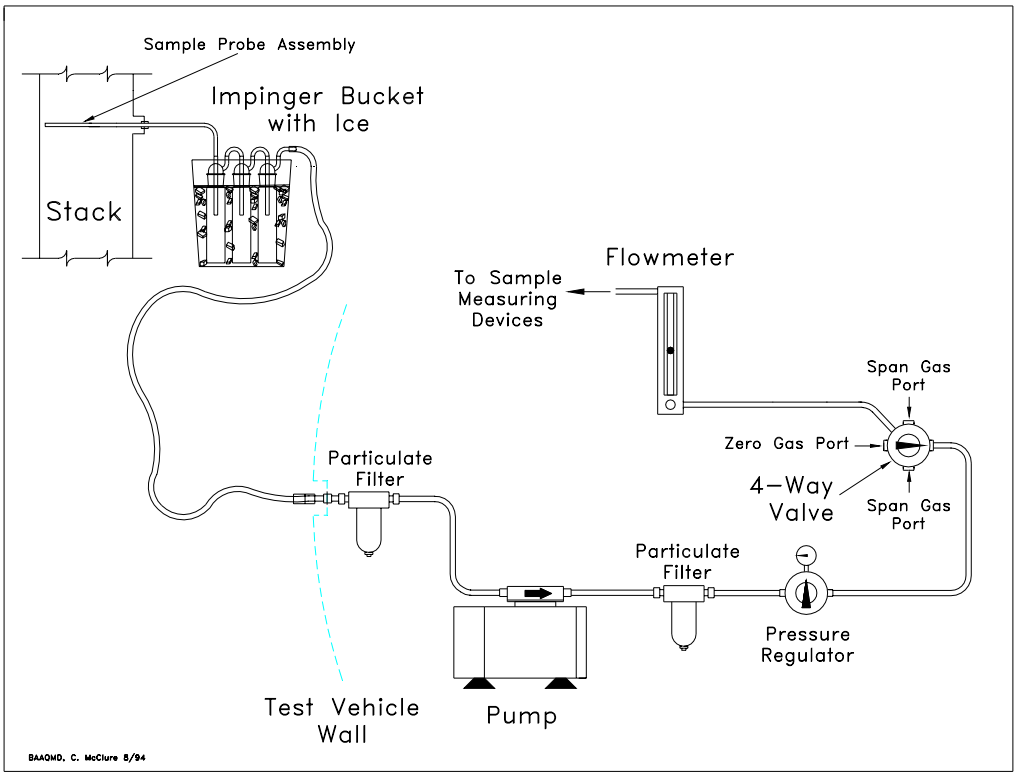
6.1 Non-Dispersive Infrared Hydrocarbon Analyzer. Use a Summit Analyzers Inc, model 703 or equivalent, to continuously monitor the concentration of hydrocarbons in the gas stream at the inlet of the incinerator. A Flame

Ionization Detector (FID) may also be used provided that, when necessary, an acceptable dilution apparatus is used.

6.2 Flame Ionization Detector. Use a Beckman, model 400, or equivalent, to continuously monitor the hydrocarbon concentration of the gas stream at the exhaust of the incinerator. The FID shall be calibrated using propane. Appropriate methodology shall be employed to allow the determination of both methane and NMOC concentrations.

Figure 34-3

Sample Gas Conditioning System



6.3 Carbon Dioxide Analyzer. Use a Summit Analyzers Inc, model 702D or equivalent, to continuously monitor the carbon dioxide concentration of the gas stream at the exhaust of the incinerator.

6.4 Carbon Monoxide Analyzer. Use a Summit Analyzers Inc, model 702D or equivalent, to continuously monitor the carbon monoxide concentration of the gas stream at the exhaust of the incinerator.

6.5 Oxygen Analyzer. Use a Summit Analyzers Inc, model 2200 or equivalent, to continuously monitor the oxygen concentration of the gas stream at the exhaust of the incinerator.

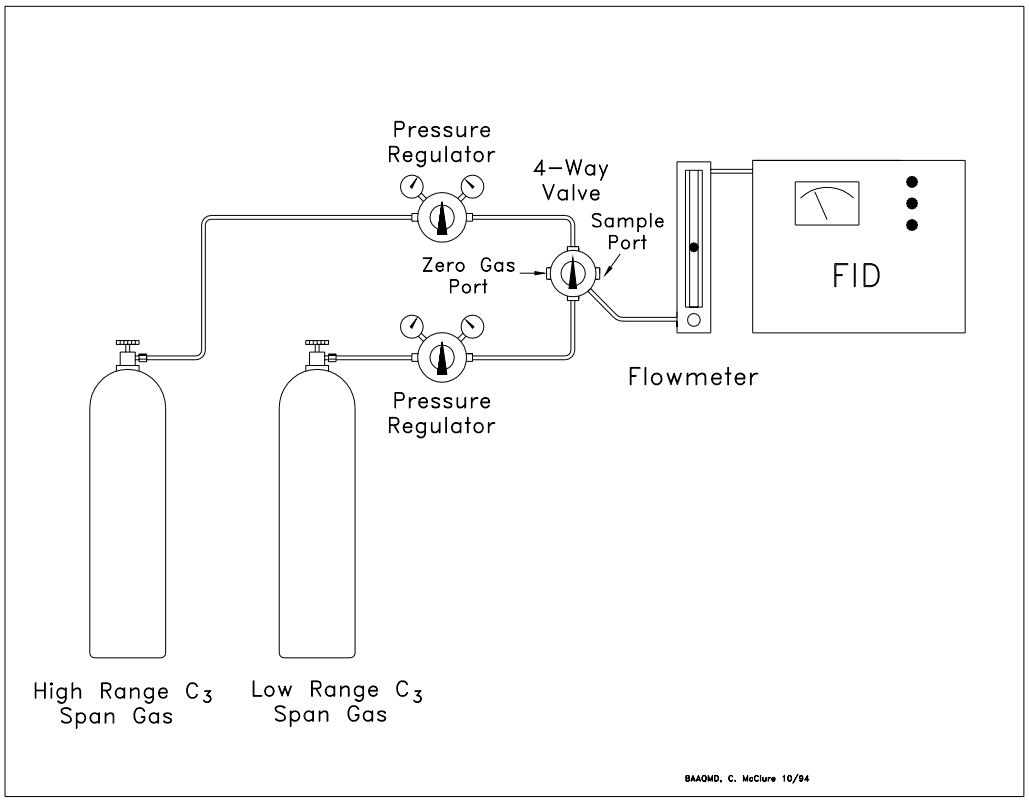
6.6 Turbine Meter. Use an appropriately sized Rockwell Turbine Meter, model Mark II Turbo-Meter or equivalent, to measure the inlet volume to the

incinerator. The turbine meter shall be equipped with a temperature sensor and pressure gauge on the inlet side and a sample port on the outlet side. The meter shall also be equipped with a pulse generator, or equivalent, for remote flowrate monitoring. The pressure drop across the meter shall not exceed two inches H_2O at a flowrate of 1,000 cubic feet per minute.

6.6.1 Pitot Tube and Pressure Transducer. Some installations preclude the use of turbine meters. In this case, use an appropriately sized pitot tube in conjunction with a pressure transducer, Viatran Corporation Model 219, or equivalent, to determine the velocity heads at the centerline of the duct during the test using BAAQMD Source Test Methods 17 and 18. The output of the transducer shall be continuously recorded on the strip chart recorder.

Figure 34-4

FID Span Gas System



6.7 Strip Chart Recorder. Use a six channel strip chart recorder, or equivalent, to continuously record the hydrocarbon concentration and flowrate at the incinerator inlet, and the hydrocarbon, carbon dioxide, carbon monoxide, and oxygen concentrations at the outlet of the incinerator.

6.8 Incinerator Sample Probe Assembly. Use a sample probe assembly as shown in Figure 34-6. The sample ports in the probe assembly shall be positioned according to the requirements set forth in Source Test Procedure ST-18, Stack Traverse Point Determination.

6.9 Sample Gas Conditioning System. This system removes entrained water from the sample stream. The sample gas conditioning system is assembled as shown in Figure 34-3.

6.10 Sample Pumps. Use two leak-free Teflon lined, or equivalent, diaphragm pumps capable of maintaining a 14.3 liter per minute (0.5 CFM) flowrate at 380 millimeters of mercury (15 inches of mercury).

6.11 Zero-Air System. This system provides air or nitrogen for zeroing the FID and NDIR analyzers, respectively, and is assembled as shown in Figure 34-1.

6.12 FID Span Gas System. This system delivers an appropriate mixture of gaseous propane, in air, for the purpose of calibrating the FID analyzers during the test. The span gas system is assembled as shown in Figure 34-4.

6.13 NDIR Span Gas System. This system delivers an appropriate mixture of gaseous butane or propane, in nitrogen, for the purpose of calibrating the NDIR analyzers during the test. The span gas system is assembled as shown in Figure 34-2.

6.14 Dry Gas Meter. Use a Rockwell gas meter, model 415 or equivalent, to measure the auxiliary gas introduced into the incinerator.

6.15 Barometer. Use a mercury, aneroid, or other barometer accurate to within 5 millimeters of mercury (0.2 inches of mercury).

6.16 Combustible Gas Detector. Use an explosion-proof Bacharach Instrument Company model 0023-7356, or equivalent, calibrated with methane. This instrument shall be used to determine the vapor tightness of the collection system, pressure relief valves, hatches, gauging ports, and miscellaneous vents, during the test.

6.17 Vapor System Pressure Assembly. Use OPW 633-F and 633-D quick connect couplers, or equivalent, and Dwyer magnehelic gauge 2025, or equivalent, to measure the system pressure. The pressure gauge shall be installed as shown in Figure 34-7.

7. APPARATUS - VAPOR STORAGE TANK (VST)

7.1 Non-Dispersive Infrared Hydrocarbon Analyzers. Use a Summit Analyzers Inc, model 703, or equivalent, to continuously monitor the outlet concentrations at the main VST vent or manway.

7.2 Turbine Meter/Check Valve Assembly. Use an appropriately sized Rockwell Turbine Meter, model Mark II Turbo-Meter, or equivalent, to measure the exhaust volume from the main outlet vent or manway of the VST. The meter shall be equipped with a temperature sensor and pressure gauge on the inlet side and a sample port on the outlet side. Each meter shall also be equipped with a pulse generator, or equivalent, for remote flow monitoring. The meter

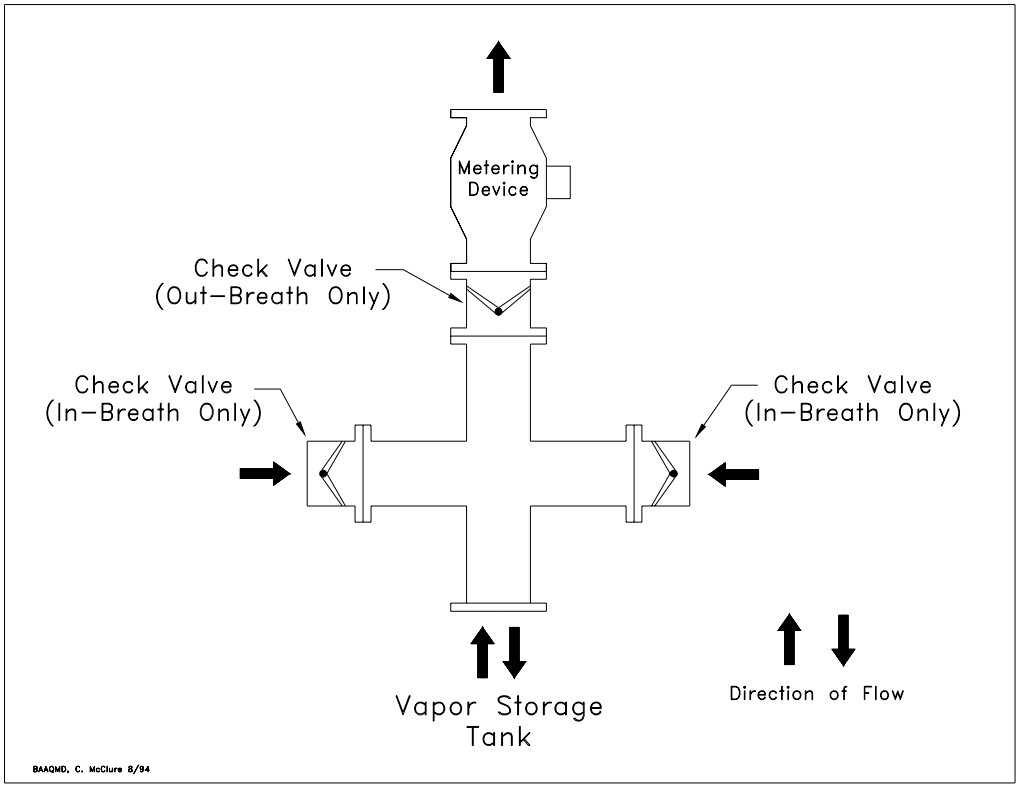
shall be connected to a check valve assembly as shown in Figure 34-5, which allows only the exhaust flow from the VST to be measured by the meter. The maximum pressure drop through the meter/check valve assembly to the atmosphere shall not exceed the cracking pressure setting of the pressure side of the pressure/vacuum valve connected to the head space below the VST bladder. The pressure drop through the check valve to the VST shall not exceed the cracking vacuum setting of the pressure/vacuum valve on the head space above the bladder.

7.3 Strip Chart Recorder. Use a six channel strip chart recorder, or equivalent, to continuously record the outlet NMOC concentration, outlet temperature, and flowrate from the turbine meters.

7.4 Sample Pumps. Use a leak-free Teflon lined, or equivalent, diaphragm pump capable of –maintaining a 14.3 liter per minute (0.5 CFM) flowrate at 380 millimeters of mercury (15 inches of mercury).

Figure 34-5

VST Check Valve Assembly



7.5 Zero-Air System. This system provides nitrogen for zeroing the NDIR analyzer and is assembled as shown in Figure 34-1.

7.6 Span Gas System. This system delivers appropriate mixtures of span gas, in nitrogen, for the purpose of calibrating the NDIR analyzer during the test. The span gas system is assembled as shown in Figure 34-2.

7.7 Barometer. Use a mercury, aneroid, or other barometer accurate to within 1 millimeter of mercury (0.04 inches of mercury).

7.8 Combustible Gas Detector. Use an explosion-proof Bacharach Instrument Company model 0023-7356, or equivalent, calibrated with methane. This instrument shall be used to determine the vapor tightness of the collection system and pressure relief valves during the test.

8. PRE-TEST PROCEDURES

8.1 For carbon adsorption and refrigeration units the test equipment shall be set up as recommended by the manufacturer.

8.2 For thermal incineration units the test equipment shall be set up as recommended by the manufacturer.

8.3 For the Vapor Storage Tank, if equipped, the test equipment shall be set up on the main vent or manway. All other vents shall be temporarily sealed for the duration of the test. If the equipment cannot maintain a pressure drop across the meter/check valve assembly as described in Section 7.2, or if the VST head space is not equipped with a pressure vacuum valve, the Alternative VST Method outlined in Section 11.4 shall be used to determine exhaust flowrates from the VST.

8.4 Zero and span each gas analyzer according to the current instructions provided by the manufacturer.

8.5 If applicable, zero and span each pressure transducer according to the most current instructions provided by the manufacturer.

9. SAMPLING - CARBON ADSORPTION AND REFRIGERATION UNITS

9.1 Conduct the test for a minimum of 4 hours or 100,000 gallons throughput, whichever is greater. Insure ~~that~~ the testing interval includes peak loading hours.

9.2 The following data shall be recorded prior to commencement of loading operations:

9.2.1 The initial readings from the index on each turbine meter.

9.2.2 The initial readings from the product delivery system.

9.2.3 Record the height of the Vapor Storage Tank (VST) if so equipped. The test shall begin and end at the same VST height.

9.3 During the entire duration of the test the following data acquisition procedures shall be followed:

9.3.1 Continuously record, on the strip chart recorder, the NMOC concentrations from the NDIR analyzers connected to the turbine meters on the carbon or refrigeration unit outlets.

9.3.2 Continuously record, on the strip chart recorder, the NMOC concentration at the inlet to the carbon beds or refrigeration units.

9.3.3 Continuously record, on the strip chart recorder, the temperature at the outlet of the carbon beds or refrigeration units.

9.3.4 Continuously record, on the strip chart recorder, the flowrate through the turbine meters. If pitot tubes and pressure transducers are used, continuously record the output of the transducers on the strip chart recorder. In addition, flow direction must be differentiated.

9.3.5 Record the barometric pressure, in inches of mercury, at 60 minute intervals during the test.

9.3.6 For carbon adsorption units, record the post-regeneration back flow volumes through the turbine meters for at least 25 percent of the regeneration cycles during the test.

9.3.7 For carbon adsorption units, record the total number of regeneration cycles during the test.

9.3.8 For carbon adsorption units, connect the rotary gas meter to the ~~the~~ purge air volume for at least two cycles per bed during the test.

9.3.9 For carbon adsorption units, record the regeneration vacuums, each minute, for the entire cycle, at least once.

9.3.10 For refrigeration units, record the index readings of the turbine meters on any units that are in defrost, at least every hour.

9.3.11 Use the combustible gas detector to determine the vapor tightness of all pressure/vacuum relief valves at least once per hour during the test. Determine the vapor tightness of all hatches, gauge ports, and vents at least twice during the test.

9.4 If outlet flow for carbon adsorption units can not be measured, the following information must be recorded to use the methodology in Section 13.5.

9.4.1 The initial readings from the product delivery system and purge air meters.

9.4.2 Continuously record, on the strip chart recorder, the NMOC concentrations from the NDIR analyzers connected to the carbon bed outlets.

9.4.3 Continuously record, on the strip chart recorder, the NMOC concentration at the inlet to the carbon beds.

9.4.4 Record the barometric pressure, in inches of mercury, at 60 minute intervals during the test.

9.4.5 Record the total number of regeneration cycles during the test.

9.4.6 Connect the rotary gas meter to the purge air inlet using 2.5 inch ID flexible tubing. Record the purge air volume for at least two cycles per bed during the test. In addition, record total purge air for each bed for the entire duration of the test.

9.4.7 For at least two regeneration cycles per carbon bed, record the regeneration vacuums each minute.

9.4.8 Record the carbon vessel volume and carbon density.

9.4.9 Use the combustible gas detector to determine the vapor tightness of all pressure/vacuum relief valves at least once per hour during the test. Determine the vapor tightness of all hatches, gauge ports, and vents at least twice during the test.

9.5 Use the vapor system pressure assembly to determine the system pressure at each vapor return arm as follows:

9.5.1 Connect the assembly to vapor coupler of the delivery vehicle.

9.5.2 Zero the pressure gauge according to manufacturer's recommendations.

9.5.3 Connect the vapor return arm to the assembly.

9.5.4 During product loading, record the maximum pressure from the gauge.

10. SAMPLING - THERMAL INCINERATION UNITS

10.1 Conduct the test for a minimum of 4 hours or 100,000 gallons throughput, whichever is greater. Insure ~~that~~ the testing interval includes peak loading hours.

10.2 The following data shall be recorded prior to commencement of loading operations:

10.2.1 The initial reading from the turbine meter index from the turbine meter mounted on the incinerator inlet line, if applicable.

10.2.2 The initial readings from the product delivery system.

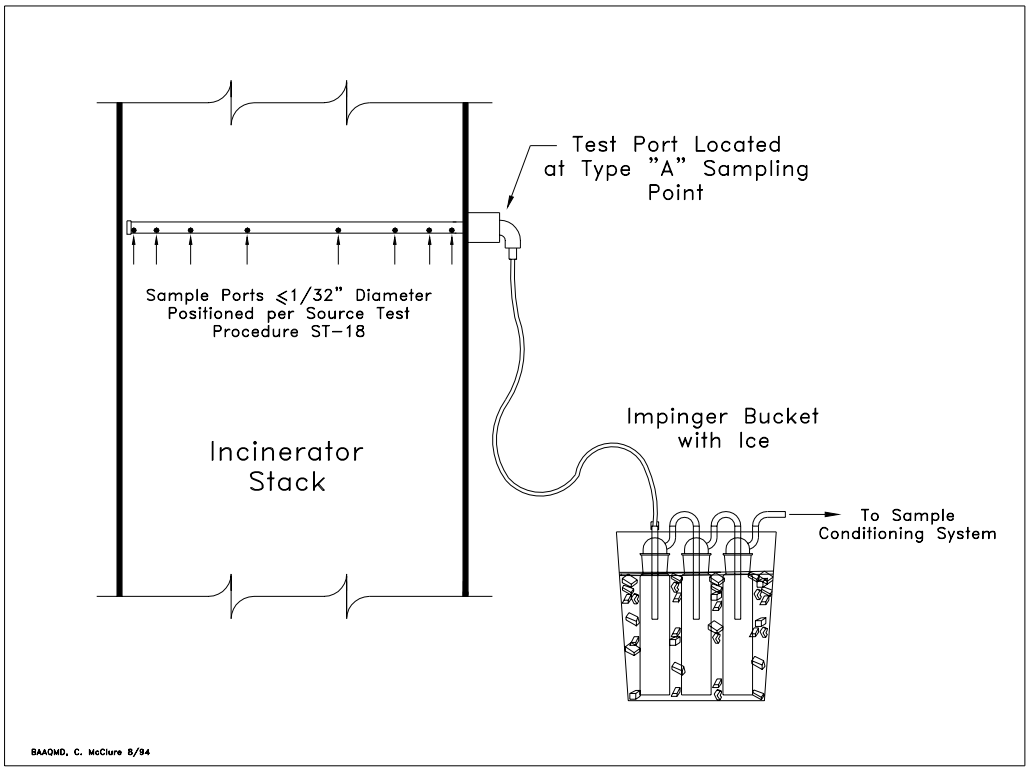
10.2.3 Record the height of the Vapor Storage Tank (VST) if so equipped. The test shall begin and end at the same VST height.

10.3 During the entire duration of the test the following data acquisition procedures shall be followed:

10.3.1 Continuously record, on the strip chart recorder, the inlet hydrocarbon concentration at the inlet to the incinerator.

Figure 34-6

Incinerator Sample Probe Assembly



10.3.2 Continuously record, on the strip chart recorder, the hydrocarbon, carbon dioxide, carbon monoxide, and oxygen concentrations at the outlet of the incinerator.

10.3.3 Continuously record, on the strip chart recorder, the temperature at the inlet of the turbine meter.

10.3.4 Continuously record, on the strip chart recorder, the flowrate through the turbine meter. If pitot tubes and pressure transducers are used, continuously record the output of the transducers on the strip chart recorder.

10.3.5 Record the barometric pressure, in inches of mercury, at 60 minute intervals during the test.

10.3.6 Determine the methane concentration by either (a) collecting integrated samples for laboratory analysis or (b) passing a portion of the sample stream through the activated carbon scrubber to adsorb NMOC prior to the analyzer.

10.3.7 Record the auxiliary fuel usage, from the dry gas meter, at 60 minute intervals during the test.

10.3.8 Use the combustible gas detector to determine the vapor tightness of all pressure/vacuum relief valves at least once per hour during the test. Determine the vapor tightness of all hatches, gauge ports, and vents at least twice during the test.

10.4 Use the vapor system pressure assembly to determine the system pressure at each vapor return arm as follows:

10.4.1 Connect the assembly to vapor coupler of the delivery vehicle.

10.4.2 Zero the pressure gauge according to manufacturer's recommendations.

10.4.3 Connect the vapor return arm to the assembly.

10.4.4 During product loading, record the maximum pressure from the gauge.

11. SAMPLING - VAPOR STORAGE TANK

11.1 Conduct the test for a minimum of 4 hours or 100,000 gallons throughput, whichever is greater. Insure ~~that~~ the testing interval includes peak loading hours.

11.2 The following data shall be recorded prior to commencement of loading operations:

11.2.1 The initial readings from the index on the turbine meter.

11.2.2 The initial readings from the product delivery system.

11.2.3 The height of the VST.

11.3 During the entire duration of the test the following data acquisition procedures shall be followed:

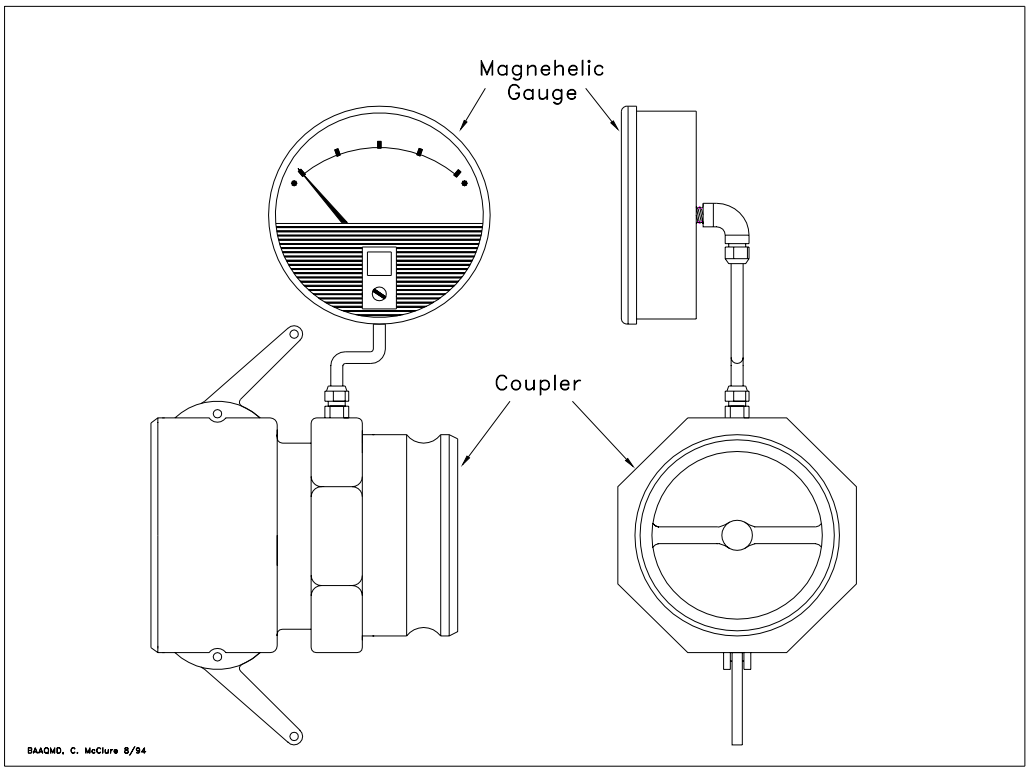
11.3.1 Continuously record, on the strip chart recorder, the NMOC concentrations from the NDIR analyzer connected to the turbine meter on the main outlet or manway of the VST.

11.3.2 Continuously record, on the strip chart recorder, the temperature at the outlet of the main vent or manway of the VST.

11.3.3 Continuously record on the strip chart recorder the flowrate through the turbine meter.

Figure 34-7

Vapor System Pressure Assembly



11.3.4 Record the barometric pressure, in inches of mercury, at 60 minute intervals during the test.

11.3.5 Record the pressure reading at the meter during out breathing at least 5 times during the test. If the reading exceeds the minimum pressure setting of the pressure/vacuum valve on the head space of the VST, immediately disconnect the meter and reopen any other vents sealed for the test and use the Alternative VST Method to determine the emission rate from the VST.

11.3.6 Record the pressure reading at the check valve during in breathing at least 5 times during the test. If the reading exceeds the minimum vacuum setting of the pressure/vacuum valve on the head space of the VST, immediately disconnect the meter and reopen any other vents sealed for the test and use the Alternative VST Method to determine the emission rate from the VST.

11.3.7 Use the combustible gas detector to determine the vapor tightness of all pressure/vacuum relief valves at least once per hour during the test. Determine the vapor tightness of all hatches, gauge ports, vents, and temporarily sealed vents at least twice during the test.

11.4 If the VST is not equipped with a pressure/vacuum valve on the head space above the bladder or if the pressures at the check valve/meter assembly exceed the pressure/vacuum valve minimum settings the following Alternative VST Method shall be used:

11.4.1 The VST test shall begin when the bladder reaches its lowest possible point.

11.4.2 The VST shall be isolated from the VRU so that all vapors go directly from the loading rack to the VST.

11.4.3 All valving leading from the VST shall be closed so that all vapors from the rack remain in the VST.

11.4.4 After each truck finishes loading, the height of the VST shall be recorded along with the total amount of product loaded.

11.4.5 After the VST has reached 50% of its capacity the valving to the VRU may be opened and the VST may be returned into normal operation.

11.4.6 A VST height versus product loaded curve shall be generated.

11.4.7 After the VRU/VST equipment is in normal operating mode, the heights of the VST shall be collected as follows:

11.4.7.1 Each time the bladder begins to raise the height shall be recorded.

11.4.7.2 Each time the bladder begins to drop the height shall be recorded.

12. POST-TEST PROCEDURES

12.1 At the conclusion of the test the following shall be recorded:

12.1.1 The final turbine meter index reading(s).

12.1.2 The final product meter readings.

12.1.3 The height of the VST, if so equipped. This height shall be the same as it was at the beginning of the test.

12.2 Record the final dry test meter readings on the auxiliary fuel line for Incineration Units.

13. CALCULATIONS - CARBON ADSORPTION AND REFRIGERATION UNITS

13.1 The outlet volume from each carbon bed shall be calculated as follows:

$$V_{es} = \left[\left(\frac{V_m}{T_m}\right) + \left(\frac{V_b(N)}{T_a}\right)\right]\left[\frac{(P_b)530}{29.92}\right] \quad \text{[Equation 13-1]}$$

where:

V_{es} = Outlet gas volume from the VRU, standard cubic feet
V_m = The uncorrected volume from the turbine meter, actual cubic feet
T_m = Average temperature through the turbine meter, ^oR
V_b = The average post regeneration back flow through the turbine meter, actual cubic feet
N = The number of post regeneration back flows during the test
T_a = Average ambient temperature during post-regeneration back flows, ^oR
P_b = The average barometric pressure during the test, inches of mercury
530 = Standard temperature, ^oR
29.92 = Standard barometric pressure, inches of mercury

13.1.2 For those tests where a pitot tube and pressure transducer are used the Carbon Adsorption VRU outlet volume shall be calculated as follows:

$$V_{ep} = (.81)(60)(85.49)\frac{(530)}{(29.92)}(t_t)(C_p)(A)\left(\Delta p^{\frac{1}{2}}{}_{AVG}\right)\left[\frac{(P_s)}{(T_s)(MW)}\right]^{\frac{1}{2}} \quad \text{[Equation 13-2]}$$

where:

V_{ep} = Outlet gas volume from the VRU, standard cubic feet
t_t = The total test time, minutes
A = The outlet duct cross-sectional area, square feet
C_p = The pitot tube coefficient, dimensionless
Δp = The velocity head, inches of water
T_s = The average temperature of the outlet gas stream, ^oR
P_s = The absolute stack gas pressure, inches of mercury
MW = Average molecular weight of the outlet gas, pound per pound-mole
0.81 = Correction factor for pitot tube at duct centerline, dimensionless
60 = Conversion from seconds to minutes, seconds per minute
85.49 = Conversion Factor derived from Bernoulli's Equation and standard conditions
530 = Standard temperature, ^oR
29.92 = Standard barometric pressure, inches of mercury

NOTE: $\Delta p^{\frac{1}{2}}{}_{AVG}$ requires the arithmetic average of the square roots of the velocity heads. Only outflow shall be used in this calculation.

13.1.3 The outlet volume for refrigeration units shall be calculated as follows:

$$V_{rs} = \frac{[V_m + V_c][P_b][530]}{[T_m][29.92]}$$ [Equation 13-3]

where:

V_{rs} = Outlet gas volume from the VRU, standard cubic feet
V_m = The uncorrected volume from the turbine meter, actual cubic feet
V_c = The uncorrected back flow volume measured during unit defrost, actual cubic feet
P_b = The average barometric pressure during the test, inches of mercury
T_m = Average temperature through the turbine meter, ^oR
530 = Standard temperature, ^oR
29.92 = Standard barometric pressure, inches of mercury

13.2 The weight of non-methane organic carbon (NMOC) emitted during the test shall be calculated as follows:

$$W_s = \frac{[V_{es}][HC_{es}][MW]}{[386.9][100]}$$ [Equation 13-4]

where:

W_s = The weight of NMOC emitted from each carbon bed during the test, pounds
V_{es} = Outlet gas volume from each carbon bed, using Equation 13-1, 13-2 or 13-3, standard cubic feet
HC_{es} = The average outlet concentration from each carbon bed or refrigeration unit, % NMOC; use flow-weighted average when appropriate.
MW = The molecular weight of the span gas used, pounds per pound-mole
386.9 = The molar volume, cubic feet per pound-mole
100 = The conversion factor from decimal fraction to percent

13.3 For those tests where a turbine meter is used at the inlet to the carbon or refrigeration unit, the inlet volume shall be calculated as follows:

~~$$V_{is} = \frac{[V_m][530][29.92]}{[T_m][P_b + P_s]}$$ [Equation 13-5]~~

$$V_{is} = \frac{[V_m][530][P_b + P_s]}{[T_m][29.92]}$$ [Equation 13-5]

where:

V_{is} = Inlet gas volume to the VRU, standard cubic feet
V_m = The uncorrected volume from the turbine meter, actual cubic feet
T_m = Average temperature through the turbine meter, ^oR

P_b = The average barometric pressure during the test, inches of mercury
P_s = The average static pressure at the turbine meter, inches of mercury
530 = Standard temperature, ^oR
29.92 = Standard barometric pressure, inches of mercury

13.3.1 For those tests where a pitot tube and pressure transducer are used at the inlet to the carbon or refrigeration unit, the inlet volume shall be calculated as follows:

$$V_{ip} = (.81)(60)(85.49)\frac{(530)}{(29.92)}(t_t)(C_p)(A)\left(\Delta p^{\frac{1}{2}}{}_{AVG}\right)\left[\frac{(P_s)}{(T_s)(MW)}\right]^{\frac{1}{2}} \quad \text{[Equation 13-6]}$$

where:

V_{ip} = Inlet gas volume from the VRU, standard cubic feet
t_t = The total test time, minutes
A = The inlet duct cross-sectional area, square feet
C_p = The pitot tube coefficient, dimensionless
Δp = The velocity head, inches of water
T_s = The average temperature of the inlet gas stream, ^oR
P_s = The absolute stack gas pressure, inches of mercury
MW = Average molecular weight of the inlet gas, pound per pound-mole
0.81 = Correction factor for pitot tube at duct centerline, dimensionless
60 = Conversion from seconds to minutes, seconds per minute
85.49 = Conversion Factor derived from Bernoulli's Equation and standard conditions
530 = Standard temperature, ^oR
29.92 = Standard barometric pressure, inches of mercury

NOTE: $\Delta p^{\frac{1}{2}}{}_{AVG}$ requires the arithmetic average of the square roots of the velocity heads.

13.3.2 When the inlet volume can not be measured using a turbine meter or pitot tube, the inlet volume of NMOC entering the carbon adsorption or refrigeration unit during the test shall be calculated as follows:

$$V_{is} = \frac{[G][530][P_b + P_m]}{[T_{is}][7.481][29.92]} \quad \text{[Equation 13-7]}$$

where:

V_{is} = The volume entering the carbon adsorption unit, ~~pounds~~cubic feet
G = The number of gallons of product loaded, gallons
P_b = The barometric pressure, inches of mercury
P_m = The static inlet line pressure, inches of mercury
T_{is} = The average inlet temperature, ^oR
530 = Standard temperature, ^oR
7.481 = The conversion factor from gallons to cubic feet, gallons per cubic foot

13.4 The weight of non-methane organic carbon (NMOC) entering the carbon adsorption or refrigeration unit during the test shall be calculated as follows:

$$W_i = \frac{[V_{is}][HC_i][MW]}{[386.9][100]} \quad \text{[Equation 13-8]}$$

where:

W_i = The weight of NMOC entering each carbon or refrigeration unit, pounds
V_{is} = Inlet gas volume to each carbon bed or refrigeration unit, using Equation 13-5, 13-6 or 13-7, standard cubic feet
HC_i = The average inlet concentration from the carbon adsorption or refrigeration system, % NMOC; use flow-weighted average when appropriate.
MW = The molecular weight of the span gas used, pounds per pound-mole
386.9 = The molar volume, cubic feet per pound-mole
100 = The conversion factor from decimal fraction to percent

13.5 In the event that the outlet flow can not be measured, the following method must be utilized. The outlet volume from the carbon beds shall be calculated as follows:

$$V_{regen} = V_{bed} - \left[\frac{\#_{carbon}}{\rho_{carbon}}\right] \quad \text{[Equation 13-9]}$$

where:

V_{regen} = The regeneration volume of the carbon bed, cubic feet
V_{bed} = The volume of the carbon vessel, cubic feet
$\#_{carbon}$ = The total amount of carbon in the vessel, pounds
ρ_{carbon} = The density of carbon used, pound per cubic foot

$$V_{as_1} = \left[\frac{(V_{regen})(P_{regen})}{P_b} + V_{purge}\right]_{Opposite} \times \left[\frac{(N)(530)(P_b)}{(T_a)(29.92)}\right] + V_{is} \quad \text{[Equation 13-10]}$$

where:

V_{as_1} = The outlet volume from Bed 1, cubic feet
P_{regen} = The maximum vacuum reached during regeneration of the opposite Bed, inches of mercury
V_{purge} = The average purge air volume, cubic feet
P_b = The average barometric pressure, inches of mercury
T_a = The average ambient temperature, ^oR
V_{is} = The total inlet volume, using Equation 13-7, standard cubic feet
N = The total number of cycles
530 = Standard temperature, ^oR

13.5.1 The outlet weight of NMOC for each carbon bed shall be calculated using Equation 13-4.

13.6 The emission factor for carbon adsorption and refrigeration units shall be calculated as follows:

$$E_{es} = \frac{\left[W_{es_1} + W_{es_2}\right]}{\left[G\right]} \times \left[1000\right] \qquad \text{[Equation 13-11]}$$

where:

E_{es} = The total emission factor, pounds per 1,000 gallon loaded

W_{es_1} = The total outlet weight from unit 1 using Equation 13-4, pounds

W_{es_2} = The total outlet weight from unit 2 using Equation 13-4, pounds

G = The total number of gallons of product loaded, gallons

13.6.1 The efficiency of the carbon adsorption or refrigeration units shall be calculated as follows:

$$H = \frac{W_i - \left[W_{es_1} + W_{es_2}\right]}{\left[W_i\right]} \times \left[100\right] \qquad \text{[Equation 13-12]}$$

where:

H = The efficiency, by weight, of the carbon adsorption unit, percent

W_i = The total inlet weight of NMOC using Equations 13-8, pounds

W_{es_1} = The total outlet weight from unit 1, using Equation 13-4, pounds

W_{es_2} = The total outlet weight from unit 2, using Equation 13-4, pounds

100 = The conversion factor from decimal fraction to percent

14. Calculations-Thermal Incineration

14.1 The incinerator inlet volume shall be calculated as follows:

14.1.1 For those tests where a turbine meter is be used the incinerator inlet volume shall be calculated as follows:

~~$$V_{is} = \frac{\left[V_m\right]\left[530\right]\left[29.92\right]}{\left[T_m\right]\left[P_b + P_s\right]}$$~~ ~~[Equation 14-1]~~

$$V_{is} = \frac{\left[V_m\right]\left[530\right]\left[P_b + P_s\right]}{\left[T_m\right]\left[29.92\right]}$$ [Equation 14-1]

where:

V_{is} = Inlet gas volume to the VRU, standard cubic feet

V_m = The uncorrected volume from the turbine meter, actual cubic feet

T_m = Average temperature through the turbine meter, ^oR
P_b = The average barometric pressure during the test, inches of mercury
P_s = The average static pressure at the turbine meter, inches of mercury
530 = Standard temperature, ^oR
29.92 = Standard barometric pressure, inches of mercury

14.1.2 For those tests where a pitot tube and pressure transducer are used the incinerator inlet volume shall be calculated as follows:

$$V_{ip} = (.81)(60)(85.49)\frac{(530)}{(29.92)}(t_t)(C_p)(A)\left(\Delta p^{\frac{1}{2}}{}_{AVG}\right)\left[\frac{(P_s)}{(T_s)(MW)}\right]^{\frac{1}{2}} \quad \text{[Equation 14-2]}$$

where:

V_{ip} = Inlet gas volume from the VRU, standard cubic feet
t_t = The total test time, minutes
A = The inlet duct cross-sectional area, square feet
C_p = The pitot tube coefficient, dimensionless
Δp = The velocity head, inches of water
T_s = The average temperature of the inlet gas stream, ^oR
P_s = The absolute stack gas pressure, inches of mercury
MW = Average molecular weight of the inlet gas, pound per pound-mole
0.81 = Correction factor for pitot tube at duct centerline, dimensionless
60 = Conversion from seconds to minutes, seconds per minute
85.49 = Conversion Factor derived from Bernoulli's Equation and standard conditions
530 = Standard temperature, ^oR
29.92 = Standard barometric pressure, inches of mercury

NOTE: $\Delta p^{\frac{1}{2}}{}_{AVG}$ requires the arithmetic average of the square roots of the velocity heads.

14.2 The outlet volume from the thermal incinerator shall be calculated as follows:

$$V_{es} = \frac{V_{is}\left[(k)(HC_i)\right]}{\left[(k)(HC_e) + (CO_{2e}) + (CO_e) - 300\right]} \quad \text{[Equation 14-3]}$$

where:

V_{es} = The exhaust gas volume, standard cubic feet
V_{is} = The inlet gas volume to the incinerator, using Equations 14-1 or 14-2, standard cubic feet
k = The calibration gas factor, 3 = Propane, 4 = Butane
HC_i = The average inlet hydrocarbon concentration, ppmv; use flow-weighted average when appropriate
HC_e = The average outlet hydrocarbon concentration, ppmv; use flow-weighted average when appropriate

CO_{2e} = The average outlet carbon dioxide concentration, ppmv; use flow-weighted average when appropriate

CO_e = The average outlet carbon monoxide concentration, ppmv; use flow-weighted average when appropriate

300 = The ambient carbon dioxide concentration, ppmv

Note: If a more accurate ambient carbon dioxide concentration can be measured, it may be substituted for the 300 ppmv used in the above equation.

14.3 The weight of non-methane organic carbon (NMOC) emitted during the test shall be calculated as follows:

$$W_{es} = \frac{[V_{es}][HC_{es}][MW]}{[386.9][1 \times 10^6]} \qquad \text{[Equation 14-4]}$$

where:

W_{es} = The weight of NMOC emitted from the incinerator during the test, pounds

V_{es} = The exhaust gas volume to the incinerator, using Equation 14-3, standard cubic feet

HC_{es} = The average outlet concentration from the incinerator, NMOC, ppmv; use flow-weighted average when appropriate

MW = The molecular weight of the span gas used, pounds per pound-mole

386.9 = The molar volume, cubic feet per pound-mole

10^6 = The conversion factor from decimal fraction to ~~percent~~ppm

14.4 The inlet weight of NMOC entering the incinerator during the test shall be calculated using Equations 14-5 or 14-6.

14.4.1 If actual inlet flow measurements cannot be obtained, the inlet weight shall be calculated as follows:

$$W_{is} = \frac{[G][HC_{is}][MW][530]}{[T_{is}][7.481][386.9][100]} + \frac{[V_{aux}][HC_{ai}][MW][530]}{[T_{ai}][386.9][100]} \qquad \text{[Equation 14-5]}$$

where:

W_{is} = The weight of NMOC entering the carbon adsorption unit, pounds

G = The number of gallons of product loaded, gallons

HC_{is} = The average inlet concentration, % NMOC; use flow-weighted average when appropriate

T_{is} = The average inlet gas stream temperature, ^oR

V_{aux} = The volume of auxiliary gas introduced before the incinerator, cubic feet

HC_{ai} = The average auxiliary gas concentration, %

T_{ai} = The average auxiliary gas temperature, ^oR

MW = The molecular weight of the span gas used, pounds per pound-mole

530 = Standard temperature, ^oR

7.481 = The conversion factor from gallons to cubic feet, gallons per cubic foot
386.9 = The molar volume, cubic feet per pound-mole
100 = The conversion factor from decimal fraction to percent

14.4.2 If a pitot tube and pressure transducer or a turbine meter was used, the inlet weight shall be calculated as follows:

$$W_{ip} = \frac{[V_{ip}][HC_{is}][MW]}{[386.9][100]} \qquad \text{[Equation 14-6]}$$

where:

W_{ip} = The weight of NMOC entering the VRU, pounds
V_{ip} = Inlet gas volume calculated using Equations 14-1 or 14-2, standard cubic feet
HC_{is} = The average inlet concentration, % NMOC; use flow-weighted average when appropriate
MW = The molecular weight of the span gas used, pounds per pound-mole
386.9 = The molar volume, cubic feet per pound-mole
100 = The conversion factor from decimal fraction to percent

14.5 The emission factor for the incinerator shall be calculated as follows:

$$E_{es} = \frac{[W_{es}]}{[G]} \times [1000] \qquad \text{[Equation 14-7]}$$

where:

E_{es} = The total emission factor, pounds per 1,000 gallons loaded
W_{es} = The total outlet weight during the test, using Equation 14-4, pounds
G = The total number of barrels of product loaded, gallons

14.6 The efficiency of the incinerator shall be calculated as follows:

$$H = \frac{[W_i] - [W_{es}]}{[W_i]} \times [100] \qquad \text{[Equation 14-8]}$$

where:

H = The efficiency, by weight, of the incinerator, percent
W_i = The total inlet weight using Equations 14-5 or 14-6, pounds
W_{es} = The total outlet weight using Equation 14-4, pounds
100 = The conversion factor from decimal fraction to percent

15. Calculations - Vapor Storage Tank

15.1 The outlet volume from the VST shall be calculated as follows:

~~$$V_{ot} = \frac{[V_m][530][29.92]}{[T_m][P_b + P_s]}$$ [Equation 15-1]~~

$$V_{is} = \frac{[V_m][530][P_b + P_s]}{[T_m][29.92]}$$ [Equation 15-1]

where:

V_{ot}	=	The outlet gas volume from the VST, standard cubic feet
V_m	=	The uncorrected volume from the turbine meter, actual cubic feet
T_m	=	Average temperature through the turbine meter, ^oR
P_b	=	The average barometric pressure during the test, inches of mercury
P_s	=	The average static pressure at the turbine meter, inches of mercury
530	=	Standard temperature, ^oR
29.92	=	Standard barometric pressure, inches of mercury

15.2 The weight of non-methane organic carbon (NMOC) emitted during the test shall be calculated as follows:

$$W_{ot} = \frac{[V_{ot}][HC_{ot}][MW]}{[386.9][1 \times 10^6]}$$ [Equation 15-2]

where:

W_{ot}	=	The weight of NMOC emitted from the VST during the test, pounds
V_{ot}	=	The exhaust gas volume from the VST, using Equation 15-1, standard cubic feet
HC_{ot}	=	The average outlet concentration from the VST, NMOC, ppmv; use flow-weighted average when appropriate
MW	=	The molecular weight of the span gas used, pounds per pound-mole
386.9	=	The molar volume, cubic feet per pound-mole
10^6	=	The conversion factor from decimal fraction to ~~percent~~ppm

15.3 The daily emissions from the VST shall be calculated as follows:

$$E_{ot} = \frac{[W_{ot}][1440]}{[t_{time}]}$$ [Equation 15-3]

where:

E_{ot}	=	The emissions from the VST, pounds per day
W_{ot}	=	Weight of hydrocarbon emitted, using Equation 15-2, pounds
t_{time}	=	The total time the test was conducted, minutes
1440	=	The conversion factor from minutes to day, minutes per day

15.4. If the Alternative Method from Section 11.4 is used, the emission from the VST shall be calculated as follows:

15.4.1 For each rise in the VST the total increase in height shall be calculated.

15.4.2 Using the loading versus tank height curve, each tank height increase shall be converted to gallons displaced from the head space above the bladder.

15.4.3 Total all gallons displaced, from Section 15.4.2, for the entire test.

15.4.4 The total weight of NMOC emitted from the VST shall be calculated as follows:

$$W_{ot} = \frac{[G_{dis}][HC_{ot}][MW][530][P_b]}{[7.481][386.9][1\times 10^6][29.92][T_a]} \qquad \text{[Equation 15-4]}$$

where:

W_{ot} = The weight of NMOC emitted from the VST during the test, pounds
G_{dis} = The total gallons displaced by the bladder from Section 15.4.3, gallons
HC_{ot} = The average outlet concentration from the VST, NMOC, ppmv; use flow-weighted average when appropriate
MW = The molecular weight of the span gas used, pounds per pound-mole
P_b = The average barometric pressure during the test, inches of mercury
T_a = The average ambient temperature during the test, ^oR
7.481 = The conversion from gallons to cubic feet, gallons per cubic foot
386.9 = The molar constant, cubic feet per pound-mole
10^6 = The conversion factor from decimal fraction to ppm
29.92 = Standard barometric pressure, inches of mercury

16. Reporting

16.1 The results of a test on a carbon adsorption unit shall be reported as shown in Form 34-1. The results of a test on a refrigeration unit shall be reported as shown in Form 34-2. The results of a test on a thermal incineration unit shall be reported as shown in Form 34-3. The results of a test on a vapor storage tank shall be reported as shown in Form 34-4.

Form 34-1

Distribution:	BAY AREA AIR QUALITY MANAGEMENT DISTRICT	Report No.: _____
Firm **Permit Services** **Enforcement Services** **Technical Services** **Planning** **Requester** **DAPCO**	***939 Ellis Street*** ***San Francisco, California 94109*** ***(415) 771-6000*** **Summary of** **Source Test Results**	Test Date: _____ Test Times: Run A: _____ Run B: _____ Run C: _____

Source Information		BAAQMD Representatives
Firm Name and Address	Firm Representative and Title Phone No. ( )	Source Test Engineers
Permit Conditions:	Source: Plant No. Permit No. Operates Hr/Day & Day/Yr	Permit Services Division/Enforcement Division Test Requested By:
Operating Parameters:	Organic Liquid Loaded During Test, Gallons: Gasoline: Diesel: AV Gas: Jet A: Other: Total:	
Applicable Regulations:		**VN Recommended:**

Sources Test Results and Comments:

PARAMETER	**RESULTS**		**LIMITS**
	Bed #1	**Bed #2**	**System**
Inlet Volume, SCF			
Purge Air, avg per cycle, SCF			
Backflow, avg per cycle, SCF			
Number of Cycles, total			
Inlet NMOC Concentration, %, avg. as C_4			
Inlet NMOC Weight, pounds			
Outlet Volume, SCF			
Outlet NMOC Concentration, ppmv , avg. as C_4			
Outlet Weight, pounds			
Emission Factor, pounds per 1,000 gallons			
Efficiency, weight percent			
Maximum System Pressure, Inches H_2O			
IF THE METHODOLOGY IN SECTION 13.5 IS USED THE FOLLOWING INFORMATION SHALL ALSO BE INCLUDED:			
Cabon Bed Vessel Volume, cubic feet			
Carbon Density, lbs per cubic foot			

Air Quality Engineer II **Date**	**Supervising Air Quality Engineer** **Date**	**Approved by Air Quality Engineering Manager**

Form 34-2

Distribution:	BAY AREA AIR QUALITY MANAGEMENT DISTRICT	Report No.: _____
Firm **Permit Services** **Enforcement Services** **Technical Services** **Planning** **Requester** **DAPCO**	***939 Ellis Street*** ***San Francisco, California 94109*** ***(415) 771-6000*** **Summary of** **Source Test Results**	Test Date: _____ Test Times: Run A: _____ Run B: _____ Run C: _____

Source Information		BAAQMD Representatives
Firm Name and Address	Firm Representative and Title Phone No. ( )	Source Test Engineers
Permit Conditions:	Source: Plant No. Permit No. Operates Hr/Day & Day/Yr	Permit Services Division/Enforcement Division Test Requested By:
Operating Parameters:	Organic Liquid Loaded During Test, Gallons: Gasoline: Diesel: AV Gas: Jet A: Other: Total:	
Applicable Regulations:		**VN Recommended:**

Sources Test Results and Comments:

PARAMETER	**RESULTS**		**LIMITS**
	Unit #1	Unit #2	System
Inlet Volume, SCF			
Inlet NMOC Concentration, %, avg. as C_4			
Inlet NMOC Weight, pounds			
Outlet Volume, SCF			
Outlet NMOC Concentration, ppmv , avg. as C_4			
Outlet Weight, pounds			
Emission Factor, pounds per 1,000 gallons			
Efficiency, weight percent			
Maximum System Pressure, Inches H_2O			

Air Quality Engineer II **Date**	**Supervising Air Quality Engineer** **Date**	**Approved by Air Quality Engineering Manager**

Form 34-3

Distribution:	BAY AREA AIR QUALITY MANAGEMENT DISTRICT *939 Ellis Street* *San Francisco, California 94109* *(415) 771-6000* **Summary of Source Test Results**	Report No.: _____ Test Date: _____ Test Times: Run A: _____ Run B: _____ Run C: _____

Distribution:
Firm
Permit Services
Enforcement Services
Technical Services
Planning
Requester
DAPCO

Source Information		BAAQMD Representatives
Firm Name and Address	Firm Representative and Title Phone No. ( )	Source Test Engineers
Permit Conditions:	Source: Plant No. Permit No. Operates Hr/Day & Day/Yr	Permit Services Division/Enforcement Division Test Requested By:
Operating Parameters:	Organic Liquid Loaded During Test, Gallons: Gasoline: Diesel: AV Gas: Jet A: Other: Total:	
Applicable Regulations:		**VN Recommended:**

Sources Test Results and Comments:

PARAMETER	**RESULTS**	**LIMITS**
Inlet Volume to Incinerator, SCF		
Inlet Volume, ~~Auxillary~~Auxiliary Fuel, SCF		
Inlet NMOC Concentration, %, avg. as C_4		
Inlet NMOC Weight, pounds		
Outlet Hydrocarbon Concentration, ppmv , avg. as C_3		
Outlet Methane Concentration, ppmv, avg. as C_1		
Outlet CO Concentration, ppmv, avg.		
Outlet CO_2 Concentration, %, avg.		
Outlet Volume, SCF		

	NMOC as C_3	CO	CO_2
Outlet Weight, pounds			
Emission Factor, pounds per 1,000 gallons			
Efficiency, weight percent			
Maximum System Pressure, Inches H_2O			

Air Quality Engineer II	Date	Supervising Air Quality Engineer	Date	Approved by Air Quality Engineering Manager

Form 34-4

Distribution:	BAY AREA AIR QUALITY MANAGEMENT DISTRICT	Report No.: _____
Firm **Permit Services** **Enforcement Services** **Technical Services** **Planning** **Requester** **DAPCO**	***939 Ellis Street*** ***San Francisco, California 94109*** ***(415) 771-6000*** **Summary of** **Source Test Results**	Test Date: _____ Test Times: Run A: _____ Run B: _____ Run C: _____

Source Information		BAAQMD Representatives
Firm Name and Address	Firm Representative and Title Phone No. ( )	Source Test Engineers
Permit Conditions:	Source: Plant No. Permit No. Operates Hr/Day & Day/Yr	Permit Services Division/Enforcement Division Test Requested By:
Operating Parameters:	Organic Liquid Loaded During Test, Gallons: Gasoline: Diesel: AV Gas: Jet A: Other: Total:	
Applicable Regulations:		**VN Recommended:**

Sources Test Results and Comments:

PARAMETER	**RESULTS**	**LIMITS**
VST Outlet Volume, SCF		
VST Outlet NMOC Concentration, ppmv, avg. as C_1		
VST Test Time, total minutes		
VST Outlet NMOC Weight, pounds		
VST Emission Factor, pounds per day		

Air Quality Engineer II **Date**	**Supervising Air Quality Engineer** **Date**	**Approved by Air Quality Engineering Manager**

Bay Area Air Quality Management District

939 Ellis Street
San Francisco, CA 94109

Final Staff Report

Proposed Amendments to BAAQMD Regulation 8, Rule 44: Marine Vessel Loading Operations

Proposed Deletion of BAAQMD Regulation 8, Rule 46: Marine Tank Vessel to Marine Tank Vessel Loading

Proposed Amendments to Manual of Procedures, Volume IV: Source Test Policy and Procedures, ST-34: Bulk And Marine Loading Terminals – Vapor Recovery Units

November 30, 2005

Prepared by:

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Senior Air Quality Engineer

William H. Guy
Assistant Council

TABLE OF CONTENTS

I. Executive Summary

Air District staff are proposing amendments to the rules that control air pollution from marine tank vessel (oil tanker) activities. The rules were adopted in 1989 to regulate activities that release vapors from organic liquid cargoes carried by tankers. Regulation 8, Rule 44 applies to loading of organic liquids at marine terminals, such as those operated by Bay Area refineries. Rule 46 applies to lightering – the transfer of cargoes, usually crude oil, from large tankers to smaller tankers that can more easily navigate the relatively shallow San Francisco Bay. Most lightering is carried out at Anchorage 9, just south of the Bay Bridge. The current rules apply to five types of organic liquid cargoes: gasoline, gasoline blending stocks, aviation gasoline, JP-4 jet fuel, and crude oil.

The proposed amendments would (1) continue to require controls for the five liquid categories listed in the current rules (gasoline, gasoline blending stock, aviation gas, JP-4 jet fuel, and crude oil) and add requirements to control other liquids with a flash point below 100 ˚F, (2) clarify application of more stringent leak standards for the equipment that controls emissions, (3) clarify and extend requirements for various activities – ballasting, tank washing, purging, and gas freeing - that can vent tank emissions to the atmosphere, (4) consolidate requirements found in two separate rules into one rule, and (5) make minor amendments in the source test procedure used to test vapor recovery units at marine terminals.

The proposed amendments would extend control requirements to a group of volatile organic chemicals that are not listed in the current rule and are handled in relatively small quantities in the Bay Area. These cargoes have flash points below 100 ˚F (flash point is the lowest temperature at which a liquid will generate sufficient vapor to form a flammable air-vapor mixture near its surface) and are as volatile as the cargoes currently controlled. As a result, these cargoes produce relatively high emissions during loading or transfer. Emission reductions from controlling these cargoes would be cost effective because significant emission reductions can be achieved by controlling a relatively small volume of cargoes.

The proposed amendments would clarify the leak requirements that apply to marine tank vessel activities. Most of the terminals subject to the rule already comply with more stringent leak standards in Regulation 8, Rule 18 (“Equipment Leaks”) that were adopted in 1998.

The proposed amendments would also require controls for various activities that may release organic vapors contained in cargo tanks. These activities, collectively called "venting" in the proposed amendments, include purging and gas freeing. Virtually all tankers in petroleum service that call on the Bay Area have inert gas systems that they use to prevent the formation of an explosive atmosphere inside cargo tanks. In purging, inert gas is introduced into a tank to reduce the hydrocarbon level, often in preparation for gas freeing. Gas freeing involves flushing the tank with air, generally to make it safe for tank entry, usually for repairs or final cleaning. The proposed amendments would require that these activities be conducted outside Bay Area waters or, if within Bay Area waters, using emission controls.

The proposed amendments would eliminate Regulation 8, Rule 46, which is nearly identical in structure and content to Rule 44, and would incorporate Rule 46’s lightering requirements into

Rule 44. The deletion of Rule 46 is intended to consolidate all requirements affecting marine tank vessel activities into a single rule.

The proposed amendments are the result of an extensive rule development process that began with Further Study Measure FS-11 ("Marine Tank Vessel Operations") from the Bay Area 2001 Ozone Attainment Plan. The primary question addressed by the further study was whether controls on low-volatility cargoes like distillate oils (such as diesel #2) and residual oils (such as fuel oil #6) would produce significant emission reductions. The evidence developed during the study does not suggest that significant emission reductions would result from controls on these cargoes. In addition, controls on distillate and residual oils would not significantly reduce worker exposure to hazardous air pollutants (HAPs), a beneficial side effect of controls on high volatility cargoes like gasoline. Distillate and residual oils contain relatively low levels of HAPs and evaporate slowly so that, for example, between 15 and 40 uncontrolled loadings of distillate oils into barges would produce roughly the same HAP emissions as one controlled loading of gasoline into a barge. In addition, other agencies – the U.S. Occupational and Health Administration and Cal/OSHA – have promulgated regulations that limit workplace exposure to benzene and other HAPs. Other elements of Further Study Measure FS-11 are discussed in Section II.B.

The rule development process for the proposed amendments included 6 workgroup meetings between 2002 and 2004 and rule development workshops in 2002, 2003, and 2005. A socioeconomic analysis of the proposed amendments concludes that the amendments would not have significant economic effects. Pursuant to the California Environmental Quality Act, an initial study was prepared for the proposal. The initial study concludes that the rule amendments would not cause significant environmental impacts, and a CEQA negative declaration is proposed for adoption. The rule and CEQA document were made available for public comment during the period from November 7, 2005 to November 28, 2005. The Western States Petroleum Association submitted two minor comments on rule language. These comments are addressed in the comment and response section of this staff report. No comments were received on the CEQA document.

II. Background

A. Tanker and Terminal Operations

Bay Area refinery inputs and outputs are primarily transported by pipelines and marine vessels. The Bay Area petroleum industry is one of the oldest industries in the Bay Area, dating back to the late 1800's. Four of the five Bay Area refineries were built before 1920. Much of the transportation infrastructure that serves the refineries also dates back to this time Ships began moving oil along the California coast in the 1880's, and the first true oil tanker began sailing for a Chevron predecessor in 1896. In addition, the major crude oil pipelines that serve the Bay Area refineries were all built before 1920.

In 2004, approximately 42% of the crude oil that supplied California refineries came from within California, while 22% came from Alaska and 36% came from foreign sources. The Bay Area refineries are served by crude oil pipelines that transport crude oil from the southern San Joaquin

valley. Most other crude comes by tanker. Very little crude oil is loaded in the Bay Area for delivery elsewhere. Some of the inbound crude is lightered onto smaller vessels that can more easily navigate through the relatively shallow San Francisco Bay. As a result, the Air District's loading rule (Rule 44) has a very limited impact on the crude trade, while the lightering rule (Rule 46) has a greater impact.

The Bay Area is a net exporter of petroleum products. Much of the Bay Area's gasoline and jet fuel production is transported by product pipelines that include a north-south line from Chico to Bakersfield and a west-east line from Brisbane to Reno. All of the Bay Area refineries are connected to the pipelines. Through the pipelines, the refineries are also directly connected to the Oakland, San Francisco, and San Jose airports as well as to Travis AFB, Mather Airport, McClelland AFB, Lemoore Naval Air Station (near Fresno), and Fallon Naval Air Station (near Reno). In addition, large quantities of petroleum products are transported by tankers and barges. Because petroleum products are rarely lightered, the Air District's loading rule (Rule 44) has the primary impact on the product trade.

In response to the Air District's loading rule, Bay Area marine terminals installed equipment to capture and control vapors. Table 1 lists Bay Area facilities that operate vapor recovery systems for loading marine vessels.

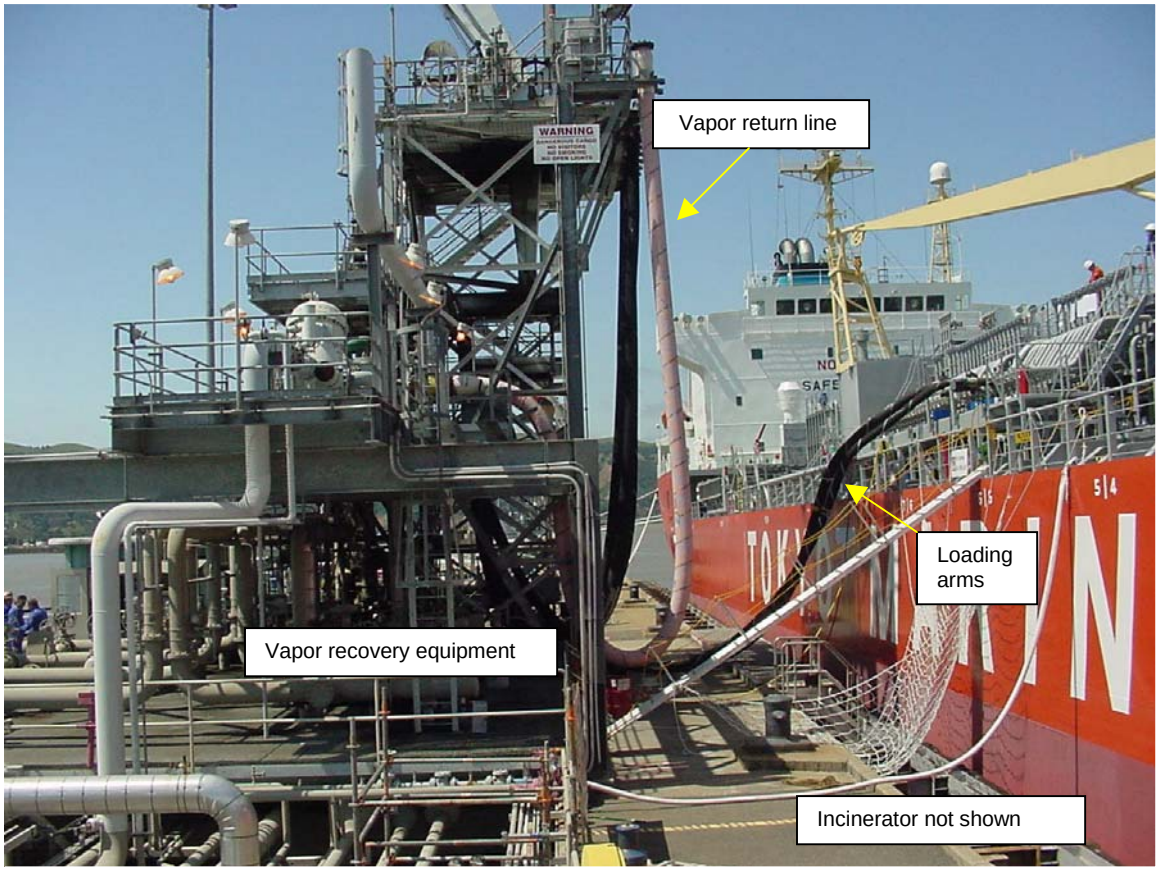
TABLE 1: BAY AREA MARINE LOADING TERMINALS

Facility	Air District Plant #	Location
BP West Coast Products, LLC	13637	Richmond
Chevron Refinery	10	Richmond
ConocoPhillips Refinery	16	Rodeo
ConocoPhillips Terminal	15693	Richmond
IMTT Terminal	10649	Richmond
Pacific Atlantic Terminals LLC (formerly Shore Terminals - Richmond)	17370	Richmond
Pacific Atlantic Terminals LLC (formerly Shore Terminals - Martinez)	7034	Martinez
Shell Refinery	11	Martinez
ST Shore Terminals LLC	581	Crockett
Tesoro Refinery	14628	Martinez
Tesoro Terminal (Amorco)	14629	Martinez
Valero Refining	12626	Benicia

The vapor recovery systems used at terminals capture vapors forced out of tanks being loaded and send them through a vapor return line to an incinerator or carbon adsorption system. These

systems are similar in concept to the vacuum assist systems found at many gas stations.

The photograph below shows a vessel loading an unregulated cargo. Because this loading operation does not require control, the vapor recovery hose is not connected to the vapor return line on the ship. The vapor recovery equipment is located to the left of the vessel.



The incinerator for the loading operation illustrated on the previous page is shown in the photograph below.

In lightering, the vapors forced out of the tanks on the smaller vessel to which cargoes are transferred are returned to the larger vessel through a vapor return line. These vapor balance systems are similar in concept to vapor balance systems found at gas stations.

B. Emissions

Regulation 8, Rule 44 is one of many Air District regulations that is intended to reduce emissions of organic compounds so that the Air District can attain and maintain compliance with state and federal ozone standards.

Pollutant emissions are typically estimated by multiplying emission factors, which specify expected emissions for some measure of activity, by the amount of the activity occurring over the period in question. For marine loading, organic emission factors are generally stated in terms of pounds of emissions for each thousand gallons or thousand barrels loaded (a barrel is 42 gallons). Activity is typically expressed in terms of thousands of barrels loaded in a single loading event or over a month or a year.

1. Emission Factors

Loading and Lightering

Organic compound emissions are generated when marine tank vessels are loaded with organic liquids. In general, liquid is loaded into the marine vessel tank, where the liquid achieves equilibrium over time with its vapor. During loading, vapors from the loaded liquid, along with the air and other gasses that were in the tank prior to the loading, are displaced from the tank by the rising liquid. The total mass of emissions vented from the tank depends on the volume of vapors displaced, the concentration of organic compounds in these vapors, the molecular weight of the organic vapors, and the volume of organic vapors vented during the loading event.

Loading emissions can be measured directly or they can be estimated from emission factors that are derived from such measurements. Developing emission factors for the loading of organic liquids into marine tank vessels is complicated by the number of variables that affect emissions. In its AP-42 Compilation of Emission Factors document, U.S. EPA identified the five primary factors: (1) physical and chemical characteristics of the previous cargo, (2) method of unloading the previous cargo, (3) operations to transport the empty carrier to a loading terminal, (4) method of loading the new cargo, and (5) physical and chemical characteristic of the new cargo. These factors can be divided into those that relate to the prior cargo and those that relate to the new cargo.

In developing its emission factors for organic liquids other than crude oil and gasoline, U.S. EPA relied upon a limited data set and a correlation equation based on that data set. The correlation equation can be used for a variety of organic liquids if certain properties of those liquids are known. According to AP-42, the correlation equation, which is shown below, can be used to estimate emissions (within ±30%) for cargoes other than gasoline and crude oil.

$$L_L = 12.46 \frac{SPM}{T}$$

where:

L_L = the loading loss, pounds per 1000 gallons (lb/10^3 gal) of liquid loaded
S = a saturation factor from a table
P = true vapor pressure of liquid loaded, pounds per square inch absolute (psia)
M = molecular weight of vapors, pounds per pound-mole (lb/lb-mole)
T = temperature of bulk liquid loaded, °R (°F + 460)

The most important factor in this equation is the true vapor pressure of the liquid loaded. The saturation factor (0.2 for ships, 0.5 for barges) remains constant. Temperature is of minor significance as a factor in the equation over the range of temperatures typically encountered (from ambient temperature up to about 175 °F) because the temperature used in the equation is in degrees Rankin (degrees Fahrenheit plus 460 degrees) so that this factor only varies by about 20%. However, because temperature affects the most important factor, true vapor pressure, temperature can have a significant effect on emissions.

The AP-42 emission factors for gasoline and crude oil rely on correlation equations developed specifically for those cargoes. These emission factors are based on different and larger data sets than the set used for the general equation above. AP-42 includes calculated emission factors for some of the cargoes covered by the current rule as well as for several others. The factors for gasoline and crude oil are based on data and equations developed specifically for those cargoes, while the factors for other cargoes are based on the general equation above. These factors are shown in Table 2. This table also shows the strong correlation between vapor pressure (and volatility) and emission factor.

TABLE 2: U.S. EPA'S AP-42 LOADING EMISSION FACTORS

Cargo	**AP-42 Emission Factor (lb/1,000 bbl)***	**True Vapor Pressure @ 60°F (psi)**
gasoline	76 (ships) 143 (barges)	3.5
crude oil	26 (ships) 42 (barges)	2.8
JP-4 (jet fuel)	21 (ships) 50 (barges)	1.3
Jet A	0.2 (ships) 0.5 (barges)	0.0085
distillate oil (#2 or diesel)	0.2 (ships) 0.5 (barges)	0.0074
residual oil (#6)	0.002 (ships) 0.004 (barges)	0.00004

In implementing Further Study Measure FS-11 ("Marine Tank Vessel Activities") from the Bay Area 2001 Ozone Attainment Plan, the Air District conducted 5 source tests on loading activities involving distillate and residual oils. These tests are time consuming and expensive. The tests covered the entire loading event because emissions typically change as the liquid level within a tank rises. Some loading operations take up to several days to complete because of the large volumes of liquid loaded. Table 3 shows the results of the Air District tests, and the results of independent CARB analyses.

TABLE 3: SOURCE TEST RESULTS, 2002 FURTHER STUDY

Cargo	Emission Factor, (lb/1000 bbl)	Prior Cargo	Load Temp.	Flash Point
flash distillate oil	District: 2.1	NA	153 °F	NA
diesel oil	District: 2.0 CARB: 2.0	diesel	82 °F	125 to 180 °F
fuel oil #6	District: 1.4 CARB: 1.6	fuel oil #6	171 °F	>150 °F
high sulfur fuel oil	District: 4.7	fuel oil	125 °F	202 °F
JP-8 jet fuel	District: 1.1 to 2.2	JP-8 jet fuel	63 °F	150 °F

The Air District source test results clustered around the emission limit in the current rule of 2 pounds per thousand barrels with an exception for the high sulfur fuel oil test. An interesting aspect of the results is the variance between the test results and the theoretically derived AP-42 emission factors. The distillate products (flash distillate oil, diesel, and JP-8) all have test emission rates approximately 10 times higher than their AP-42 emission factors. One of the residual products also has a test emission rate close to 2 lb/1000 bbl, which is approximately 1000 times higher than what would be expected based on AP-42. The other residual loading exceeds the AP-42 emission factor by an even larger margin.

There are several possible explanations for the difference between AP-42 factors and the test results for distillate and residual oils. The AP-42 factors for these cargoes were derived from limited data sets which may be inaccurate for low-vapor-pressure liquids. While the Air District source tests were direct field measurements, the tests did not control for all of the variables that may affect emissions. Although the Air District attempted to determine prior cargoes, it was only able to obtain general information about the prior commodities for 4 of the 5 tests. Thus it is possible that significant contributions to the measured emissions are related to prior cargoes, either immediately prior cargoes or earlier cargoes. The Air District also did not have resources available to analyze the vessel piping – which is often quite complex – to ensure that there was no carryover of vapors from tanks other than the one being loaded. It is therefore possible that emissions contributions came from other tanks that may have been loaded prior to testing. Another variable not addressed was the ship's inert gas generator, which was not separately tested and may have contributed to measured emissions.

Another noteworthy aspect of the test results is that emissions were relatively uniform during the tests. This observation differs from what is typically observed in the loading of gasoline and other volatile commodities: emissions are relatively low at the beginning of a test and increase as the liquid level rises and begins to push stratified organic vapors, which have the highest concentration of high molecular weight compounds near the liquid's surface, out of tank vents. The observation is consistent, however, with the observation that diesel and residual oils have very low volatility and would not be expected to produce a mass of organic vapors sufficient to significantly affect loading emissions. The observation is also consistent with the idea that the emissions measured in the Air District source tests may have a significant contribution from

something other than the liquid being loaded and may well represent “baseline” emissions related to inert gas generator exhaust and carryover from prior cargoes or other tanks.

As a result of the source tests and the foregoing analysis, the Air District has concluded that loading typically involves baseline emissions of approximately 2 pounds per thousand barrels, which result from a variety of potential sources. There is little evidence to suggest that emissions from loading of cargoes with low vapor pressures like those typical of distillate and residual oils results in emissions significantly higher than this baseline. There may be cases where a cargo, particularly a residual oil, will have an unusually high vapor pressure or a low flash point because light ends have been added to the oil. However, the proposed requirements to control cargoes with low flash points should result in controls in these cases.

The 4.7 lb/1000 bbl result for high sulfur fuel oil is not inconsistent with the Air District's conclusion that 2 lb/1000 bbl are the reasonably expected emissions from distillate and residual oil cargo loading. First, if this cargo had significant volatility and contributed significantly to emissions, the typical increase in emissions toward the end of the loading cycle would have been observed. As with the other tests, no such increase was observed and cargo volatility does not seem to have been a factor. Second, this high result was balanced against other test results below 2 lb/1000 bbl in reaching the conclusion that 2 lb/1000 bbl is a reasonable emission factor for these cargoes. Third, the result is within the normal variation observed with prior tests of tanker loading. In 1992, after Bay Area terminals installed emission controls in response to Regulation 8, Rule 44, the Air District conducted source tests during loading of gasoline and crude oil into ships. These source test results are summarized in Table 4.

TABLE 4: AIR DISTRICT SOURCE TEST RESULTS, 1992

Cargo	Emission Factor, Before Controls (lb/1000 bbl)	Emission Factor, After Controls (lb/1000 bbl)
MTBE	35.4	0.098
gasoline	106.1	2.33
gasoline	32.3	<0.83
gasoline	31.2	<0.035
gasoline	47.2	0.02
SJV crude	7.6	0.2
gasoline	109.2	<0.14
gasoline	16.6	<0.22
Pt. Arguello crude	18.6	NA
SJV Crude	19.6	NA

Both gasoline and crude oil loading show significant variation in test results. Gasoline emission factors ranged from 16.6 lb/1000 bbl to 109.2 lb/1000 bbl, with an average factor of 57 lb/1000

bbl. Crude oil emission factors ranged from 7.6 lb/1000 bbl to 19.6 lb/1000 bbl with an average factor of 15 lb/1000 bbl. Of note is that these average emission factors are relatively close to the AP-42 emission factors for gasoline and crude oil, which might be expected because of the larger data sets used to develop those emission factors.

Ballasting

Ballasting is the introduction of seawater into vessel tanks in order to obtain proper hull, propeller, and rudder immersion, generally after a vessel has discharged its cargo and is riding high in the water. Although modern vessels are typically designed with “segregated” ballast tanks that are not used for cargo storage, older vessels may not have segregated ballast tanks, and even vessels with segregated tanks may use empty cargo tanks for ballast in especially rough ocean conditions.

U.S. EPA’s AP-42 emission factors include factors for ballasting. The AP-42 emission factor for "typical overall" ballasting situations is 46 lb/1000 bbl. The Air District has not conducted any source tests for ballasting emissions.

Venting

Virtually all tankers that call on the Bay Area have inert gas systems that are used to keep tank atmospheres outside the explosive range through the introduction of "inert gas," typically scrubbed vessel exhaust, into cargo tanks. Inert gas systems are employed to maintain an inert gas blanket over an organic liquid cargo, to fill tanks with inert gas to replace discharged cargo, to purge hydrocarbon vapors from an empty tank, and to purge air from a clean tank prior to the introduction of cargo. Though AP-42 does not include an emission factor specifically for venting, emissions in the most common case - when tanks are purged after crude oil discharge - would be best represented by the emission factor for ballasting. As with ballasting, the Air District has not conducted source tests of venting emissions.

2. Vessel Activity

To calculate emissions and emission reductions, information on emission factors must be combined with vessel activity data. In developing emission and emission reduction estimates, the Air District has relied on vessel activity data from two sources: (1) U.S. Army Corps of Engineers data contained in its annual publication titled "Waterborne Commerce of the United States," and (2) an extensive survey and compilation of data from Further Study FS-11. The Corps of Engineers data is the more recent data but the Air District survey data is the more comprehensive data.

Army Corps of Engineers Data

Primarily because of the high demand for motor, aviation and other fuels in the Bay Area, San Francisco Bay and its ports handle large quantities of crude oil, refined and intermediate petroleum products, and other organic liquids. Crude oil is imported into San Francisco Bay in large tanker vessels, and then lightered into smaller vessels for distribution to area refineries. Refined petroleum products and organic chemicals are produced at area refineries and chemical

plants and loaded onto marine vessels for distribution along the Pacific Coast or elsewhere. Table 5 summarizes data from the U.S. Army Corps of Engineers[2] for commodity traffic through the entrance to San Francisco Bay in 2003 and indicates which cargos are currently subject to Rule 44.

TABLE 5: 2003 COMMODITY TRAFFIC

Cargo (note 1)	2003 Volume (1,000 bbl)	Emissions Controlled by Current Rule 44?
crude oil	161,000	yes
Gasoline	38,000	yes
kerosene	180	no
distillate fuel oils and diesel fuel	17,000	no
residual fuel oils	11,600	no
fuel intermediates (naphtha, others)	2,200	yes (note 2)
heavy refined products (lube oil, grease, wax, asphalt)	7,600	no
organic chemicals (benzene, toluene, alcohols, others)	8,500	no (note 2)

1. In addition to the traffic shown in this table, area refineries also receive crude oil by pipeline from California oilfields, and distribute gasoline, jet fuel and other products via pipeline, tanker truck and rail.
2. Only fuel intermediates used in gasoline production are regulated by Rule 44; intermediates used in diesel production are not currently regulated. Miscellaneous organic chemicals, including benzene and toluene, may be used as fuel blending stocks and are regulated by Rule 44 if used in gasoline production.

As shown in Table 5, there is significant traffic in a category the Army Corps of Engineers calls "organic chemicals." This cargo consists of volatile organic chemicals such as benzene and toluene with high unabated loading emission factors similar to those for currently-regulated materials. These cargoes are not currently regulated by Regulation 8, Rule 44 unless they are used as gasoline blending stocks.

Air District Survey Data

In conducting Further Study FS-11, the Air District examined Army Corps of Engineers data. However, there are some difficulties in using the Corps data for calculating emissions because it is difficult to determine quantities of cargoes actually loaded at Bay Area terminals and distinguish them from those cargoes that passed through the Golden Gate for unloading in the Bay Area or those cargoes that were loaded outside the Bay Area but nevertheless passed through the Golden Gate.

As a result of the difficulties with the Corps data, the Air District conducted an extensive data gathering effort to determine more precisely the volume of cargoes loaded. To do this, the Air District collected available records from all terminals and submitted data requests to supplement this data. The Air District assembled records for all Bay Area loading of organic liquids that occurred during the period from September 2000 through August 2001. The various

commodities loaded were classified as "light," "medium," or "heavy" cargoes. The cargo classification is shown in Table 6.

TABLE 6: CARGO CLASSIFICATION – FS-11

Light Cargoes	Medium Cargoes	Heavy Cargoes
Gasoline	Jet fuel	Fuel oil
Crude oil	Diesel oil	Bunker oil
Aviation gas & aviation fuel (JP-4)	Cutter stock	Lube oil
Gasoline blending stock	Alkane	Charge stock
Naphtha	Kerosene	Cat Cracker Feed
Ortho-Benzene	Diesel blending stock	Gas oil
	Light Cycle Oil	Black oil
		Residual oil
		Polymers

Currently-regulated cargoes were classified as light cargoes. Almost all of the light cargoes were gasoline. Almost all of the medium cargoes were diesel oils. The heavy cargoes were a variety of residual oils, including fuel oil #6, bunker oil, gas oil, lube oil, and carbon black.

The quantities loaded for each cargo classification are shown in Table 7.

TABLE 7: CARGO QUANTITIES LOADED 9/00 TO 8/01

Facility Type	Quantities Loaded (barrels)		
	Light Cargoes	Medium Cargoes	Heavy Cargoes
Refinery Terminals	17,428,154	6,766,530	31,413,080
Other Terminals	6,963,825	19,045,922	19,761,093
Totals	**24,391,979**	**25,812,452**	**51,174,173**

3. Emissions Estimates

The Air District has estimated emissions from commodity categories based on both the 2003 Army Corps of Engineers activity data and the District's 2001 survey data.

2003 Emissions – Army Corps of Engineers Data

Total estimated emissions for the organic chemical category for which controls **are** proposed and for distillate and residual oils for which controls **are not** proposed were calculated as follows:

For organic chemical cargoes:

Assuming a very conservative (low) average factor of 10 lb/1,000 bbl, the emissions subject to control would be:

(8,500,000 bbl/yr) (10 lb/1,000 bbl) (ton/2,000 lb) = 42.5 ton/yr or 0.12 ton/day

For distillate oil cargoes:

Assuming an average factor of 2 lb/1,000 bbl for distillate oils, the uncontrolled emissions from these cargoes would be:

(17,000,000 bbl/yr) (2 lb/1,000 bbl) (ton/2,000 lb) = 17.0 ton/yr or 0.05 ton/day

For residual oil cargoes:

Assuming an average factor of 2 lb/1,000 bbl for residual oils, the uncontrolled emissions from these cargoes would be:

(11,600,000 bbl/yr) (2 lb/1,000 bbl) (ton/2,000 lb) = 11.6 ton/yr or 0.03 ton/day

2001 Emissions – Air District Survey Data

Total estimated uncontrolled emissions for the three cargo categories were calculated as follows:

For light cargoes:

Assuming an average factor of 50 lb/1,000 bbl for light cargoes, most of which is gasoline, the uncontrolled emissions from these cargoes would be:

(24,391,979 bbl/yr) (50 lb/1,000 bbl) (ton/2,000 lb) = 610 ton/yr or 1.67 ton/day

For medium cargoes (distillate oils):

Assuming an average factor of 2 lb/1,000 bbl for distillate oils, the uncontrolled emissions from these cargoes would be:

(25,812,452 bbl/yr) (2 lb/1,000 bbl) (ton/2,000 lb) = 25.8 ton/yr or 0.07 ton/day

For heavy cargoes (residual oils):

Assuming an average factor of 2 lb/1,000 bbl for residual oils, the uncontrolled emissions from these cargoes would be:

(51,174,173 bbl/yr) (2 lb/1,000 bbl) (ton/2,000 lb) = 51.2 ton/yr or 0.14 ton/day

B. Rule History

Regulation 8, Rule 44 and Rule 46 were both adopted in 1989. The rules were the first of their kind in the nation. The rules require the control of emissions from loading or lightering of five materials (gasoline, gasoline blending stocks, aviation gasoline, JP-4 aviation fuel, and crude oil). Emissions must not exceed 2 pounds per thousand barrels (2 lb/1,000 bbl) of material loaded or they must be reduced by at least 95% by weight. These five materials were chosen because they were considered to be the only materials with significant emissions and significant loading volume in the Bay Area.

The Bay Area 2001 Ozone Attainment Plan included Further Study Measure FS-11 ("Marine Tank Vessel Activities"). The results of this study measure were published in December 2002 in a draft technical assessment document (TAD). In the further study, Air District staff attempted to determine whether significant emission reductions could be cost-effectively achieved by: (1) regulating currently unregulated liquids, (2) imposing more stringent control requirements, (3) tightening leak standards, and (4) regulating activities that vent tank vapors to the atmosphere.

1. Unregulated Liquids

The primary question addressed by the TAD was whether controls on low-vapor-pressure cargoes like distillate oils and residual oils would produce significant emission reductions. In order to determine whether emissions from loading of medium and heavy cargoes are significant, the Air District conducted 5 marine loading source tests and summarized the results in the TAD. The TAD also included a summary of test data from other agencies. Though some tests of distillate or residual oil loading indicated an uncontrolled emission factor greater than 2 lb/1000 bbl under circumstances that would not require control under the existing provisions of Rules 44 and 46, others showed the uncontrolled emission factor to be less than 2 lb/1000 bbl. This testing also revealed that a number of factors, besides the properties of the liquid being loaded, may have a large effect on the overall emission rate during loading. The results of Air District testing and results obtained by other agencies suggest that an emission factor of 2 lb/1000 bbl, rather than U.S. EPA's AP-42 emission factors, would provide more reasonable estimates for emissions from loading distillate and residual oils.

2. More Stringent Control Requirements

In the draft TAD, the Air District compared Regulation 8, Rule 44 to rules from other air districts and found that the current Air District abatement standard (2 lb/thousand bbl or 95% by weight) is at least as stringent as corresponding standards in the South Coast AQMD, San Luis Obispo County APCD, and Santa Barbara County APCD. The document did not include a recommendation for a more stringent control standard.

3. More Stringent Leak Standard

In the draft TAD, the Air District found that the current "gas tight" standard for tanks and connectors in Regulation 8, Rules 44 and 46 (10,000 ppm) is less stringent than the standard in the South Coast AQMD and San Luis Obispo County APCD (both 1,000 ppm). However, the draft TAD did not discuss the Air District's more stringent 100 ppm standard, found in Regulation 8, Rule 18, which applies at all of the marine terminals regulated by Regulation 8, Rule 44.

4. Purging and Gas Freeing

In the draft TAD, the Air District found that the South Coast AQMD and San Luis Obispo County APCD require control of gas venting operations where air or inert gas is introduced into a marine tank previously loaded with regulated cargo, usually for safety reasons. Neither the South Coast rule nor the San Luis Obispo rule includes a mechanism to enforce these requirements. The Air District rules do not directly regulate gas venting operations, but have been interpreted by the Air District to apply to some of these activities when they are related to loading or lightering.

III. Proposed Rule Amendments

The proposed rule amendments make changes in eight main areas:

- They broaden applicability of the rule to include currently unregulated liquids with a flash point below 100 ˚F;
- They impose new requirements regarding the control of emissions from ballasting;
- They impose new requirements regarding control of emissions from venting;
- They impose more stringent leak standards;
- They impose new notification requirements;
- They clarify record keeping requirements and impose new requirements;
- They combine Rule 44, which applies to loading, and Rule 46, which applies to lightering;
- They make minor corrections and clarifications.

A section-by-section explanation of changes made is included in Appendix I to this staff report.

A. Proposed Control of Currently Unregulated Liquids (§§ 222, 301)

The Air District is proposing to extend control requirements to all cargoes with a flash point less than 100 ˚F. This threshold is proposed for four reasons: (1) data shows that there is significant Bay Area traffic in unregulated commodities with a flash point below 100 ˚F, (2) these cargoes can be readily identified prior to loading, (3) liquids with a flash point below 100 ˚F are extremely volatile and therefore produce significant emissions, and (4) control of emissions from the currently-regulated liquids, each of which has a flash point below 100 ˚F, has proven to be both feasible and cost effective.

The flash point of a material is the lowest temperature at which a liquid will generate sufficient vapor to form a flammable air-vapor mixture near its surface. Flash point is inversely related to volatility and vapor pressure because a flammable material with a greater tendency to volatilize will support ignition at a lower temperature than a flammable material that is less volatile. Thus, flash point may be used as a surrogate for vapor pressure. Although the Air District has considered using a vapor pressure criterion as the trigger for control requirements, the regulated community overwhelmingly prefers the use of flash point because this data is usually known for each cargo while vapor pressure is not. Further, the procedure to measure flash point is much simpler than that required to measure vapor pressure.

Materials with a flash point below 100 degrees:

• all 5 materials currently subject to control requirements in Rules 44 and 46 (crude oil has a large flash point range and some crude oils may have a higher flash point than 100 ˚F, however, the 5 currently regulated materials, including all crude oils, will continue to be subject to control requirements regardless of their flash point.

• all BTEX compounds (benzene, toluene, xylene)
• most alcohols, except for those with the lowest vapor pressures (and therefore the lowest expected loading emissions)

Importantly, a flash point criterion of less than 100 degrees would **exclude** the following materials from control requirements, since each of these has a flash point of 120 degrees or more:

• diesel fuel
• all distillate fuel oils
• all residual fuel oils

Therefore, a flash point criterion of 100 ˚F will require emission controls for most materials in the category of "organic chemicals" in Table 6 in Section II.A – materials that are expected to have loading emissions as high as those of the 5 currently-regulated materials, but will not require controls for materials (diesel fuel, distillate and residual fuel oils) that have not been established to have emission factors that exceed the current control standards of Rules 44 and 46 (2 lb/thousand bbl of material loaded).

The primary effect of the proposed amendments would be to extend control requirements to a group of volatile organic chemicals that are not listed in the current rule and are handled in relatively small quantities in the Bay Area. These cargoes are as volatile as the cargoes currently controlled and therefore produce relatively high emissions during loading or transfer. Although some loading of these chemicals is already regulated if the chemicals are to be used as gasoline blending stock, other loading of the same chemicals escapes control simply because the individual chemicals are not listed in the rule. While it was true in 1989 and is true today that controls on the five specified cargo categories capture the overwhelming majority of emissions from these activities, additional emission reductions would be achieved by regulating the loading of these additional volatile organic chemicals. These emissions reductions would be cost

effective because the high volatility of the cargoes means that significant emission reductions can be achieved by controlling a relatively small volume of cargoes.

The proposed amendments would retain the current list of cargoes for which controls are required and supplement the list by specifying that any cargo with a flash point below 100 ˚F would also have to be controlled. This "hybrid" approach has numerous advantages. By retaining the current approach of listing by name most of the cargoes to be controlled, the rule would continue to provide for certainty and clarity. Using flash point also provides a clear means to identify other cargoes subject to control as it is a known value for most refined products, is relatively easily tested for, and is required to be known for compliance with various regulations that govern the transportation of flammable liquids. The certainty provided by the rule is crucial from the perspective of terminal and ship operators, who must plan for dock time and equipment availability, and useful for the Air District, which can readily identify activities subject to the rule.

During the rule development process, concern was expressed that failure to regulate distillate and residual oils would result in significant continuing workplace exposure to toxic air contaminants that could be significantly reduced by regulating these liquids. Workplace exposure to benzene and other hazardous air pollutants is regulated by the U.S. Occupational Safety and Health Administration (OSHA) and Cal/OSHA, and both agencies have established limits on workplace exposures to benzene. Under OSHA rules, employers must monitor worker exposures and limit those exposures.

By limiting emissions from loading activities, the current Air District rules have an additional beneficial effect in reducing the opportunities for workplace exposures. The volatile cargoes regulated by the current rule contain hazardous air pollutants (HAPs) such as benzene, toluene, and xylene. Other commodities loaded at marine terminals also contain these HAPs. U.S. EPA has developed the HAP emission factors for marine loading shown in Table 8.

TABLE 8: HAP EMISSION FACTORS – MARINE LOADING

HAP	HAP Emission Factors (lb/1000 bbl)		
	Gasoline	Crude Oil	Distillate Fuel
benzene	0.63 (tankers) 1.219 (barges)	0.269 (tankers) 0.420 (barges)	0.0016 (tankers) 0.0039 (barges)
toluene	1.092 (tankers) 2.016 (barges)	0.180 (tankers) 0.294 (barges)	0.0013 (tankers) 0.0033 (barges)
xylenes	0.336 (tankers) 0.630 (barges)	0.040 (tankers) 0.067 (barges)	0.0032 (tankers) 0.0008 (barges)

As a check on the EPA emission factors for HAPs, the Air District compared EPA's benzene emission factor to results from Air District source test results for uncontrolled loading of distillate oil into a barge. The benzene emission factor for the test was 0.0063 lb/1000 bbl,

which is relatively close to the EPA factor of 0.0039 lb/1000 bbl.

To assess the relative risks posed by the currently unregulated cargoes, HAP emission factors for those cargoes can be compared to post-control factors for the high-volatility cargoes regulated under the current rules. Because the current rules require emissions to be reduced to 2lb/1000 bbl or by 95%, the emission factors for high-volatility cargoes would have to be reduced by 95% for purposes of this comparison. A comparison between controlled emissions for loading gasoline and uncontrolled emissions for loading distillate fuel is shown in Table 9.

TABLE 9: HAP EMISSIONS – GASOLINE AND DISTILLATE FUEL

HAP	HAP Emission Factors, Barge Loading (lb/1000 bbl)	
	Gasoline, Controlled	Distillate Fuel, Uncontrolled
benzene	0.061	0.0039
toluene	0.101	0.0033
xylenes	0.032	0.0008

From the comparison above, it can be seen that post-control emissions of HAPs from loading gasoline are 15 to 40 times greater than uncontrolled emissions from distillate oil. This comparison demonstrates that risks from currently unregulated cargoes are sufficiently low that requiring controls would have minimal benefits to workers. This result is not surprising given the great difference in volatility between the two fuels. Through the existing requirements, the Air District has already achieved most of the reduction in worker exposure to HAPs that can be achieved through controls on marine tank vessel loading.

Another comment received during the rule development process was that Regulation 8, Rule 44 should be structured like South Coast AQMD Rule 1142. The comment was based on an assumption that the South Coast AQMD rule is more stringent than the BAAQMD rule and requires controls for a broader range of cargoes. This assumption is incorrect. Rather than specifically naming the cargoes to be controlled or using an easily-determined trigger like flash point, the South Coast rule states that no loading event may be conducted unless emissions are limited to 2 lb/1000 bbl or reduced by 95%. However, to determine whether emissions exceed the limits requires testing that "shall be conducted for at least 30 minutes during the transfer of the last 50 percent of total liquid cargo." As a result, it cannot be known in advance whether controls are required for a particular cargo. In practice, the South Coast AQMD enforces controls on essentially the same cargoes controlled under the BAAQMD rule. This picture is complicated by an EPA consent decree that requires one South Coast terminal to control all cargoes until EPA approves a "protocol" that will "function as a preliminary determination for whether loading and housekeeping events are subject to Rule 1142," i.e., a means of providing the certainty that Rule 1142 lacks. Current Regulation 8, Rule 44 provides for certainty regarding the cargoes to be controlled, and the proposed amendments are intended to preserve that approach.

B. Proposed Requirements for Ballasting (§§ 203, 302)

Current Regulation 8, Rule 44 was intended to require controls for ballasting. However, the rule accomplishes this indirectly by defining, the term "loading of organic liquid" to include "the loading into a tank vessel where the prior cargo was an organic liquid." This definition (in current § 211) is proposed for deletion. The proposed amendments would add a definition of ballasting (proposed § 203) and provisions restricting ballasting into cargo tanks that contained a cargo of an unregulated organic liquid (proposed § 302).

Emissions from ballasting are declining because few vessels calling on the Bay Area ballast into cargo tanks. Modern vessels have segregated ballast tanks that are used only for ballast water. Older vessels are being phased out of service in response to the Oil Pollution Act of 1990 (OPA 90). The tanker fleet that serves the Bay Area is relatively modern, and ballasting emissions are expected to decline to insignificance in the future.

The proposed amendments require that ballasting emissions be controlled or that emissions be limited through the use of segregated ballast tanks, dedicated clean ballast tanks, or through containing or transferring vapors within a vessel. Under current U.S. Coast Guard regulations, vessels without segregated ballast are required to have a means to contain ballasting emissions and to employ those means when ballasting within ozone non-attainment areas.

To the extent that ballasting that would violate proposed Section 8-44-302 is required for vessel safety, a vessel can rely on the safety exemption of proposed Section 8-44-115 (current § 402).

C. Proposed Control of Gas Venting Operations (§§ 225, 303)

Air District rules do not directly address emissions from tank washing, purging, and gas freeing. In a March 2005 compliance advisory, the Air District interpreted the rules to apply to these activities when the activities are associated with a regulated loading or lightering activity. The Air District is now proposing to require controls for all “venting” activities that involve release of vapors from regulated cargoes and to require record keeping for all such activities.

Tank inerting, cleaning, purging, and gas freeing carried out by marine tank vessel operators may result in the venting of tank vapors. All tankers that serve the Bay Area have inert gas generators that are used to introduce inert gas, typically scrubbed exhaust from an engine, into tanks. This inert gas ensures that tank atmospheres remain outside the explosive range. During inerting, the inert gas introduced into a tank may displace hydrocarbon vapors, which are vented through tank vents. Venting may also occur when the inert gas generator is run during cargo discharge to replace offloaded cargo .

Venting may also occur during various activities related to tank cleaning. Although most of the marine tank vessels that serve the Bay Area are in dedicated service and carry one narrow range of cargoes, tank cleaning may be required when a vessel loads a cargo different from those it typically carries. Tank washing is frequently done with machines – often called “Butterworths”

after one brand name – and inerting and associated venting may occur during this process. If tank entry is required for final cleaning or to perform repairs, a vessel's inert gas system may be used to purge all hydrocarbon vapor from the tank. Gas freeing, which is the introduction of fresh air to replace inert or other gas for tank entry, may also result in venting of hydrocarbons.

The Air District estimates that approximately 2 to 4 venting events per month of crude oil tankers occurred in San Francisco Bay prior to issuance in March 2005 of a compliance advisory stating that most venting violated Regulation 8, Rules 44 or 46. Several ship operators have indicated that they have discontinued the practice of uncontrolled venting within San Francisco Bay and that venting emissions are either controlled, or venting is performed outside of Air District waters.

Air District staff originally proposed control requirements on all venting occurring not only within the District, but also out to the boundary of "California Coastal Waters." The definition of California Coastal Waters included in the proposal was developed by the California Air Resources Board (CARB) in the late 1970's. The defined area was intended to encompass those areas off the California coast within which emissions released by vessel activities would be likely to travel to shore and affect air quality over land. The definition was based on meteorological research and tracer studies that involved the release of tracer gases by vessels offshore and their detection by sensors placed along the coast. The venting prohibition out to the limit of California Coastal Waters that was included in the earlier proposal was based on a similar prohibition in the South Coast AQMD rule.

The proposed amendments would impose venting controls only out to the limit of California's territorial waters, 3 miles off the coast, rather than to the limit of California Coastal Waters. The current proposal is simply a reflection of practical considerations: the Air District has not found a means of documenting and enforcing such a prohibition at sea. Within the Bay and in nearshore waters, the Air District can, with the assistance of the Coast Guard, maintain these restrictions. In a March 2005 compliance advisory, the Air District interpreted the existing marine tank vessel rules as prohibiting venting within the District, and the Coast Guard assisted the District by notifying mariners of the prohibition. Though the South Coast rule includes the broader prohibition, Air District staff believe such a prohibition to be impractical for the Bay Area at present.

The proposed amendments include a requirement for operators of marine tank vessels that call on the Bay Area to maintain records of tank cleaning activities that occur, not only within the District, but also anywhere in California Coastal Waters. There are two reasons for this proposal. First, the records would allow the Air District to properly enforce the rule. Under the existing and proposed rules, controls are required when an unregulated liquid is loaded into a tank that held a prior cargo of a regulated liquid, except when the tank was cleaned after discharge of the prior cargo. Tank cleaning records would allow the Air District to verify that loads exempted from controls on this basis are appropriately exempted.

Second, the records would help the Air District determine whether tank cleaning should be further regulated. Venting during tank cleaning can involve significant emissions. Tank cleaning tends to volatilize cargo residues, adding to existing tank vapor from the prior cargo. These tank vapors are then frequently vented to the atmosphere during purging and gas freeing

operations associated with tank cleaning. This purging and gas freeing can produce many tons of emissions over a relatively short period of time. Typically, tank cleaning is related to a change in the type of cargo being carried in a tank (called "switch loading") and is dictated by incompatibilities between the prior cargo and the cargo to be loaded. However, in this situation – where tank cleaning may be necessary and appropriate – potentially enormous emissions are released, and shippers may avoid the full environmental costs of this type of transaction by conducting the activity offshore. It is likely that, in many cases, emissions from this type of activity can be controlled at terminals by using organic liquid washes and then conducting loading using the terminal's vapor recovery system.

The tank cleaning records would give the Air District a verifiable means to determine the frequency of this activity and would allow more accurate estimates of emissions. When a vessel engages in tank cleaning, an entry is required in the Oil Record Book required by federal law and international regulations. The records required under the proposal could therefore be checked against Oil Record Book entries for verification.

If, after reviewing tank cleaning records in the future, the Air District determines that further restrictions on tank cleaning are appropriate, it has full legal authority to regulate these activities out to the limits of California Coastal Waters. During the rule development process, refining industry representatives stated that they did not believe the Air District had this authority. The industry representatives based this claim on the U.S. Supreme Court's decision in a case called *United States. v. Locke,* 529 U.S. 89 (2000). But nothing in the *Locke* decision alters the Air District's view that it has the authority to regulate air emissions from marine tank vessel activities. In *Locke*, the Supreme Court reaffirmed the approach it took in an earlier case, *Ray v. ARCO,* 435 U.S. 151 (1978), in which it held that a state agency's regulatory jurisdiction is preempted only where Congress has intended a federal statute to "occupy the field" and preempt state authority in the "field", or (2) where Congress intended to allow concurrent regulation by federal and state regulation, but the state regulation conflicts with federal regulation.

Refinery representatives have claimed that the federal Ports and Waterways Safety Act (PWSA) would preempt Air District regulation of venting out to the limits of California Coastal Waters because such regulation would conflict with the PWSA. However, the PWSA is intended to protect against shipping accidents and resulting oil spills. It does not address air emissions in any way. Nothing in the current Air District rule would conflict with safety requirements under the PWSA. Even if such a theoretical conflict could be found, the Air District rule specifically exempts "acts necessary to secure the safety of a vessel or for saving life at sea." For these reasons, the Air District believes the proposed rule presents no conflict with federal law and that future regulation of tank cleaning, properly structured, would present no such conflict.

D. Proposed More Stringent Leak Standard (§ 305)

As discussed in Section II.B, the current "gas tight" standard for marine tanks and connectors subject to control requirements (10,000 ppm) appears to be less stringent than the standard in the South Coast AQMD and the San Luis Obispo County APCD (1,000 ppm). As noted, however, the Air District imposes a more stringent 100 ppm standard, found in Regulation 8, Rule 18, at all of the marine terminals regulated by Regulation 8, Rule 44.

The Air District is proposing amendments that clarify applicability of the Regulation 8, Rule 18 standards to marine terminals and impose a default 1,000 ppm standard for terminals not subject to this rule. The amendments retain the 10,000 standard for equipment on ships. Marine tank vessel operators have indicated that connectors and other fugitive sources in service on ships cannot meet the same low level of leakage achieved in shore service because of the harshness of the marine environment and because ship structures are subject to changing mechanical forces (determined by sea conditions, cargo volumes and cargo distribution) that make tight sealing of components more difficult than for non-marine components.

The proposed amendments require efforts to minimize leaks on shipboard equipment during loading and remove the requirement to halt loading when leaks are discovered. This amendment is intended to reduce overall emissions. Halting a loading operation when a leak is discovered has great potential to increase emissions as it forces the vessel to remain longer at the terminal increasing the potential for venting, requires longer waits for other vessels arriving to load, and requires breaking and restoring connections with the potential for creating additional leaks.

The proposed amendments also include an explicit requirement for operators to inspect equipment for leaks by "sniffing" components such as hose fittings and hatches with a handheld detector. The current rule does not include an inspection mandate, but most terminals already conduct such inspections.

E. Proposed Notification Requirements (§§ 403, 404)

Current section 8-44-402 states that nothing in the rule is to be construed to interfere with U.S. Coast Guard requirements or interfere with acts necessary for vessel safety or acts necessary for saving life at sea. This provision is retained in the proposed amendments but is renumbered as Section 8-44-115 and moved to the exemptions section of the rule. The exemption is necessary to ensure that the Air District does not penalize or burden activities necessary for safety.

The proposed amendments would require that the Air District be notified when the operator of a marine tank vessel or terminal operator invokes the safety/emergency exemption. Notice is required within 48 hours after the use of the exemption so as not to interfere with acts that may be necessary for safety. At present, the Air District has no means of knowing whether compliance with the rule is being excused through use of the existing exemption. The Air District expects that the exemption will be used when a vessel must vent a cargo tank to reduce pressures or to take on ballast during storm conditions when segregated ballast is insufficient and

emissions cannot be controlled, or in other circumstances involving some risk to a vessel or its crew.

The proposed amendments also include notification for lightering, ballasting, and tank cleaning activities that the Air District may wish to inspect. The specific activities for which notification would be required are not expected to be conducted frequently. Very little lightering activity is carried on presently. Most ships now ballast into segregated ballast tanks rather than cargo tanks, and notification would only be required for ballasting into cargo tanks. Because the proposed amendments would prohibit venting within District waters, with some exceptions, and because tank cleaning generally involves venting, tank cleaning notifications are also not expected to be common.

F. Proposed Record Keeping Requirements (§§ 501, 502, and 503)

The current rule includes record keeping requirements in Section 8-44-501. These requirements are clarified in the proposed amendments. The amendments propose separate recordkeeping requirements for terminal and vessels in order to clarify responsibilities. For both terminals and vessels, the records required by the proposed amendments are somewhat more detailed than those required under the current rule. The additional detail required includes information necessary to enforce the proposed requirements to control low flash point liquids as well as documentation of leak checks. To document the flash point of liquids loaded, terminals will be required to maintain specification sheets for the cargo, material safety data sheets for the cargo, or other documentation of cargo flash point based on prior flash point tests. To the extent that no such documentation is available for a cargo, the cargo flash point will have to be tested, and documentation of the test results will have to be maintained by the terminal.

The proposed amendments also include requirements to keep records regarding the use of rule exemptions. These records are intended to allow the Air District to verify that exemptions are properly claimed.

G. Proposed Consolidation of Rules 44 and 46

Currently, Regulation 8, Rule 44 applies to loading of marine vessels at terminals while Rule 46 applies the same standards to vessel-to-vessel loading. These rules were adopted separately in 1989 because resource limitations did not allow rulemaking for both aspects of marine loading to be completed at the same time. However, consolidation of these largely identical rules at this time will simplify Air District regulations. The draft amendments would eliminate Rule 46 and consolidate all marine loading requirements in Rule 44.

H. Minor Amendment to Source Test Procedure

The amendments to ST-34 make corrections to temperature and pressure standardization errors in some equations and incorporate a requirement to determine gas constituent average concentrations on a flow-weighted basis in some circumstances.

I. Other Amendments

In addition, the proposed amendments contain minor editorial and administrative changes. All changes are shown in the Appendix to this staff report.

IV. Emission Reductions

A. Introduction

Emissions from marine tank vessel activities are discussed in Section II. This section discusses the emissions reductions anticipated from the proposed regulatory amendments.

B. Emission Reductions from Proposed Amendments

1. Proposed Control of Currently Unregulated Liquids

As discussed in Section III.A, the Air District is proposing to extend control requirements to all cargoes with a flash point of 100 ˚F or less. This amendment would affect the cargoes identified as "organic chemicals" in Table 1 in Section II.A. This category includes volatile organic chemicals such as benzene and toluene with high unabated loading emission factors similar to those for currently-regulated materials. These materials are not currently regulated by Regulation 8, Rule 44 unless they are used as gasoline blending stocks. The volume of these materials shipped through the Golden Gate in 2003 was 8,500,000 barrels. Assuming a very conservative (low) average factor of 10 lb/1,000 bbl, the emissions subject to control would be:

(8,500,000 bbl/yr) (10 lb/1,000 bbl) (ton/2,000 lb) = 42.5 ton/yr or 0.12 ton/day

Emission reductions from controlling these cargoes would be:

(8,500,000 bbl/yr) ((10 – 2) lb / 1,000 bbl) (ton/2,000 lb) = 34 ton/yr or 0.09 ton/day

A significant portion of these emissions consists of compounds, including benzene and toluene, which are categorized as toxic air contaminants. To the extent that some cargoes included in this category may already be subject to control requirements if they are used as gasoline blending stocks, the emission reduction would be lower.

2. Proposed Amendments to Leak Standard

The proposed amendments will make it clear that the Air District's Regulation 8, Rule 18 standards apply to marine terminals subject to that rule. The proposed amendments also establish a 1000 ppm standard for any terminal that is not subject to Regulation 8, Rule 18.

Because the Air District is already enforcing the 100 ppm standard in Regulation 8, Rule 18 at most or all of the marine terminals subject to Regulation 8, Rule 44, no reduction in emissions is expected at marine terminals. Because the Air District is not changing the current standard for shipboard equipment, no emission reductions are expected from vessels.

3. Proposed Control of Gas Venting Operations

The TAD for Further Study Measure FS-11 found evidence that crude oil tankers performed approximately 2 to 4 venting events per month (total) in San Francisco Bay, and estimated that the resulting emissions could be as high as 720 tons per year if a typical venting event resulted in 15 tons of emissions. Crude oil tankers are the most likely vessels to undergo venting because they occasionally take on a different cargo after unloading crude, which may require that the cargo tanks be cleaned and vented.

Using the AP-42 emission factor for crude tanker ballasting, 46 lb/1000 barrels, emissions from fully venting a typical 120,000 dead weight ton (dwt) crude oil tanker with a capacity of 750,000 barrels would be 17 tons. Even if only one such tanker were vented per month, emissions could be as high as 200 ton/yr. Requiring controls for these activities would reduce emissions by approximately 190 ton/yr or 0.52 ton/day. If ship operators elect to perform venting outside of Air District waters, as appears to be the case since 2004, rather than controlling emissions within San Francisco Bay, then an emission reduction would still occur within the District.

V. Economic Impacts

A. Cost Effectiveness

The primary costs associated with the proposed amendments to Rule 44 are for control of additional cargos with a flash point below 100 ˚F.

As noted in Section IV.B.2, new equipment or improved maintenance practices are not expected to be necessary to comply with the new proposed “gas tight” standard since this standard is already in effect at other port areas in California.

As noted in Section IV.B.3, the practice of venting organic gases from ships within San Francisco Bay without emission controls appears to have been discontinued by ship operators. It is expected that ship operators will continue to perform most venting outside of Air District waters rather than control these emissions as required by the proposed amendments. Therefore, no cost is associated with the proposed requirement to control venting emissions from vessels previously loaded with regulated materials.

Although there may be increased costs associated with the proposed new monitoring and recordkeeping requirements for both regulated and unregulated organic liquids, most of this monitoring and records are already required by Coast Guard regulations and other regulations, so the overall cost increase is expected to be minimal.

1. Costs for Expanded Control Requirements

As noted in Section III.A, the expanded control requirements for loading of cargos with flash points lower than 100 ˚F are expected to affect, at most, 8,500,000 bbl/yr of additional cargo with approximately 34 ton/yr of organic emissions. To the extent that some of these cargos are used as gasoline blending stocks they are already subject to control.

Because the new materials subject to control will represent only about 4% of the materials already subject to control, it is expected that existing abatement facilities will be able to accommodate these additional materials without significant capital costs. These materials may be assumed to be loaded into barges rather than large tankers.

The Air District analyzed costs for controlling low-flash-point cargoes by estimating the various utility and labor costs that would be incurred in controlling these additional cargoes. This analysis assumes no new capital investment given the minor incremental increase in cargo volume. The vapor control systems that are used to control loading emissions burn natural gas and consume electricity. In addition, labor costs would be incurred for the additional time that the systems would have to run. The Air District's analysis of these costs is shown in Table 10 on the following page.

Table 10
Cost and Cost Effectiveness
Expand Control Standard (Oxidizer) to Materials with Flash Point Less Than 100 °F

I. Abatement Costs

Additional controlled material (thou bbl/yr)[1]	Oxidizer Natural Gas Usage (thou scf/yr)[2]	Natural Gas Cost ($/yr)[3]	Oxidizer Electrical Usage (kW-hr/yr)[4]	Electrical Cost ($/yr)[5]	Oxidizer Operating Hours (hr/yr)[6]	Operational Labor Cost ($/yr)[7]	Maintenance Labor Cost ($/yr)[8]	Total Cost ($/yr)
8,500	15,749	113,392	79,231	8,297	1,743	261,375	65,344	**448,407**

Notes:
1) From Table 5
2) Natural gas usage assumed to be 30% of loaded liquid volume (displaced gas volume) +10%
3) $7.2/1,000 scf from U.S. DOE natural gas price summary for industrial customers (July 05)
4) Assume 100 hp load, with operating time based on 8,000 bbl/hr loading rate
5) $0.10472/kWh average total rate for primary firm power for industrial customers from PG&E10/1/05 rate schedule
6) Assume 50,000 bbl/load, 8,000 bbl/hr loading rate, 2 hours before and after each load for startup/shutdown
7) Assume $75/hr/person for 2 persons
8) Assume 1/4 of operational labor cost

II. Cost Effectiveness

Additional controlled material (thou bbl/yr)[1]	Abatement Cost ($)[2]	Emission Reduction (ton)[2]	Cost Effectiveness ($/ton)
8,500	448,407	162	**2,777**

Notes:
1) From Table 5
2) Assume 95% emission reduction to 2/lb/1000 bbl of loaded material

B. Socio-Economic Impacts

Section 40728.5 of the California Health and Safety Code requires an air district to assess the socioeconomic impacts of the adoption, amendment or repeal of a rule if the rule is one that "will significantly affect air quality or emissions limitations". Applied Economic Development of Berkeley, California has prepared a socioeconomic analysis. The analysis concludes that the affected refineries should be able to absorb the costs of compliance with the proposed rule without significant economic dislocation or loss of jobs.

C. Incremental Costs

Under Health and Safety Code § 40920.6, the Air District is required to perform an incremental cost analysis for any proposed best available retrofit control technology rule. The Air District must: (1) identify one or more control options achieving the emission reduction objectives for the proposed rule, (2) determine the cost effectiveness for each option, and (3) calculate the incremental cost effectiveness for each option. To determine incremental costs, the District must "calculate the difference in the dollar costs divided by the difference in the emission reduction potentials between each progressively more stringent potential control option as compared to the next less expensive control option."

In developing the proposed amendments, the Air District analyzed a control option that would expand control requirements to distillate and residual oils. As discussed in Section II.B.3 above, emissions from loading these cargoes during the one-year period from September 2000 through August 2001 are estimated to have been 0.07 tons per day for distillate cargoes and 0.14 tons per day for residual cargoes. The Army Corps of Engineers 2003 waterborne commerce data, discussed in Section II.B.1 above, shows lower volumes of these cargoes for 2003. Based on this data, 2003 emissions from these cargoes are estimated to have been 0.05 tons per day for distillate cargoes and 0.03 tons per day for residual cargoes.

The Air District used both the District's 2001 data and the Army Corps of Engineers 2003 data to calculate the incremental costs for controlling distillate and residual oils. The results of this incremental cost analysis are shown in Table 11. The cost for controlling these cargoes, regardless whether the calculations are based on the 2001 data or the 2003 data, is approximately $55,000 per ton, or 20 times the cost of controlling the organic chemical cargoes. These higher costs are the direct result of the need to control a much larger volume of cargo to achieve much smaller emission reductions.

The costs shown in Table 11 do not include the costs of new equipment. New equipment would almost certainly be required to control these cargoes. The Air District's data show that the volume of light cargoes loaded in 2001 was about 25 million barrels per year, while the volume of distillate and residual oils together was approximately 75 million barrels. If current loading volumes are even remotely similar to the 2001 volumes, the existing equipment would be required to control a cargo volume several times greater than current volume. In 2002, during development of the technical assessment document for marine loading, representatives of Bay Area refineries estimated that the capital costs to install new equipment to control

Table 11
Cost and Cost Effectiveness (Excluding Capital Costs)
Expand Control Standard (Oxidizer) to Distillate and Residual Oils

I. Abatement Costs

Material	Additional controlled material (thou bbl/yr)[1]	Oxidizer Natural Gas Usage (thou scf/yr)[2]	Natural Gas Cost ($/yr)[3]	Oxidizer Electrical Usage (kW-hr/yr)[4]	Electrical Cost ($/yr)[5]	Oxidizer Operating Hours (hr/yr)[6]	Operational Labor Cost ($/yr)[7]	Maintenance Labor Cost ($/yr)[8]	Total Cost ($/yr)
2001 Distillate Oils	25,812	47,825	344,337	240,600	25,196	5291	793,719	198,430	**1,361,681**
2001 Residual Oils	51,174	94,815	682,671	477,006	49,952	10,491	1,573,601	393,400	**2,699,624**
2003 Distillate Oils	17,000	31,498	226,783	158,461	16,594	3,485	522,750	130,688	**896,815**
2003 Residual Oils	11,600	21,493	154,746	108,127	11,323	2378	356,700	89,175	**611,944**

Notes:
1) From Tables 5 and 7
2) Natural gas usage assumed to be 30% of loaded liquid volume (displaced gas volume) +10%
3) $7.2/1,000 scf from U.S. DOE natural gas price summary for industrial customers (July 05)
4) Assume 100 hp load, with operating time based on 8,000 bbl/hr loading rate
5) $0.10472/kWh average total rate for primary firm power for industrial customers from PG&E10/1/05 rate schedule
6) Assume 50,000 bbl/load, 8,000 bbl/hr loading rate, 2 hours before and after each load for startup/shutdown
7) Assume $75/hr/person for 2 persons
8) Assume 1/4 of operational labor cost

II. Cost Effectiveness

Material	Additional controlled material (thou bbl/yr)[1]	Abatement Cost ($)[2]	Emission Reduction (ton)[2]	Cost Effectiveness ($/ton)
2001 Distillate Oils	25,812	1,361,681	24.5	**55,579**
2001 Residual Oils	51,174	2,699,624	48.6	**55,548**
2003 Distillate Oils	17,000	896,815	16.1	**55,703**
2003 Residual Oils	11,600	611,944	11.0	**55,631**

Notes:
1) From Tables 5 and 7
2) Assume 95% emission reduction

distillate and residual oils would be between $10 million and $25 million for all five refineries taken together. This capital cost estimate is in line with Air District's estimates of the costs for installing controls in response to the adoption of the original rule. This estimate does not include capital costs for independent terminals. It is therefore likely that the costs to control distillate and residual oils would be significantly higher than $55,000 per ton.

VI. Environmental Impacts

Pursuant to the California Environmental Quality Act, the Air District has had an initial study for the proposed amendments prepared by Environmental Audit, Inc. The initial study concludes that there are no potential significant adverse environmental impacts associated with the proposed amendments. A negative declaration is proposed for adoption by the Board. The initial study and negative declaration were circulated for public comment during the period from November 7, 2005 to November 28, 2005. No comments were received.

VII. Regulatory Impacts

Section 40727.2 of the Health and Safety Code requires an air district, in adopting, amending, or repealing an air district regulation, to identify existing federal and district air pollution control requirements for the equipment or source type affected by the proposed change in district rules. The district must then note any differences between these existing requirements and the requirements imposed by the proposed change.

Rules 44 and 46 are the only Air District rules that impose control requirements on marine vessel loading or lightering. A number of the marine terminals in the Air District are subject to the federal marine loading rule in 40 C.F.R. Part 63, Subpart Y. There are a number of differences between the federal rule and the Air District rule:

- The Air District rule potentially affects a broader range of loading operations because control requirements may apply because of the prior cargo;
- The federal rule imposes slightly more stringent control requirements (98% reduction) if combustion is used for control, but control requirements are otherwise similar;
- The leak standards in the federal rule and current Air District rule are similar, but the proposed amendments to the District rule would make the District rule more stringent;
- In many respects, the federal rule is more specific than the Air District rule, but the District imposes specific requirements through permit conditions.

A detailed comparison of the federal and BAAQMD requirements can be found in Appendix II.

VIII. Rule Development Process

A. Workgroup Meetings

Air District staff formed a technical working group that consisted of representatives from Western States Petroleum Association, the refineries, independent terminal operators, ship

operators, engineering consultants, Communities for a Better Environment, and CARB and Air District staff.

- On June 13, 2002 the workgroup met at the offices of Eichleay Engineers in Concord to discuss development of the technical assessment document, source testing, and the emissions inventory.
- On August 7, 2002, the workgroup met, again in Concord, to discuss housekeeping emissions, ballasting, and factors that influence costs to the ship operator.
- On November 11, 2002, the workgroup met to further discuss source testing and control options.
- On May 13, 2003, the workgroup met in the Air District offices to discuss concepts for control of additional cargos, lowering the emission standard of 2.0 lb/1000 bbl loaded, controls for ballasting and housekeeping operations, and reporting of marine cargo activity.
- On July 21, 2003, the workgroup met again at Air District offices to further discuss these regulatory concepts.
- Finally, on June 22, 2004 a meeting was held with shippers and agents at the Air District offices to discuss costs of controlling additional cargos, compliance experience with the Santa Barbara and South Coast rules, and cargo tank cleaning in San Francisco Bay.

B. Public Workshops

On August 8, 2002, staff held a public workshop at the Rodeo Senior Center to discuss possible changes to Regulation 8, Rules 44 and 46. Staff discussed basic regulatory concepts prior to preparing proposed amendments.

On October 16, 2003, staff held a workshop at the Crockett Community Center to discuss proposed amendments. Major issues discussed at the workshop were the desire expressed by the affected facilities for a clear method to determine in advance whether controls are required for a particular loading event, concerns of the affected facilities that the cost of controlling additional loads would be excessive, would require the use of large quantities of natural gas, and would generate significant amounts of secondary pollutants such as NOx to reduce a small amount of organic compound emissions.

On October 19, 2005, staff held a workshop at the Benicia City Council chambers to discuss proposed amendments. Major issues discussed at the workshop were the preference for use of flash point as a criteria for control requirements by loading operators, and whether the data available to the Air District for diesel, distillate, and residual fuel oils could be used to accurately estimate emissions from these materials.

The proposed rule amendments were made available for public comment during the period from November 7, 2005 to November 28, 2005. The Western States Petroleum Association submitted two minor comments on rule language. These comments are addressed in the comment and response section of this staff report.

IX. Conclusion

The proposed amendments to Regulation 8, Rule 44 and Rule 46 are expected to be cost effective and to reduce emissions of volatile organic compounds by approximately 0.61 tons per day. In addition, the amendments will also reduce emissions of toxic air contaminants. The proposal would achieve these reductions by focusing controls on a relatively small volume of volatile organic chemical cargoes that are not regulated under the current rule and by imposing restrictions on marine tank vessel venting.

The cargoes that would become regulated under the proposal are organic chemicals, such as benzene, toluene, and xylene, which have low flash points and evaporate readily at ambient temperatures. Significant emission reductions can be achieved by controlling a relatively small volume of cargoes, and the cost effectiveness for the controls is roughly $3000 per ton. Because the cargoes to be controlled are also toxic air contaminants, the proposed controls will also reduce worker exposure to toxic compounds.

Emissions would also be reduced by the proposed prohibition on venting of cargo tanks that contain or contained a regulated cargo. Though the Air District recently interpreted the existing rules to prohibit venting within the District, the proposed amendments would clarify and formalize the restrictions, and would ensure that emission reductions that may have occurred are permanent.

The proposed amendments preserve the current structure of the rule, which relies on identifying, in advance of loading, the cargoes for which controls are required. This certainty allows better planning and use of resources for both industry and the Air District and makes the rule easier to enforce.

Pursuant to Section 40727 of the California Health and Safety Code (H&SC), regulatory amendments must meet findings of necessity, authority, clarity, consistency, non-duplication, and reference. The proposed amendments are:

- Necessary to achieve cost-effective emission reductions from marine tank vessel operations and to clarify control, notification, and record keeping requirements;
- Authorized by H&SC Sections 40000, 40001, 40702, 40725 through 40728, 40919, and 42300 *et seq*.;
- Written or displayed so that their meaning can be easily understood by the persons directly affected by them;
- Consistent with other Air District rules, and not in conflict with state or federal law;
- Non-duplicative of other statutes, rules, or regulations.

The proposed amendments have met all legal noticing requirements and have been discussed with interested parties. District staff recommend adoption of the amendments as proposed.

X. Comments and Responses

Comment 1: Please clarify that the "flash point" tests required for unregulated cargo can be from tests previously obtained for the same (or virtually the same) materials. We see no need to test every load. The record keeping requirements will ensure that a paper trail for flash point tests is available. (Dennis Bolt, WSPA, 11/30/05)

Response: The District does not intend that each load necessarily be tested at the time of loading. Where the flash point of a cargo has been documented by prior testing and that same cargo (i.e. made to the same specification) is being loaded, the prior test data is sufficient to establish flash point for the cargo being loaded. The terminal must maintain the specification sheet, material safety data sheet, or other documention of the flash point test results for the loaded cargo. A brief discussion of this issue has been added to the staff report on p. 23.

Comment 2: Please clarify that the flash point requirement of Section 8-44-501.1.5 is not effective until January 2007. As it reads, we would be required to record flash point effective on the adoption date. (Bolt, WSPA, 11/30/05)

Response: Under the proposed rule, low-flash-point liquids become regulated on January 1, 2007. The District intends that documentation of flash point begin on that same date. An effective date clause has been added to Section 8-44-501.1.5 to make this clear.

XI. References

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APPENDIX I

Amended Title, Section 101

The title and rule description are amended to reflect that Rule 44 rule will apply not only to terminal operations, but also to ship-to-ship loading since Rule 46 will be incorporated into Rule 44. Also, the rule is expanded to include non-precursor organic compounds; this amendment is discussed in the description of the amendment to Section 215.

Amended Section 110

This exemption is re-titled to more precisely indicate the scope of the exemption. Also, editorial changes.

Amended Section 111

Editorial change.

Deleted Section 112

The lightering exemption is deleted because Rule 46 requirements for ship-to-ship loading will be incorporated into Rule 44.

Deleted Sections 113 and 114

These delayed compliance provisions are deleted because the effectiveness date (7/1/92) has passed.

New Section 115 / Deleted Section 402

The current exemption for safety considerations and emergency operations appears in administrative Section 8-44-402. However, exemptions are more appropriately included in Section 100. Therefore, the text of Section 402 is simply moved to this new exemption.

New Section 116

A new limited exemption is added to exempt equipment from the leak standards in this rule if they are also subject to the leak standards of Regulation 8, Rule 18. Rule 18 has more stringent leak limits than are proposed in Rule 44 as well as extensive monitoring and leak repair provisions.

Section 200

The definitions in this section are re-organized alphabetically and re-numbered as necessary.

New Section 201

A definition of “aviation gas” is added.

New Section 202

A definition of “background” is added to provide guidance regarding the measurement of gaseous leaks.

New Section 203

A definition of “ballasting” is added.

New Section 204

A definition of “California Coastal Waters” is added.

New Section 206

A definition of “District Waters” is added.

New Section 208

A definition of “gas freeing” is added.

New Section 209

A definition of “gasoline” is added.

New Section 210

A definition of “gasoline blending stocks” is added.

New Section 211, 212

New definitions of “inert gas” and “inerting” are added.

New Section 213

A definition of “JP-4 fuel” is added.

Amended Section 215

The definition of a loading event is amended to reflect that Rule 44 rule will apply not only to terminal operations, but also to ship-to-ship loading since Rule 46 will be incorporated into Rule 44.

Amended Section 216

The definition of tank vessel is changed to “marine tank vessel” for consistency and is simplified without substantive change.

Amended Section 219

The definition of "organic compound, precursor" is replaced with a definition of "organic compound" in order to expand the applicability of the rule to include non-precursor organic compounds as well as precursor organic compounds. Because there is no significant traffic in non-precursor organic compounds, this amendment is not expected to result in control of many additional loading events. However, because uncontrolled loading events tend to have very high emission levels, excluding non-precursor organic compounds from control requirements may result in substantial daily emissions. Sections 8-44-101, 219, 601 and 603 are also amended for consistency.

New Section 220

A definition of "prior cargo" is added.

New Section 221

A definition of "purging" is added.

Amended Section 222

The definition of organic liquid is amended in order to expand control requirements from the current 5 materials to all organic liquids with a flash point less than 100 degrees F.

The reference to "aviation fuel (JP-4 type)" is changed to JP-4 fuel. The effect of this change is to expand the control requirements from JP-4 used as a jet fuel to different formulations of JP-4 used as turbine fuels or other types of fuel. This expansion is justified because there is no significant difference in emissions from different formulations of JP-4. However, no emission reductions or costs are expected to result from this expansion because JP-4 fuel is believed to no longer be in use.

New Section 223

A definition of "tank cleaning" is added.

New Section 224

A definition of "unregulated organic liquid" is added that is consistent with new Section 222.

New Section 225

A definition of "vent" is added.

Deleted Section 208

A definition of "leak free" is no longer necessary because the definition has been incorporated into Section 8-44-303, so this section is deleted.

Deleted Section 209

A definition of "gas tight" is no longer necessary because the definition has been incorporated into Section 8-44-303, so this section is deleted.

Deleted Section 211

A definition of "loading of organic liquid" is no longer necessary for the amended rule, so this section is deleted.

Deleted Section 212

Because exemption 8-44-113 is deleted, the definition of infrequent visits is no longer required.

Deleted Section 213

Because exemption 8-44-114 is deleted, the definition of a small terminal is no longer required.

New Sections 301 and 302 / Deleted Sections 301 and 302

New Sections 301 and 302 are created which include the current control requirements from deleted Sections 301 and 302 for loading and lightering of regulated organic liquid and ballasting. This section formally extends the authority of the rule to "District Waters".

New Section 303

A new control requirement is added for venting operations.

Amended Section 304

This section is amended to delete the obsolete effectiveness, to delete Section 304.2 (which is replaced by the minimization and repair requirements of new Section 8-44-303.2.

New Section 305 / Deleted Section 303

The current leak standards from Section 303 are incorporated into new Section 305 which clarifies the boundary between vessel leaks and terminal leaks. Liquid leak standards and gaseous leak standards on vessels remain the same while gaseous leak standards for terminals are reduced from 10,000 to 1,000 ppm. As in the current rule, leaks discovered by the APCO are subject to enforcement action. However, leaks discovered by the operators are subject to minimization and repair requirements.

Deleted Section 305

This section is deleted because it no longer has any effect. This section prohibits uncontrolled loading of regulated organic liquid when an ozone excess is predicted. However, as of July 1,

1991, uncontrolled loading of regulated organic liquid is prohibited entirely. This was an interim requirement that had force from July 1, 1989 until July 1, 1991 when the standards of the rule were phased in.

Deleted Section 401

This section is deleted because the effectiveness dates have passed.

New Sections 501 and 502/ Deleted Section 501

The recordkeeping requirements in current Section 501 have been divided into new Section 501 for marine terminals and new Section 502 for marine vessels. Recordkeeping requirements have been significantly expanded to provide monitoring for all rule requirements, including new leak monitoring requirements.

New Section 503

This section is added to require records for each of the exemptions provided in the amended rule.

Amended Section 504

Editorial change.

Amended Section 601 / Deleted Section 602

Current Sections 601 and 602 are combined in amended Section 601. Because source test method ST-4 is no longer in effect, alternate test methods are provided.

Amended Section 603

This section is amended for consistency with other amendments described in this report. Also, a provision for an alternate test method for leak determinations is provided.

New Section 604

Laboratory methods are added to allow determination of flash point as required in the amended rule.

APPENDIX II

COMPARISON OF FEDERAL AND BAAQMD REQUIREMENTS

Federal RACT Requirements	Federal MACT Requirements	Current BAAQMD Requirements	Proposed BAAQMD Requirements
Source Size Thresholds			
Apply to sources with throughput of 10 million barrels of gasoline or 200 million barrels of crude oil calculated on an annual average basis for the period from September 19, 1996 to September 19, 1998 and on an annual basis thereafter. (§§ 63.560(b); 63.561 [def. of "Source(s) with throughput of 10M barrels or 200M barrels"].) A combined RACT and MACT standard applies to the Valdez Marine Terminal. (§ 63.562(d).)	Apply to existing major sources with loading emissions of 10 tons of a single HAP or 25 tons of a combination of HAPs calculated on an annual average basis for the period from September 19, 1997 to September 19, 1999 and on an annual basis thereafter. (§§ 63.560(a); 63.561 [def. of "Source(s) with emissions of 10 or 25 tons"].) Apply to new major sources with any HAP emissions from loading as calculated on an annual average basis for the period from September 19, 1997 to September 19, 1999 and on an annual basis thereafter. (§ 63.560(a), (d); § 63.561 [def. of "Source(s) with emissions less than 10 or 25 tons"].) A combined RACT and MACT standard applies to the Valdez Marine Terminal. (§ 63.562(d).)	Apply to all loading events involving 1000 barrels or more of gasoline, gasoline blending stock, aviation gas, JP-4, or crude oil. (Current §§ 8-44-110, 204.) Apply to loading events involving the loading of 1000 barrels or more of any commodity, including water (ballasting), into tanks which formerly contained one of the five commodities listed above. (Current § 8-44-211.)	No change in source size thresholds, but broader range of commodities affected. (Proposed §§ 8-44-110, 222.)

APPENDIX II

Federal RACT Requirements	Federal MACT Requirements	Current BAAQMD Requirements	Proposed BAAQMD Requirements
Commodities Affected			
Commodities with true vapor pressure of 1.5 psia or greater. (§ 63.560(d)(1).)	Commodities with true vapor pressure of 1.5 psia or greater. (§ 63.560(d)(1).)	Gasoline, gasoline blending stock, aviation gas, JP-4, or crude oil. (Current § 8-44-204.) And Loading of any commodity into a tank where the prior cargo was one of the 5 listed commodities. (Current § 8-44-211.)	Same as current requirements, but with the addition of all commodities with flash point less than 100 °F. (Proposed §§ 8-44-222, 301.)
Exemptions			
Do not apply to existing offshore (≥ 0.5 mi.) loading terminals. (§ 63.560(d)(6).) Do not apply to ballasting. (§ 63.560(d)(7).) Do not apply to bunkering. (See § 63.560 [Def. of "Marine tank vessel loading operation"].) Do not apply to lightering. (See § 63.560 [Def. of "Source(s)"].) For vapor balancing systems, % emission reduction requirements do not apply, but provisions regarding vapor collection, ship-to-shore compatibility, and vessel vapor tightness do apply. (§ 63.560(d)(2).)	Do not apply to sources collocated at refineries subject to and complying with the Refineries NESHAP (i.e. loading emissions may be bubbled with refinery emissions). (§ 63.560(d)(3).) Do not apply to benzene loading operations subject to and complying with the benzene NESHAP. (§ 63.560(d)(4).) Applicability to existing offshore terminals, ballasting, bunkering, lightering, and vapor balancing systems same as for RACT.	Do not apply to bunkering. (Current § 8-44-111.) Do not apply to lightering. (Current § 8-44-112.)	Same as current for bunkering, but proposed rule would apply to lightering. (Proposed § 8-44-301.)

APPENDIX II

Federal RACT Requirements	Federal MACT Requirements	Current BAAQMD Requirements	Proposed BAAQMD Requirements
Effective September 19, 1998 or upon start-up, if start-up occurs after 9/19/98, or within three years after exceeding the applicability threshold, if exceeded after 9/19/98, reduce captured VOC from loading of commodities with true vapor pressure of 1.5 psia or more by 98% with combustion, or by 95% with recovery, or to 1000 ppmv outlet concentration. (§§ 63.560(d)(1), (63.560(e)(2); 63.562(c)(3).) For the Valdez Marine Terminal, effective March 19, 1997, a combined RACT and MACT standard requires reduction of captured HAP and VOC emissions by 98% for at least two berths and for other berths if throughputs exceed certain specified levels. (§§ 63.560(e)(3); 63.562(d).) After 2002, no loading may be performed without controls, except as allowed under maintenance provisions of the rule. (§63.562(d)(2)(ii).)	Effective September 19, 1999 or upon start-up, if start-up occurs after 9/19/99, or within three years after exceeding the applicability threshold, if exceeded after 9/19/99, reduce captured HAP emission from loading of commodities with true vapor pressure of 1.5 psia or more by 97% for existing sources, 98% for new sources, and 95% for new offshore loading terminals. (§§ 63.560(d)(1), 63.560(e)(1); 63.562(b)(2), (3), and (4).) For the Valdez Marine Terminal, see discussion in the RACT column.	Reduce emissions by 95% from uncontrolled conditions or limit emissions to 2 lbs per 1000 barrels loaded. (Current § 8-44-301.)	No change. (Proposed § 8-44-304.)

APPENDIX II

Federal RACT Requirements	Federal MACT Requirements	Current BAAQMD Requirements	Proposed BAAQMD Requirements
Vapor Collection System			
Collection system must be designed to collect VOC vapors displaced during loading and to prevent collected vapors from passing to the atmosphere through another berth. (§ 63.562(c)(2).)	Collection system must be designed to collect HAP vapors displaced during loading and to prevent collected vapors from passing to the atmosphere through another berth. (§ 63.562(b)(1).)	Emission control equipment must be designed and operated to collect and process all organic compound emissions from loading events to which the emission standard applies. (Current § 8-44-302.)	No change. (Proposed § 8-44-304.)
Ship-to Shore Compatibility			
A terminal owner or operator may only load vessels equipped with vapor collection equipment that is compatible with the terminal's vapor collection system. (§ 63.562(c).)	A terminal owner or operator may only load vessels equipped with vapor collection equipment that is compatible with the terminal's vapor collection system. (§ 63.562(b).)	Though there is no parallel BAAQMD requirement, such a requirement is implicit in the terminal and vessel vapor tightness requirements of current sections 8-44-303 and 304.	No change.
Terminal Vapor Tightness			
Whenever there is visual, audible, olfactory, or other evidence of a leak, an operator must conduct an inspection to identify the leak, must monitor it within 5 days using EPA Method 21, and must begin repair within 15 days or prior to the arrival of the next vessel, whichever is later. The entire system must be inspected annually using Method 21. (§ 63.563(c).) A leak is defined as a reading of 10,000 ppmv or greater determined using Method 21. (§ 63.561 [def. of "Leak"].)	Same as RACT.	All equipment associated with loading shall be maintained to be leak free (<4 drops/min.) and gas tight (≤10,000 ppm @ 1 cm.). (§§ 8-44-208, 209, 303.) In addition, loading must be halted when a liquid leak or gas leak is discovered and may continue only after repair. (Current § 8-44-304.2.)	Leak standards would become more stringent. (Proposed § 8-44-305.)

APPENDIX II

Federal RACT Requirements	Federal MACT Requirements	Current BAAQMD Requirements	Proposed BAAQMD Requirements
Vessel Vapor-Tightness			
Terminal owner or operator may only load vessels that are connected to the vapor collection system and are vapor-tight. (§ 63.562(c)(2)(iii).) The terminal owner or operator must ensure compliance with the vapor-tightness requirement by (1) requiring pressure test or leak test documentation from the vessel owner or operator, (2) requiring the vessel owner or operator to conduct a leak test during loading, or (3) loading under negative pressure. (§ 63.563(a)(4).) If a leak is discovered during loading (of a vessel lacking pressure test or leak test documentation), the vessel owner or operator must document the leak and repair it prior to the next loading operation, unless the repair would require cleaning and gas freeing or dry-docking. (§ 63.563((a)(4)(iii).) A terminal owner or operator may not load a vessel that has failed a leak test unless the leak was repaired or the repair would require cleaning and gas freeing or dry-docking. (§ 63.563(a)(4)(ii).). A leak is defined as a reading of 10,000 ppmv or greater determined using Method 21. (§ 63.561 [def. of "Leak"].)	Same as RACT.	All hatches, pressure relief valves, connections, gauging ports, and vents associated with loading are to be maintained to be leak free (<4 drops/min.) and gas tight (≤10,000 ppm @ 1 cm.). (§ 8-44-208, 209, 303.) The vessel owner or operator must certify that the vessel is leak free and gas tight. (§ 8-44-304.1.) In addition, loading must be halted when a liquid leak or gas leak is discovered and may continue only after repair. (§ 8-44-304.2.)	No change in leak standards but requirements for leak certification and to halt loading removed. Certification requirement dropped as no longer necessary to assign responsibility for leaks. Halt loading requirement dropped to minimize startup and shutdown emissions. New requirements to conduct inspections would apply. (Proposed § 8-44-305.)

APPENDIX II

Federal RACT Requirements	Federal MACT Requirements	Current BAAQMD Requirements	Proposed BAAQMD Requirements
Carbon Adsorber Emissions			
A terminal owner or operator using a carbon adsorber to control emissions must prevent HAP emissions from the regeneration of the carbon bed. (§ 63.562 (c)(5).)	A terminal owner or operator using a carbon adsorber to control emissions must prevent HAP emissions from the regeneration of the carbon bed. (§ 63.562 (b)(5).)	Emission control system must be designed and operated to collect and process all organic compound emissions. (Current § 8-44-302.)	No change. (Proposed § 8-44-304.)
Exempt Loading Events			
Control requirements do not apply to loading at a berth during a maintenance allowance approved by the EPA Administrator. (§ 63.562(c)(6).)	Control requirements do not apply to loading at a berth during a maintenance allowance approved by the EPA Administrator. (§ 63.562(b)(6).)	Control requirements do not apply to loading events of less than 1000 bbls. (§ 8-44-110.)	No change.
Initial Compliance Demonstration			
Initial performance test required within 180 days after the compliance date for the affected source. (§ 63.563(b)(1).) During the initial performance test, the owner or operator must establish operating ranges for various control system parameters. (§ 63.563(b)(4) to (b)(9).) The owner or operator must perform a maintenance inspection when monitoring data shows operation outside acceptable ranges. (§ 63.563(b)(3).)	Same as RACT.	None.	No change.

APPENDIX II

Federal RACT Requirements	Federal MACT Requirements	Current BAAQMD Requirements	Proposed BAAQMD Requirements
Monitoring Requirements			
An owner or operator must monitor specific parameters set forth in the federal regulation. (§ 63.564.)	Same as RACT.	No monitoring requirements analogous to the federal requirements. Monitoring requirements are established by permit conditions for the particular source and control equipment.	No change.
Test Methods			
For vessel vapor tightness, the methods specified in § 63.565(c). For control devices (except flares), the methods specified in § 63.565(d). For flares, the methods specified in § 63.565(e). For emissions estimates used to determine applicability, the method specified in § 63.565(l). For other parameters, see §§ 63.565(f) to (k).	Same as RACT.	For loading emissions, BAAQMD Manual of Procedures, Volume IV, ST-34. For mass emission rates, ST-4. For leaks, EPA Method 21.	For flash point determinations, two ASTM methods. Otherwise, no change in methods applicable.

APPENDIX II

Federal RACT Requirements	Federal MACT Requirements	Current BAAQMD Requirements	Proposed BAAQMD Requirements
Record Keeping and Reporting Requirements			
An owner or operator must: • Notify EPA that it is subject to the rule • Notify regarding construction or reconstruction • Provide throughput and emissions data related to rule applicability • Submit excess emissions and system performance reports where a CMS is required • Submit initial performance reports • Maintain on site an engineering report describing the control system • Maintain records regarding all times when emissions bypass the control system • Maintain vapor-tightness documentation for all vessels loaded • (MACT only) Maintain records regarding exempt loadings, emission estimates, HAP control efficiency • Maintain leak inspection and repair records (§ 63.567.)	Same as RACT.	The owner or operator must keep operating records for each loading event. The records must specify, among other things, the vessel loaded, the date and time, the cargo loaded, the prior cargo, and the condition of the tanks prior to loading. (Current § 8-44-501.)	Additional record keeping requirements for all activities. (Proposed §§ 8-44-501, 502.) New record keeping requirements for use of safety/emergency exemption. (Proposed § 8-44-503.)

SOCIOECONOMIC
ANALYSIS
PROPOSED RULE

REGULATION 8, RULES 44 & 46: MARINE VESSEL LOADING OPREATIONS

November 2, 2005

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CONTENTS

1. EXECUTIVE SUMMARY

INTRODUCTION

This report describes the socioeconomic impacts of proposed amendments to Regulation 8, Rule 44 and Rule 46 that, if implemented, will allow the Bay Area Air Quality Management District (District) to achieve and maintain state ambient air quality standards for ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide. Following this summary, the report summarizes the proposed rule requirements and describes the methodology for the socioeconomic analysis. The report also describes the economic characteristics of sites affected by the proposed rule amendments along with the socioeconomic impacts of the proposed amendments. The proposed amendments will assist the BAAQMD in meeting its commitments to improving air quality in the region by reducing emissions from Marine Loading-related activities due to enhanced monitoring and prevention measures.

SUMMARY

The proposed rule amendments affect Bay Area businesses engaged in petroleum refining, bulk storage, and marine transport. It is believed that five oil refineries, six terminal facilities, and five marine transportation businesses will experience the greatest proportion of the impact resulting from the proposed rule amendments. The refineries are estimated to generate sales of $9.8 billion per year and to realize net income of about 7 percent of sales, or $689 million per year. Total annual sales at the six terminal facilities is estimated at $488.4 million, of which, 2.7 percent ($13.2 million) is estimated to be profit. Annual revenue at the impacted water transportation firms is estimated at $221.6 million with 3.9 percent ($8.6 million) profit.

Compliance with the proposed rule amendments explicitly would require affected businesses to control emissions from an expanded list of regulated organic liquids, those with a "flash point" of 100 °F or lower. Compliance will also require that businesses monitor emissions from organic

liquids with a "flash point" above 100 °F; however, this testing is expected to be required for a limited period of time and there are expected to be a number of regulator exemptions, as well as a provision for requesting a special exemption. Finally, the proposed amendments will require that affected businesses control emissions from operations related to the venting of vessel cargo tanks.[1]

The cost to comply with the proposed expansion of the regulated materials list is expected to cost a total $448,407 per year. Respectively, this annual compliance cost represents 0.07 percent, 3.4 percent, and 5.2 percent of profits for the oil refineries, terminal facilities, and water transportation firms. However, this assumes that each individual group of businesses bears the full annual compliance cost. It is more likely that the total annual cost will be spread among all sixteen impacted sites, not just five or six of them. Additionally, most of the impacted terminal facilities and water transportation firms are owned by the same corporations that own the oil refineries. Therefore, it is believed that the above percent of profits estimates are conservatively high.

At the upper end, the annual cost to comply with the proposed expansion of the rule to venting operations is expected to be $720,000. As this requirement pertains to the venting of marine vessel cargo tanks it is believed that only the water transportation businesses will be affected by this proposed amendment. At total profits of $8.6 million, it is estimated that annual compliance could represent up to 8.3 percent of profits for the five impacted businesses. It is believed that this estimate is also conservatively high. The proposed amendment would only apply within District waters, therefore, a vessel venting outside District waters would not be subject to the regulation. Furthermore, it is believed to be less expensive, even without the added regulatory compliance cost associated with the proposed

[1] The proposed rule amendments will also require that businesses control emissions from marine tanks and connectors emitting more than 1,000 ppmv, a lower standard than is currently in effect. However, this same standard is in effect in other CA air districts. Therefore, it is believed that this amendment will not require affected businesses to significantly alter their overall operating practices.

amendment, to vent outside District waters. In addition, the majority of the five impacted water transportation firms are owned by the same corporations that own the oil refineries. Therefore, the percentage of profits represented by the actual costs to comply with this rule amendment will likely be lower than is estimated here.

The analysis concludes that the compliance costs associated with the compliance will not result in significant economic dislocation or job losses. For the oil refineries and terminal facilities, the total annual cost of compliance is well below the 10 percent of profits threshold for significant impact. Also, while the combined compliance cost of the expanded regulated materials list and the venting requirement could exceed 10 percent of profits for water transportation businesses, it is not believed that this will be the case. For the impact on these firms to exceed 10 percent of profits, it must be assumed that they will bear the full annual compliance cost of both proposed regulatory amendments. Also, it must be assumed that these businesses will choose to vent within District waters, even though it is believed that, even without the cost to comply with the proposed amendments, it is less expensive for vessels to vent outside District waters.

2. DESCRIPTION OF THE PROPOSED RULE

CURRENT STATUS OF THE RULE

Regulation 8, Rule 44 and Rule 46 were both adopted in 1989. These rules address organic compound emissions generated when marine tank vessels are loaded with organic liquids. The emissions occur because the loaded liquid evaporates as it is loaded and the loaded liquid volume forces the gas headspace, including the evaporated organics, out of the tank. Emissions addressed by these rules also result from "venting"[2] and "ballasting[3]" operations.

The proposed amendments to the rules address the following current rule requirements:

1) **Regulated materials**: Regulation 8 Rule 44 and Rule 46 apply to the loading of five (5) materials, each of which have a Reid vapor pressure of 2.0 psia or greater: gasoline, gasoline blending stocks, aviation gasoline, JP-4 aviation fuel, and crude oil. Emissions from these materials may not exceed two (2) pounds per thousand barrels (2 lb / 1,000 bbl) of material loaded, or be controlled such that emissions are reduced by at least 95 percent by weight.

2) **Venting operations**: Emission controls are required for loading of any organic liquid if the prior cargo was one of the five (5) currently regulated liquids. However, emissions from venting operations are not directly addressed.

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[2] Venting refers to forcing air or an inert gas into a vessel's cargo tank to eliminate the risk that vapors from the liquid organic compounds will ignite or explode. Venting is typically performed when a vessel's tank must be cleaned so that it can be filled with a different cargo than it held previously.

[3] Ballasting refers to filling a marine tank, which previously held a cargo of organic liquid, with seawater to improve the vessel's stability. Modern vessels are typically designed with "segregated" ballast tanks; however, older vessels may not have segregated tanks, and, empty cargo tanks may be used for ballast in especially rough ocean conditions.

While this is the case, in a March 2005 compliance advisory, the District interpreted the rules to apply to these activities when a regulated material is involved.

3) **"Gas Tight" standard**: The current "gas tight" standard for marine tanks and connectors is 10,000 ppmv. All marine tanks and connectors emitting more than 10,000 ppmv are subject to control requirements.

4) **Separation of Rules**: Both Rule 44 and Rule 46 are largely identical. Between them, the rules apply the same control standards to the loading of marine vessels at terminals (Rule 44) and vessel-to-vessel loading[4] (Rule 46). Resource limitations in 1989 did not allow rulemaking for both aspects of marine loading to be completed at the same time.

In 2001, the District prepared a 2001 Bay Area Ozone Attainment Plan to attain the national 1-hour ozone standard in the Bay Area. The 2001 Plan included a study measure (FS-11, "Marine Tank Vessel Activities") that proposed to examine whether significant additional emission reductions were available from further regulation of marine tank vessel operations. The results of this study were published in 2002 in a draft technical assessment document (TAD).

PROPOSED RULE AMENDMENTS

Pursuant to FS-11, District staff examined whether significant emission reductions were available from loading, lightering, ballasting, and "housekeeping" activities. The FS-11 TAD compared Rule 44 to rules from other aid districts and found that the current District abatement standard (2 lb/1,000 bbl or 95 percent by weight) is at least as stringent as corresponding standards in the South Coast AQMD, San Luis Obispo APCD, and Santa Barbara County APCD.

[4] Vessel-to-vessel loading is also referred to as "lightering." Because the San Francisco Bay is not deep enough to accommodate larger tanker vessels at some of the refinery marine terminals, cargoes are loaded ("lightered") into smaller vessels for distribution to area refineries and bulk storage facilities.

However, the current "gas tight" standard for tanks and connectors (10,000 ppmv) is less stringent than the standard in the South Coast AQMD and San Luis Obispo County APCD (1,000 ppmv). Also, both the South Coast AQMD and San Luis Obispo County APCD require control of gas venting operations, whereas, Rule 44 and Rule 46 do not.

Based upon FS-11 and the findings of the FS-11 TAD, the District is proposing the following amendments to Regulation 8 Rule 44 and Rule 46:

1) **Expansion of rule requirements to other materials**: The proposed amendments would expand the current list of regulated materials to include all organic liquids with a "flash point" of 100 °F or lower[5]. This amendment has been proposed for the following reasons:

    a. data shows that there is significant traffic these liquids
    b. these liquids can be readily identified prior to loading
    c. liquids with a "flash point" of 100 °F or lower are extremely volatile and therefore produce significant emissions; and,
    d. control of emissions from these liquids has proven both feasible and cost effective

    Additionally, in October 2003, the District proposed to modify Rule 44 to require controls on an event-specific parameter for low-volatility liquids.[6] However, the District has concluded that it cannot, at present, identify low-volatility liquids

[5] Originally, the District had determined that the regulated "high-volatility" liquids would be those with a Reid Vapor Pressure of 2.0 psia or higher. However, based upon stakeholder comments, it has been determined that Reid Vapor Pressure is not a practical measure for determining which organic compounds are subject to regulation. Flash point has been found to be a more reasonable measure and that regulating liquids with a "flash point" of 100 °F or less sufficiently captures the "high volatility" compounds originally intended to be included as regulated.

[6] These are liquids with a "flash point" above 100 °F.

that can be cost-effectively controlled. Therefore, rather than make these liquids subject to emission control requirements, the District is proposing to gather more data by requiring that operators measure the organic concentration in cargo tanks during loading operations.[7] Then, the District may be able to determine whether certain low-volatility organic materials under certain conditions should be subject to control requirements under Rule 44.

2) **Controlled venting operations**: The District is proposing to expand emission control requirements to include venting operations. In order to vent within the District waters, vessels will be required to vent to emission control devices.

3) **Reduction in "gas tight" standard**: The 1,000 ppmv standard in effect in the South Coast AQMD and San Luis Obispo County APCD is proposed for all marine loading operations. To date, the District has not established that the ultra-low leak standards (100 ppmv for connectors, 500 ppmv for pressure relief devices) in Regulation 8 Rule 18 for equipment at non-marine facilities are feasible for marine service.[8]

4) **Consolidation of Rules 44 and 46**: The proposed amendments will eliminate Rule 46 and consolidate all marine loading requirements in

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[7] Operators would be required to measure organic concentration at hourly intervals during loading operations, to record other loading parameters, and to submit this data to the District. District staff expects that this rule amendment will include built-in exemptions and an option to file for a special exemption. Staff also expects that the testing requirement will include a sunset date.

[8] In October 2003, the District proposed to lower the standard 100 ppmv consistent with the rule for equipment at non-marine facilities. Marine loading operators have indicated that connectors and other fugitive sources in marine service cannot meet the same low level of leakage achieved in non-marine service because of the harshness of the environment and because loading hoses must be connected and disconnected for each loading event, and thus much more frequently than for typical non-marine connectors.

Rule 44. The rules are largely identical and consolidation will simplify District regulations. The rules were originally adopted separately because resource limitations did not allow rulemaking for both aspects of marine loading to be completed at the same time.

EMISSIONS REDUCTIONS

This section details the emissions reductions expected from the proposed amendments to Rule 44 and Rule 46. The District estimates that the proposed rule amendments will reduce emissions by more than 30 tons/day. The reductions would result from the expansion of the rule requirements to other materials, the expansion of the rule requirements to gas venting operations, and the reduction in the "gas tight" standard. The proposed consolidation of Rule 46 into Rule 44 is not expected to result in emission reductions. The remainder of this section details the emission reductions expected from the other three (3) proposed rule amendments.

EXPANSION OF RULE REQUIREMENTS TO OTHER MATERIALS

Expansion of the control requirements of Rule 44 to all organic chemicals with a Reid vapor pressure exceeding 2.0 psia is expected to reduce emissions by a much more significant amount than the "gas tight" standard reduction. This proposed amendment is expected to result in control of up to 8,500,000 bbl/yr of additional volatile organic cargo, such as benzene and toluene, with high unabated loading emission factors. Assuming a conservative average factor of 10 lb/1,000 bbl, the resulting emission reduction would be:

(8,500,000 bbl/yr) ((10 – 2) lb / 1,000 bbl) (ton/2,000 lb) = 34 ton/yr

Some cargos included in this category may already be subject to control requirements if they are used as gasoline blending stocks. To the extent this is the case, the emission reduction would be less.

Expansion of Rule Requirements to Gas Venting Operations

Emissions reductions from this amendment are expected to be the highest of all proposed, about 170 ton. FS-11 found evidence that crude oil tankers performed approximately two (2) to four (4) venting events per month (total) in the San Francisco Bay, and estimated that the resulting emissions could be as high as 720 tons per year if a typical venting event resulted in 15 tons of emissions. Crude oil tankers are the most likely vessels to undergo venting because they occasionally take on a different cargo after unloading crude, which may require that the cargo tanks be cleaned and vented. Even if only one (1) 100,000 barrel tanker were cleaned per month, emissions could be as high as 180 ton/yr. If emission controls achieved a 95 percent emission reduction, the resulting overall emission reduction would be about 170 ton/yr.

Reduction in "Gas Tight" Standard

Reduction of the current "gas tight" standard for marine tanks and connectors subject to control requirements from 10,000 ppmv to 1,000 ppmv is expected to reduce emissions by a minimal amount (approximately 0.05 tons per day). Assuming that annual throughput of materials with a Reid vapor pressure exceeding 2.0 psia, that the materials are shipped in 500,000 barrel tankers,[9] and that each vessel remains in the Bay Area five (5) days, then there would be about 419 trips per year, with approximately six (6) vessels in the Bay Area on the average day. Further, assuming that each vessel will have 20 connectors, one (1) pressure relief valve (gas service), and one (1) pump seal (light liquid service), and that each vessel spend half the time in the Bay Area actively loading material, the emissions may be estimated using the screening value method for fugitive emissions using the factors in Table IV-2a of the CAPCOA/CARB guidelines.[10]

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[9] This is the largest size in use in the Bay Area.

[10] California Implementation Guidelines for Estimating Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities, February 1999, CAPCOA/CARB

At the current limit of 10,000 ppmv, the emissions would be:

(1/2) (6) (24 hr/day) (kg/2.2 lb) (ton/2,000 lb) [(20)(0.0375 kg/hr)+(1.691 kg/hr)+(0.437 kg/hr)] = 0.05 ton/day

At the proposed limit of 1,000 ppmv, the emissions would be:

(1/2) (6) (2.20 kg/lb) (ton/2,000 lb) [(20)(0.00006 kg/hr)+(0.0447 kg/hr)+(0.012 kg/hr)] = 0.001 ton/day

Therefore, an emission reduction of approximately 0.05 ton/day may be achieved by reducing the "gas tight" standard as proposed. It is not expected that improved equipment or maintenance practices will be necessary to achieve compliance with the new standard. The following assumption have been made

3. IMPACT OF PROPOSED RULE AMENDMENTS

This section of the socioeconomic analysis describes demographic and economic trends in the San Francisco Bay Area (Bay Area) region. Following an overview of the methodology for the socioeconomic analysis, the first part of this section compares the Bay Area against California and provides a context for understanding demographic and economic changes that have occurred within the Bay Area between 1994 and 2004. After an overview of Bay Area industries, we focus on the following industries:

- SIC 2911, Oil Refining (NAICS 32411 – oil refineries)
- SIC 5171, Petroleum Bulk Stations and Terminals (NAICS 42471 – Petroleum Bulk Stations and Terminals)
- SIC 4449/4499, Water Transportation of Freight/Services[11] (NAICS 483113 – Coastal and Great Lakes Freight Transport)
- SIC 4412/4424, Deep Sea Foreign/Domestic Transportation of Freight (NAICS 483111 – Deep Sea Freight Transportation)

Then the impacts on businesses within these industries of the proposed changes to Rule 8-44/46 concerning Marine Loading are analyzed. For the purposes of this report, the Bay Area region is defined as Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties.

3.1 METHODOLOGY

The socioeconomic analysis of the proposed rule amendments concerning marine loading involves the use of information provided directly by BAAQMD, as well as secondary data used to describe the industries affected by the proposed rule amendments.

[11] SIC 4499 is Water Transportation Services; SIC 4449 is Water Transportation of Freight.

Based on conversations with BAAQMD staff, ADE determined that the impacts would affect oil refineries, terminal facilities, and water transportation firms located and operating in the BAAQMD region. In relation to the refineries, we further focused attention on Chevron, Shell, Conoco Phillips, Valero, and Tesoro refineries. Also, for the terminal facilities we focused on those operated by Shore Terminals (2), IMTT, BP, Tesoro, and Conoco Phillips. Finally, for the water transportation firms, we focused on Foss Maritime, SeaRiver Maritime, Crowley Maritime, Polar Tanker, and Sause Brothers[12].

With this information we began to prepare an economic description of the industry groups of which the affected sites are a part, as well as to analyze data on the number of jobs, sales levels, the typical profit ratios and other economic indicators for the Bay Area businesses. ADE also reviewed and summarized documents available to the public such as annual reports for publicly traded companies.

With the annual reports and data from the US Economic Census, ADE was able to estimate revenues and profit ratios for many of the sites affected by the proposed Marine Loading rule amendments. In calculating aggregate revenues generated by Bay Area refineries, terminals, and water transporters, ADE first estimated annual revenue based upon available data. Using annual reports and publicly available data, ADE calculated ratios of profit per dollar of sales for the businesses on which the analysis focused. To estimate employment, ADE used employment data from Dun & Bradstreet.

The result of the socioeconomic analysis shows what proportion of profit the compliance costs represent. Based on a given threshold of significance, ADE discusses in the report whether the affected sites are likely to reduce jobs as a means of recouping the cost of compliance or as a result of reducing business operations. To the extent that such job losses appear likely, the indirect multiplier effects of the job

[12] SeaRiver Maritime is a subsidiary of Exxon. Polar Tankers is a subsidiary of Conoco Phillips. Foss Maritime, Crowley Maritime, and Sause Brothers are independent.

losses area estimated using a regional IMPLAN input-output model.

3.2 REGIONAL DEMOGRAPHIC TRENDS

The Bay Area experienced moderate population growth from 1994 to 2004. Between 1994 and 1999, the nine-county region increased by 7 percent, from 6.2 million in 1994 to 6.6 million in 1999. From 1994 to 2004, the population increase was from 6.2 million to 6.8 million for an increase of 11 percent. At the same time, California had population growth of 14 percent.

Within the Bay Area, the greatest percentage increase occurred in Contra Costa County. From 1994 to 2004 Contra Costa increased its population by 18 percent. All other Bay Area counties had population increases equal to, or slower than, the State. The smallest percentage increase occurred in Marin and San Mateo Counties where population grew 5 percent from 1994 to 2004. Table 1 shows the population changes that have occurred in the Bay Area and California from 1994 to 2004.

Table 1
Population Growth: San Francisco Bay Area

	Population			Percent Change		
	1994	1999	2004	94 - 99	99 - 04	94 - 04
California	30,889,182	32,971,834	35,300,654	7%	7%	14%
Bay Area	6,189,000	6,646,167	6,865,370	7%	3%	11%
Alameda County	1,302,462	1,406,046	1,470,456	8%	5%	13%
Contra Costa County	844,076	914,645	992,608	8%	9%	18%
Marin County	228,718	236,955	239,209	4%	1%	5%
Napa County	111,083	118,088	126,283	6%	7%	14%
San Francisco County	729,024	771,122	772,985	6%	0%	6%
San Mateo County	667,218	712,376	702,017	7%	-1%	5%
Santa Clara County	1,544,523	1,672,977	1,701,831	8%	2%	10%
Solano County	356,652	377,601	399,826	6%	6%	12%
Sonoma County	405,244	436,357	460,155	8%	5%	14%

Source: Applied Development Economics, based on household population estimates from The California Department of Finance

3.3 REGIONAL ECONOMIC TRENDS

The Bay Area is one of the world's greatest regional economies. It benefits from pre-eminent knowledge-based industries, with competitive strength flowing from an unmatched culture of entrepreneurship, world-leading

research institutions, and some of the nation's best educated and most highly skilled workforce. With these remarkable advantages, it has led through innovation in a wide range of research and industrial fields.

Many of the Bay Area's most prominent industries are manufacturing related. From Intel to PowerBar, Bay Area manufacturers are often high profile companies with world-renowned recognition. From small to large, Bay Area industry has been dynamic, creating wealth and jobs in both the export sector and local serving industries.

The economic base is typically comprised of export industries within the manufacturing, minerals-resource extraction, and agricultural sectors. There are also the "local support industries" such as retail or service sectors, the progress of which is a function of the economic base and demographic changes, and more so the latter than the former. As population increases in a given area, demand for services – such as realtors, teachers, healthcare – increases, as does demand for basic retail items like groceries, gas for commuting, or clothing at the local apparel shops.

The industries affected by the proposed PRD rule amendments are a prominent part of the region's economic base. Mainly engaged in export related business, the oil refineries are classified as manufacturers. In the Bay Area, manufacturing jobs have decreased over the last decade. In 1994, manufacturing accounted for 14 percent of all Bay Area employment. By 2004, manufacturing declined 11 percent to account for 11 percent of all Bay Area employment.

As of 2004, the professional and business services sector was the largest employer in the region, at 520,200 jobs or 16 percent of all private and public sector jobs. This is a change from 1994 when professional and business services accounted for 15 percent of all Bay Area employment. During the same period, professional and business services increased 17 percent. The next largest industry in the Bay Area is public service, or government, with 460,300 jobs. In 2004, government accounted for 14 percent of all Bay Area employment. From 1994 to 2004, government had one of the lowest growth rates of all industries at 4 percent. Two other industries came close to manufacturing in total

employment. Retail trade and education & health care both made up 11 percent of total employment and had only a few hundred or few thousand jobs less than manufacturing. Unlike manufacturing, both retail trade and education & health care had significant job gains from 1994 to 2004. All other industries made up less than manufacturing in total employment in 2004. Table 2 shows Bay Area industry sectors and their trends from 1994 to 2004.

Table 2
Employment Profile of the San Francisco Bay Area, 1994 - 2004

Industry	1994	1999	2004	% of Total Employment in 2004
Farm	25,800	28,600	21,300	1%
Natural Resources & Mining	4,300	3,600	2,300	0%
Construction	109,300	171,400	181,000	6%
Manufacturing	405,400	459,400	359,700	11%
Wholesale Trade	118,500	107,100	121,900	4%
Retail Trade	300,200	339,000	337,900	11%
Transportation & Warehousing & Utilities	115,500	124,700	102,900	3%
Information	89,200	122,100	111,600	3%
Financial Activities	193,300	197,400	209,800	7%
Professional and Business Services	445,400	626,100	520,200	16%
Education & Health Care	293,800	335,000	359,200	11%
Leisure and Hospitality	250,000	289,500	304,400	10%
Other Services	100,100	108,800	109,700	3%
Government	444,500	449,800	460,300	14%
Total	**2,895,300**	**3,362,500**	**3,202,200**	**100%**

Source: Applied Development Economics from data supplied by the Labor Market Information Division of the California Employment Development Department

3.4 DESCRIPTION OF AFFECTED INDUSTRIES

The proposed Marine Loading rule amendments affect industries in the following SIC's:

- SIC 2911, Oil Refining (NAICS 32411 – oil refineries)
- SIC 5171, Petroleum Bulk Stations and Terminals (NAICS 42471 – Petroleum Bulk Stations and Terminals)
- SIC 4449/4499, Water Transportation of Freight/Services[13] (NAICS 483113 – Coastal and Great Lakes Freight Transport)
- SIC 4412/4424, Deep Sea Foreign/Domestic Transportation of Freight[14] (NAICS 483111 – Deep Sea Freight Transportation)

What follows is a description of this industry, along with economic trends for oil refineries in the Bay Area, and it provides a comparison between 2001 and 2004. Data in Table 3 are for all sources, not just the major sites that have been focused on in the Bay Area. As shown in Table 3, employment in oil refineries increased by 2 percent in the four years from 2001 to 2004. This is at the same time that Bay Area manufacturing jobs decreased 22 percent. In California, oil refineries declined 5 percent during the same period and manufacturing jobs declined 14 percent.

[13] SIC 4499 is Water Transportation Services; SIC 4449 is Water Transportation of Freight.

[14] SIC 4424 is Deep Sea Domestic Transportation of Freight; SIC 4412 is Deep Sea Foreign Transportation of Freight.

Table 3
Employment Trends: Industries Affected by Proposed Amendments, 2001 - 2004

	2001	2004	Change from 2001 to 2004	% Change from 2001 to 2004
San Francisco Bay Area				
Manufacturing	460,992	357,385	-103,607	-22%
Petroleum refineries	7,086	7,196	110	2%
Petroleum bulk stations and terminals	175	59	-116	-66%
Trade, Transportation, and Utilities	608,519	555,081	-53,438	-9%
Deep sea freight transportation	745	668	-77	-10%
Coastal and Great Lakes freight transport	165	73	-92	-56%
California				
Manufacturing	1,780,544	1,536,787	-243,757	-14%
Petroleum refineries	13,447	12,776	-671	-5%
Petroleum bulk stations and terminals	1,589	1,794	205	13%
Trade, Transportation, and Utilities	2,719,610	2,729,841	10,231	0.38%
Deep sea freight transportation	2,550	2,367	-183	-7%
Coastal and Great Lakes freight transport	563	346	-217	-39%

Source: Applied Development Economics from data supplied by the Labor Market Information Division of the California Employment Development Department

According to the data in Table 3[15], that employment at Bay Area terminal facilities (also in the Manufacturing sector) declined 66 percent between 2001 and 2004. This particular data set reports Bay terminals employed only 59 workers in 2004. A separate data set (Dun and Bradstreet's "Zapdata.com"), used later in this report to estimate employment at the specific sites on which this analysis focuses, indicates that employment at these sites alone totals 260. During the same period (2001 – 2004), statewide employment in the Petroleum Bulk Stations and Terminals industry grew by 13 percent.

The data from the Quarterly Census of Employment and Wages indicates that the Deep Sea Freight Transportation and Coastal and Great Lakes Freight Transport industries employed zero people in the Bay Area in 2001; but, that by 2004 these industries employed nearly 750 people combined. Given the historical port operations in the Bay Area and the

[15] Data in Table 3 was obtained from the "Quarterly Census of Employment and Wages," published by the CA Employment Development Department's Labor Market Information Division.

statewide employment trends in these industries, it is unlikely that there were zero people employed in occupations related to these industries in 2001. In fact, Occupational Employment Data from the Labor Market Information Division of the Employment Development Department indicates that there were over 900 people employed in the "Captains, Mates, and Pilots of Water Vessels" and "Sailors and Marine Oilers" occupations in 2001[16]. In light of this data, it should be assumed that Bay Area employment in the Deep Sea Freight Transportation and Coastal and Great Lakes Freight Transport industries were similar to the State between 2001 and 2004.

Table 4 identifies the economic characteristics of the specific sites affected by the proposed Marine Loading rule amendments. This table shows that the refineries, terminal facilities, and water transportation providers are estimated to employ 1,935 workers, 260 workers, and 365 workers respectively. These sites have an estimated aggregate payroll of $219.6 million, and estimated revenues of $10.5 billion. In calculating aggregate revenues generated by Bay Area refineries, the consultant estimated an average revenue figure per refinery based on revenues generated by that refinery in 2004 using annual reports. Then, the consultant summed the refineries' estimated revenue to arrive at the aggregate amount of $9.8 billion.

Because not all of the sites in the terminal facilities and water transportation groups are owned/operated by publicly-held companies, the consultant relied on a combination of Dun and Bradstreet business and industry data, as well as data from the 2002 Economic Census to estimate annual revenues per Bay Area site. Wherever possible, revenue data for the specific site was used. Where specific site data was not available, a site's annual revenue was assumed to be equal to the annual revenue for the "average" Bay Area site in its industry.

[16] This data has been used in Table 3 to approximated the 2001 Bay Area employment in the Deep Sea Freight Transportation" and "Coastal and Great Lakes Freight Transport" industries.

Table 4
Economic Characteristics of Impacted Businesses in the San Francisco Bay Area

	No. of Businesses	Estimated Sales	Estimated Employment	Estimated Payroll
Petroleum Refineries	5	$9,837,598,944	1,935	$172,194,300
Terminal Facilities	6	$488,400,000	260	$12,855,766
Water Transportation	5	$221,628,381	365	$34,522,563
Total	**16**	**$10,547,627,325**	**2,560**	**$219,572,629**

Source: U.S. Economic Census 2002; California Employment Development Department Quarterly Census of Employment and Wages

As Table 5 shows, the affected refinery sites represent 27 percent of all employment within their respective industry in the Bay Area. Overall, there are an estimated 7,196 petroleum refining employees in the Bay Area. Of the 7,196 workers, 1,935 work in the affected refineries, or 27 percent. In all of California, there were 12,776 workers in SIC 2911 (NAICS 32411), meaning that the affected Bay Area refineries equal 15 percent of the state oil refinery workforce.

Table 5
Employment at Impacted Sites Relative to the Bay Area as a Whole

	No. of Businesses	Estimated Employment	Affected Businesses as a % of Bay Area Total	Affected Businesses as a % of California Total
Petroleum Refineries	5	1,935	27%	15%
Terminal Facilities	6	260	34%	14%
Water Transportation	5	365	49%	13%
Total	**16**	**2,560**	**29%**	**15%**

Source: Calculations by Applied Development Economics

Based upon the Dun and Bradstreet data used in Table 4, Bay Area Terminal Facilities employ approximately 758 people. Of this amount, 260 (34 percent) are employed by the affected facilities represents 34 percent of the Bay Area's total employment in this industry. These affected sites also account for 14 percent of the statewide employment in the Petroleum Bulk Stations and Terminals industry. This is comparable to the affected oil refinery's share of statewide employment in their industry.

Within the Bay Area, the affected water transportation firms account for 49 percent of the total employment in their

combined industries. This is the largest proportion of all of the affected groups within their respective industries. Statewide, however, water transportation firms account for only 13 percent of the total employment in their combined industries. This is comparable to the proportions for both the refineries and the terminal facilities when compared to the statewide industry employment.

3.5 COMPLIANCE COSTS

In addition to consolidating Rule 46 into Rule 44, the proposed rule amendments will reduce the "gas tight" standard for marine tanks and connectors subject to control requirements; expand emission control requirements to include venting operations; and, expand the current list of regulated materials to include all organic liquids with a "flash point" of 100 ºF or lower. The remainder of this section discusses the District's estimates of the annual costs for firms to comply with these proposed regulatory amendments. The estimates discussed below are based upon District staff's independent research, as well as conversations with industry professionals engaged in operating the equipment and systems that would be utilized to comply with the proposed amendments.

Since the proposed standard of 1,000 ppmv is already in effect in other California ports, no new equipment or maintenance practices are expected to be necessary for compliance. While there could be some cost increases associated with the proposed new monitoring and recordkeeping requirements, these costs are expected to be minimal; most of this monitoring is already required by Coast Guard and other regulations. Additionally, the consolidation of Rule 46 into Rule 44 is intended to streamline the District's Regulations; and, therefore, is not expected to increase compliance costs. The two (2) proposed amendments that are expected to result in some compliance cost increases are the expansion of the current regulated materials list and the expansion of control requirements to venting operations.

EXPANSION OF CONTROLLED MATERIALS LIST

The annual cost to comply with the proposed amendment to expand the list of controlled materials to include all organic

materials with a "flash point" of 100 ºF or lower is expected to be $448,407 according to District staff calculations. In 2003, 8,500,000 bbl of these materials moved through the Bay Area. The District estimates that the following line item costs will be involved in complying with this proposed amendment:

- Natural Gas = $113,392/year[17]
- Electrical Cost = $8,297/year[18]
- Operational Labor Cost = $261,375[19]
- Maintenance Labor Cost = $65,344[20]

The sum of these line item costs is $448,407.

EXPANSION OF VENTING CONTROL REQUIREMENTS

The total annual cost of compliance with this proposed amendment is estimated at between $360,000 and $720,000. While the precise volume of venting activity in District waters is unknown, it is estimated that as many as two to four ventings of large crude oil tankers occur in the San Francisco Bay each month. At an estimated cost of $15,000 per event, existing abatement facilities are expected to have the capacity to accommodate the additional controlled venting events resulting from this proposed amendment; therefore, no new facilities will be necessary. With 24 events per year, compliance will cost $360,000; 48 events per year will cost $760,000.

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[17] Assuming usage of 15,749,000 scf/year at $7.2/1,000 scf based upon the US DOE *Natural Gas Price Summary for Industrial Customers* (July 2005). Natural gas usage is assumed to be 30 percent of the loaded liquid volume (displaced gas volume) + 10 percent.

[18] Assuming usage of 79,231 KW-hr/yr at $0.10472/kWh average total rate for primary firm power for industrial customers from PG&E 10/1/05 rate schedule. Electrical usage assumes 100 hp load, with operating time based on 8,000 bbl/hr loading rate.

[19] Assuming 1,743 operating hours per year at $75/hr/person for 2 persons. The estimate of operating hours assumes 50,000 bbl/load, 8,000 bbl/hr loading rate, 2 hours before and after each load for startup/shutdown.

[20] Assumed to be equal to ¼ of the operating labor cost.

Table 6
Estimated Cost of Venting Control Compliance

	Per Event Compliance Cost	No. of Annual Events		Total Compliance Cost	
		Lower End	Upper End	Lower End	Upper End
Venting Control Requirements	$15,000.00	24	48	$360,000	$720,000

Source: Estimates by Bay Area Air Quality Management District Staff.

3.6 BUSINESS RESPONSE TO COMPLIANCE COSTS

Sites impacted by the proposed Marine Loading rule amendments may respond in a variety of ways when faced with new regulatory costs. These responses may range from simply absorbing the costs and accepting a lower rate of return to shutting down the business operation all together. Businesses may also seek to pass the costs on to their customers in the form of higher prices, although, in general, throughout the oil industry prices are set in global markets and individual producers or refineries are not in a position to affect prices. More likely, they may renew efforts to increase productivity and reduce costs elsewhere in their operation in order to recoup the regulatory costs and maintain profit levels.

3.7 IMPACT ANALYSIS

The businesses' responses to increased compliance costs hinge on the effect of the costs on the profits generated at the affected sites. An impact on estimated profits greater than 10 percent implies that the source would experience serious economic effects because of the compliance cost. When compliance costs are greater than 10 percent of estimated profits, companies typically respond to the impact by laying off some workers, closing parts of manufacturing facilities or, in the most drastic case, possibly closing the manufacturing facility.

Using the cost estimates developed for the proposed Marine loading rule amendments (where those costs are expected to be greater than negligible), ADE calculated the socioeconomic impacts of the proposed actions. In

calculating impacts on profits, ADE used return on sales ratios identified by media reports and in annual reports of companies directly affected by the proposal. Based on this information, we estimate that the affected refineries generated a combined profit of $688 million on $9.8 billion in revenues.

Because not all of the sites in the terminal facilities and water transportation groups are owned/operated by publicly-held companies a combination of Dun and Bradstreet business and industry data, as well as data from the 2002 Economic Census was used to estimate annual revenues per Bay Area site. Wherever possible, revenue data for the specific site was used. Where specific site data was not available, a site's annual revenue was assumed to be equal to the annual revenue for the "average" Bay Area site in its industry. Based upon this data, we estimate that affected terminal facilities generate a combined profit of $13.2 million on $488.4 million in revenues. Affected water transportation firm profits are estimated at $8.6 million on $221.6 million in revenues.

The remainder of this section discusses the impacts compliance with the proposed rule amendment is expected to have on the estimated profits of affected sites. The estimated profit impacts have been calculated where annual compliance costs are expected to be greater than negligible. This is the case with two of the proposed amendments: the expansion of the regulated materials list to include organic compounds with a "flash point of 100 ºF or lower, and, the expansion of the venting control requirement.

Expansion of Regulated Materials List

Table 7 details the projected impacts of compliance with this proposed rule amendment on affected site profits. The estimated annual compliance cost of $448,407 represents less than one percent of profits for affected Bay Area petroleum refineries. The impact on the profits of affected terminal facilities and water transportation firms, at 3.4 percent and 5.2 percent respectively, is higher than that for the petroleum refineries. However, the impacts for all three sets of affected facilities are below the 10 percent threshold for a significant impact.

Table 7
Impact of Proposed Expanded Controlled Materials List on Estimated Profits at Bay Area Businesses

	Impacted Businesses	Estimated Profits Generated	Annual Abatement Cost	Cost as a % of profits
Petroleum Refineries	5	$688,631,926	$448,407	0.07%
Terminal Facilities	6	$13,186,800	$448,407	3.40%
Water Transportation	5	$8,643,507	$448,407	5.19%
Total	**16**	**$710,462,233**	**$448,407**	**0.06%**

Source: Calculations by ADE, based on a 7 percent profit margin for oil refiners, 3.9 percent for Water Transportation Businesses, and 2.7 percent for Terminal Facilities

It is believed that the profit impacts shown in Table 7 are conservative (i.e. higher than will actually be realized). The estimates of profit impacts assume that each industry bears the full cost of compliance. It is more likely that the total $448,407 annual compliance cost will be spread between sites in all three affected industries. Therefore, it is most likely that no one set of affected sites will carry the full cost of compliance with this proposed amendment. Also, the majority of the impacted sites are operated by the same companies that own and operate the oil refineries. Therefore, the annual compliance cost may actually be a much smaller percentage of overall corporate profits.

EXPANSION OF VENTING CONTROL REQUIREMENT

It is assumed that only the profits of businesses providing water transportation services will be impacted by this proposed rule amendment. Table 8 details the project profit impacts. At the low end, assuming twelve (12) venting events per year and an annual compliance cost of $360,000, compliance with this proposed amendment represents 4.2 percent of the affected water transportation firms combined profits. At the high end, assuming 48 events per year, the $760,000 annual compliance cost represents 8.3 percent of the businesses' combined profits. The impacts in both cases are below the 10 percent threshold for a significant impact.

Table 8
Impact of Proposed Venting Control Requirements on Estimated Profits at Bay Area Businesses

	Impacted Businesses	Estimated Profits Generated	Cost of Prevention Measure		Cost as a % of profits	
			Lower End	Upper End	Lower End	Upper End
Water Transportation	5	$8,643,507	$360,000	$720,000	4.16%	8.33%

Source: Calculations by ADE, based on a 7 percent profit margin for oil refiners, 3.9 percent for Water Transportation Businesses, and 2.7 percent for Terminal Facilities

It is believed that these profit impact estimates are conservative in that they are higher than what will actually be the case. Vessels will only be subject to this rule amendment if they vent within District waters. If a vessel sails out of District waters to vent, it will not be subject to this amendment. Because other costs, such as demurrage can be avoided by sailing off the coast, outside District waters, it is believed that some vessels will choose to do this; thereby, reducing the actual annual compliance cost and impact on overall profits. Additionally, the majority of the impacted businesses are operated by the same companies that own and operate the oil refineries. Therefore, the annual compliance cost may actually be a much smaller percentage of overall corporate profits.

3.8 IMPACT ON SMALL BUSINESS

In addition to analyzing the employment impacts of the proposed Marine Loading rule amendments, state legislation requires that the socioeconomic analysis assess whether small businesses are disproportionately affected by air quality rules. First, this section begins with a definition of small business per California Statute. It then goes on to profile oil refineries in the Bay Area region by employment size categories, and, in so doing, shows that most of these manufacturers are relatively large employers. This portion of the section discusses the average size of the five refineries affected by the proposed changes; and, shows how the five refineries affected by the proposed Marine Loading rule amendments fail to qualify as small businesses as defined by the State of California.

Next, this section analyzes the proportion of small to large businesses in the Petroleum Bulk Stations and Terminals industry. The per employee cost of compliance with the proposed expansion of regulated materials for these facilities is calculated and used to estimate the proportion of the total annual compliance cost that will be incurred by small businesses in this sector. The analysis shows that small businesses are not disproportionately affected by this proposed amendment.

This section closes with the application of the above methodology employed for analyzing the small businesses in the Petroleum Bulk Stations and Terminals to the Bay Area businesses engaged in the marine transportation of freight. The proportion of the annual costs for complying with the expansion of the regulations to both other materials and venting operations. As with the Petroleum Bulk Stations and Terminals, the analysis finds that small businesses are not disproportionately impacted the proposed amendments to the Marine Loading rule.

Definition of Small Business Per California Statute

For purposes of qualifying small businesses for bid preferences on state contracts and other benefits, the State of California defines small businesses in the following manner:

- Must be independently owned and operated;
- Cannot be dominant in its field of operation;
- Must have its principal office located in California
- Must have its owners (or officers in the case of a corporation) domiciled in California; and,
- Together with its affiliates, be either:
    - A business with 100 or fewer employees, and an average gross receipts of $10 million or less over the previous tax years, or
    - A manufacturer with 100 or fewer employees

Oil Refineries by Employment Size Category

Fifty percent of all businesses in California and 46 percent of United States businesses employ less than fifty people. Data in Table 9 are for all of the oil refinery sites identified by the BAAQMD, and it includes data on sites affected by the proposed Marine Loading rule amendments. The data in the table comes from Dun & Bradstreet and is current as of the second quarter of 2005. As a group, establishments in the affected petroleum refining industry are significantly larger than state and national industries as a whole.

Table 9
Distribution of Oil Refineries by Employment Size in the San Francisco Bay Area

	Employment Size Categories*							
	1 thru 4	5 thru 9	10 thru 24	25 thru 49	50 thru 99	100 thru 249	250 thru 499	500 or more
Bay Area Petroleum refineries	0%	1%	1%	3%	5%	0%	30%	60%
California (all industries)	16%	8%	14%	12%	13%	14%	8%	15%
U.S. (all industries)	12%	8%	14%	12%	13%	15%	8%	18%

Source: Applied Development Economics, based on data supplied by Zapdata.com (a Dun & Bradstreet Company)
*Note: Employment size based on number of employees located at individual company/business sites

Establishments with more than 100 workers represent 37 percent of all establishments in all industries in California and 41 percent in the United States. In contrast, 90 percent of Bay Area oil refineries employ at least 100 people. We estimate that the sites directly affected by the proposed rule amendments employ, on average, 387 workers, placing these facilities as mid- to large-sized employers.

The refineries that are affected by the proposed Marine Loading rule amendments are not independently-owned and operated businesses. These refineries are owned by publicly-traded global corporations whose headquarters are generally outside of California. In addition, each of the refineries that are affected by the proposed Marine Loading rule amendments employ, on average, 387 workers, and their average revenue is approximately $1.9 billion. Thus, by the standards established by the State of California, these sources are not small businesses. Based on this discussion, it is determined that the proposed Marine Loading rule amendments do not disproportionately affect small businesses because the sources impacted by the proposed changes do not meet California's definition of small business.

TERMINAL FACILITIES

According to Dun and Bradstreet, there are twelve Bay Area businesses operating in the Petroleum Bulk Stations and Terminals industry. Combined these firms employ 758 people. Eight (67 percent) of the twelve firms employ less than 100 workers and have gross receipts (sales) of less than $10 million annually. These eight firms qualify as small businesses and employ a combined 117 workers. Table 10 illustrates the expected distribution of the annual cost to comply with the proposed expansion of the regulated materials list between small and medium-large businesses in this sector.

Table 10
Share of Annual Cost to Comply with Proposed Expanded Regulated Materials List, by Business Size Category

Business Size Category	No. of Businesses	% of Total Businesses	No. of Employees	Per Employee Compliance Cost	Annual Compliance Cost	% of Total Compliance Cost
Small Businesses	8	67%	117	$592	$69,213	15%
Mid - Large Businesses	4	33%	641	$592	$379,194	85%
Total	**12**	**100%**	**758**	**$592**	**$448,407**	**100%**

Source: Dun and Bradstreet's "Zapdata.com;" calculations by Applied Development Economics

Since all twelve 12 terminal facilities in the Bay Area employ a combined 758 workers, compliance with the proposed expansion of rule requirements to other materials, with a total annual cost of $448,407, is expected to cost Bay Area firms in this sector $592 per employee on an annual basis. On a per employee basis, compliance will cost small businesses in this sector, which employ 117 people, a combined $69,213 annually. Since small businesses account for 67 percent of the Bay Area firms in this sector and are only expected to incur 15 percent of the total estimated annual compliance cost, it is determined that small businesses will not be disproportionately affected by this proposed amendment.

WATER TRANSPORTATION FIRMS

Utilizing the same Dun and Bradstreet data set employed for the terminal facilities, there are approximately 124 businesses in the Bay Area that are engaged in transporting freight by marine routes. Of these, 116 firms, or 94 percent, qualify as small businesses based on the criteria used above. These 116 firms employ a total of 606 people. Table 10 illustrates the expected distribution of the annual cost to comply with the proposed venting control requirements between small and medium-large businesses in this sector.

Table 11
Share of Cost to Comply With Proposed Venting Requirement, by Business Size Category

Business Size Category	No. of Businesses	% of Total Businesses	No. of Employees	Per Employee Compliance Cost	Annual Compliance Cost	% of Total Compliance Cost
Small Businesses	116	94%	606	$225	$136,606	19%
Mid - Large Businesses	8	6%	2,588	$225	$583,394	81%
Total	**124**	**100%**	**3,194**	**$225**	**$720,000**	**100%**

Source: Dun and Bradstreet's "Zapdata.com;" calculations by Applied Development Economics

Because all 124 water freight transportation firms in the Bay Area employ 3,194 workers, compliance with the proposed expansion of rule requirements to gas venting operations is expected to cost Bay Area firms in this sector up to $760,000, or, $225 per employee on an annual basis. On a per employee basis, compliance will cost small businesses in this sector, which employ 606 people, a combined $136,606 annually. Since small businesses account for 94 percent of the Bay Area firms in this sector and are only expected to incur 19 percent of the total estimated annual compliance cost, it is determined that small businesses will not be disproportionately affected by this proposed amendment.

Likewise, Bay Area small businesses in the water freight transportation sector are not expected to be disproportionately affected by the proposed expansion of rule requirements to organic compounds with a “flash point” of 100 °F or less. Employing the same methodology as above, compliance with this proposed amendment will cost $140 per employee. The total annual compliance cost to Bay Area small businesses will be $85,077; 19 percent of the total annual compliance cost. Detail is provided in Table 12 below.

Table 12
Share of Annual Cost to Comply with Proposed Expanded Regulated Materials List, by Business Size Category

Business Size Category	No. of Businesses	% of Total Businesses	No. of Employees	Per Employee Compliance Cost	Annual Compliance Cost	% of Total Compliance Cost
Small Businesses	116	94%	606	$140	$85,077	19%
Mid - Large Businesses	8	6%	2588	$140	$363,330	81%
Total	**124**	**100%**	**3194**	**$140**	**$448,407**	**100%**

Source: Dun and Bradstreet's "Zapdata.com;" calculations by Applied Development Economics

Initial Study/Negative Declaration for the Amendments to Bay Area Air Quality Management District Regulation 8, Rule 44, Rule 46; and Manual of Procedures, Volume IV; ST-34

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Chapter 1

Chapter 2

Chapter 3

FIGURES:

TABLES:

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Chapter 1

Introduction

Purpose of this Document

This Initial Study/Negative Declaration (IS/ND) assesses the environmental impacts of the proposed adoption of amendments to Regulation 8, Rule 44, Rule 46 and ST-34 by the Bay Area Air Quality Management District (BAAQMD or District) as required by the California Environmental Quality Act (CEQA) and in compliance with the state CEQA Guidelines (Title 14 California Code of Regulations§§1400 et seq.). An IS/ND serves as an informational document to be used in the decision-making process for a public agency that intends to carry out a project; it does not recommend approval or denial of the project analyzed in the document. The BAAQMD is the lead agency under CEQA and must consider the impacts of the proposed rule amendments when determining whether to adopt them. The BAAQMD has prepared this IS/ND because no significant adverse impacts would result from the proposed rule amendments.

Scope of this Document

This document evaluates the potential impacts of the proposed amendments on the following resource areas:

- aesthetics,
- agricultural resources,
- air quality,
- biological resources,
- cultural resources,
- geology and soils,
- hazards and hazardous materials
- hydrology and water quality,
- land use planning,
- mineral resources,
- noise,

- population and housing,
- public services,
- recreation,
- transportation/traffic, and
- utilities and service systems.

Impact Terminology

The following terminology is used in this IS/ND to describe the levels of significance of impacts that would result from the proposed rule amendments:

- An impact is considered *beneficial* when the analysis concludes that the project would have a positive effect on a particular resource.
- A conclusion of *no impact* is appropriate when the analysis concludes that there would be no impact on a particular resource from the proposed project.
- An impact is considered *less than significant* if the analysis concludes that an impact on a particular resource topic would not be significant (i.e., would not exceed certain criteria or guidelines established by BAAQMD). Impacts are frequently considered less than significant when the changes are minor relative to the size of the available resource base or would not change an existing resource.
- An impact is considered *less than significant with mitigation incorporated* if the analysis concludes that an impact on a particular resource topic would be significant (i.e., would exceed certain criteria or guidelines established by BAAQMD), but would be reduced to a less than significant level through the implementation of mitigation measures.

Organization of This Document

The content and format of this document, described below, are designed to meet the requirements of CEQA.

- Chapter 1, "Introduction," identifies the purpose, scope, and terminology of the document.
- Chapter 2, "Description of the Proposed Rule," provides background information of Regulation 8, Rule 44, describes the proposed rule amendments, and describes the area and facilities that would be affected by the amendments.

- Chapter 3, "Environmental Checklist," presents the checklist responses for each resource topic. This chapter includes a brief setting description for each resource area and identifies the impact of the proposed rule amendments on the resources topics listed in the checklist.

- Chapter 4, "References Cited," identifies all printed references and personal communications cited in this report.

Chapter 2

Description of the Proposed Rule

Background

Bay Area Air Quality Management District (District) proposes amendments to Bay Area Air Quality Management District Regulation 8, Rule 44: Marine Vessel Loading Terminals, and Rule 46: Marine Tank Vessel to Marine Tank Vessel Loading. The proposed amendments would (1) require controls for all liquids regulated by the current rules, (2) impose more stringent leak standards on the equipment that controls emissions, (3) clarify and extend requirements for various activities – tank washing, purging, and gas freeing – that can vent tank emissions to the atmosphere, and (4) consolidate all requirements into one rule. In addition, the District proposes to modify a source test method used to determine compliance with the emissions standards for vapor recovery units in Rule 44, ST-34: Bulk and Marine Loading Terminals – Vapor Recovery Units.

Main tank vessels operate in the Bay Area in two primary trades: the delivery to the Bay Area of refinery inputs such as crude oil, and the delivery to markets outside the Bay Area of a variety of refinery outputs such as gasoline, distillate oils, and residual oils.

The two District rules that would be changed by the proposal are Regulation 8, Rules 44 and 46. Rule 44 applies to loading activities that release organic compounds contained in the cargo tanks of marine tank vessels. Rule 46 applies to lightering, the transfer of cargoes from a large oil tanker with a draft greater than can be accommodated by the relatively shallow San Francisco Bay into a smaller vessel capable of delivering the cargo. In the Bay Area, virtually all lightering activity involves transfer of crude oil to smaller vessels for delivery to Bay Area refineries.

The current rules are intended to reduce emissions of organic compounds that lead to the formation of ozone, the primary constituent of smog. The rules were adopted in 1989 and apply to the five cargoes that account for most emissions: Crude oil, gasoline, gasoline blending stock, aviation gasoline, and JP-4 jet fuel.

Various tanker operations produce organic compound emissions subject to the rule. Loading or lightering of one of the five regulated liquids produces emissions when vapors from evaporation of the liquid are forced out of the tank by the incoming liquid. Loading or lightering of an unregulated organic liquid may also produce emissions if the liquid displaces vapors remaining from a prior cargo of one of the regulated liquids. Ballasting – the introduction of seawater into a tank in order to ensure proper propeller, rudder, and hull immersion – may be conducted after cargo delivery and may produce emissions if the tank receiving ballast water contained a regulated liquid cargo. Ballasting emissions are now relatively uncommon as most tankers calling on the Bay Area have segregated ballast tanks that are used only for ballast water. Other

activities – tank washing, purging, and gas freeing – may also produce emissions subject to the rule if they involve any venting of vapors from a regulated liquid.

Regulation 8, Rule 44 was primarily intended to control loading emissions. The rule limits emissions from loading to 2 pounds of organic compounds per thousand barrels of liquid loaded (2 lb/1000 bbl). By defining loading to include any "loading into a tank vessel when the prior cargo was an organic liquid," the standard was also intended to apply to ballasting. Regulation 8, Rule 46 extended the same standard to lightering. Though the rules do not directly address emissions from tank washing, purging, and gas freeing, the District has interpreted the rules to apply to these activities when the activities are associated with a regulated loading or lightering activity.

In 2001, the District prepared a 2001 Bay Area Ozone Attainment Plan to attain the national 1-hour ozone standard in the Bay Area. The 2001 Plan included a study measure (FS-11, "Marine Tank Vessel Activities") that proposed to examine whether significant additional emission reduction were available from further regulation of marine tank vessel operations. The results of this study were published in December 2002 in a draft technical assessment document (TAD). In the draft TAD, the District attempted to determine whether significant emission reductions could be cost-effectively achieved by: (1) regulating currently unregulated liquids, (2) imposing more stringent control requirements, (3) tightening leak standards, and (4) regulating activities that vent tank vapors to the atmosphere.

The testing performed during the development of the FS-11 TAD was not sufficient to establish reliable emission factors for currently-unregulated cargoes. However, the results of District testing and results obtained by other agencies suggest that an emission factor of 2 lb/1000 bbl is an appropriate assumption for the emissions produced by the loading of distillate fuel oils, including diesel, and residual fuel oils.

The draft TAD found that the current District abatement standard (2 lb/1000 bbl or 95% by weight) is at least as stringent as corresponding standards in the South Coast AQMD, San Luis Obispo County APCD, and Santa Barbara County APCD. The TAD did not include a recommendation for a more stringent control standard. The TAD did find that the current "gas tight" standard for tanks and connectors subject to control requirements (10,000 ppmv) is less stringent than the standard in the South Coast AQMD and San Luis Obispo County APCD (both 1,000 ppmv). In the Draft TAD, the District found that the South Coast AQMD and San Luis Obispo County APCD require control of gas venting operations where air or inert gas is introduced into a marine tank previously loaded with regulated cargo, usually for safety reasons. As noted, the District rules do not directly regulate gas venting operations, but have been interpreted by the District to apply to some of these activities when they are related to loading or lightering.

Building on the 2001 study measure and the 2002 TAD, District staff have further evaluated the rules and developed the following amendments in order to make the rule(s) more enforceable:

1) Reduce the allowable leak standard for marine terminal equipment and connections associated with marine loading from 10,000 ppm to 1,000 ppm based on standards in effect in other air districts;

2) Incorporate Rule 46 requirements regarding lightering operations into Rule 44 and eliminate Rule 46;

3) Require control of emissions from loading any liquid with a flashpoint of less than 100 ^{o}F, which would control currently unregulated emissions from the loading of certain organic chemicals;

4) Require control of emissions when organic vapors are vented to atmosphere, such as during cleaning, purging and gas freeing of cargo tanks on marine tank vessels;

5) Require collection and submission of various data; and

6) Make minor clarifying changes to the rules such as deletion of obsolete references and addition of definitions.

Objectives

The primary objective of the proposed rule amendments is to reduce emissions of ozone forming compounds (e.g., VOCs).

The U.S. Environmental Protection Agency (U.S. EPA) has set primary national ambient air quality standards for ozone and other air pollutants to define the levels considered safe for human health. CARB has also set a California ozone standard. The federal standard is 8 parts per hundred million (pphm), averaged over 8 hours. The state standard is 9 pphm, averaged over 1 hour. The BAAQMD is currently classified as a non-attainment area for both the federal 8-hour standard and the state 1-hour standard. However, monitoring data show that the BAAQMD now has an attainment record for the federal standard, despite the non-attainment classification. Under the requirements of the federal Clean Air Act (CAA), non-attainment areas must prepare ozone attainment demonstrations showing how they will attain the federal standard. The most recent federal attainment demonstration is the Bay Area 2001 Ozone Attainment Plan. Similarly, the California Clean Air Act of 1988 requires areas that do not comply with the standard to prepare ozone attainment plans. The most recent approved state plan is the Bay Area 2000 Clean Air Plan. The BAAQMD released the 2005 Ozone Strategy for public review and comment in September 2005, which is the most recent triennial ozone plan. However, this plan has not yet been approved.

Both federal and state plans include measures to reduce emissions of the pollutants that form ozone. These measures may be already-adopted rules, new regulations, or amendments to existing regulations. As noted, Regulation 8, Rule 44 would improve emission controls during marine tank vessel operations.

Currently, Regulation 8, Rule 44 applies to loading of marine vessels at terminals while Rule 46 applies the same standards to vessel-to-vessel loading. These rules were adopted separately in

1989 because resource limitations did not allow rulemaking for both aspects of marine loading to be completed at the same time. However, consolidation of these largely identical rules at this time will simplify Air District regulations. The draft amendments would eliminate Rule 46 and consolidate all marine loading requirements in Rule 44.

The proposed amendments to ST-34 includes corrections to temperature and pressure standardizations in some equations and incorporates a requirement that, in some situations, gas constituent average concentrations shall be determined on a flow-weighted basis.

Affected Area

The proposed rule amendments would apply to marine terminals under BAAQMD jurisdiction, which includes all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma counties (approximately 5,600 square miles). The San Francisco Bay Area is characterized by a large, shallow basin surrounded by coastal mountain ranges tapering into sheltered inland valleys. The combined climatic and topographic factors result in increased potential for the accumulation of air pollutants in the inland valleys and reduced potential for buildup of air pollutants along the coast. The Basin is bounded by the Pacific Ocean to the west and includes complex terrain consisting of coastal mountain ranges, inland valleys, and bays.

See Figure 1 depicting the area covered by the Bay Area Air Quality Management District. The marine terminals fall within this region, mostly near or adjacent to refineries located in Contra Costa and Solano County adjacent to the San Francisco Bay.

The Chevron refinery is located in Richmond, Contra Costa County, California. The refinery lies to the west of Castro Street and mostly to the north of Interstate 580, although some storage tanks and the wharf lie south of I-580. A marine terminal is located at the Chevron refinery site.

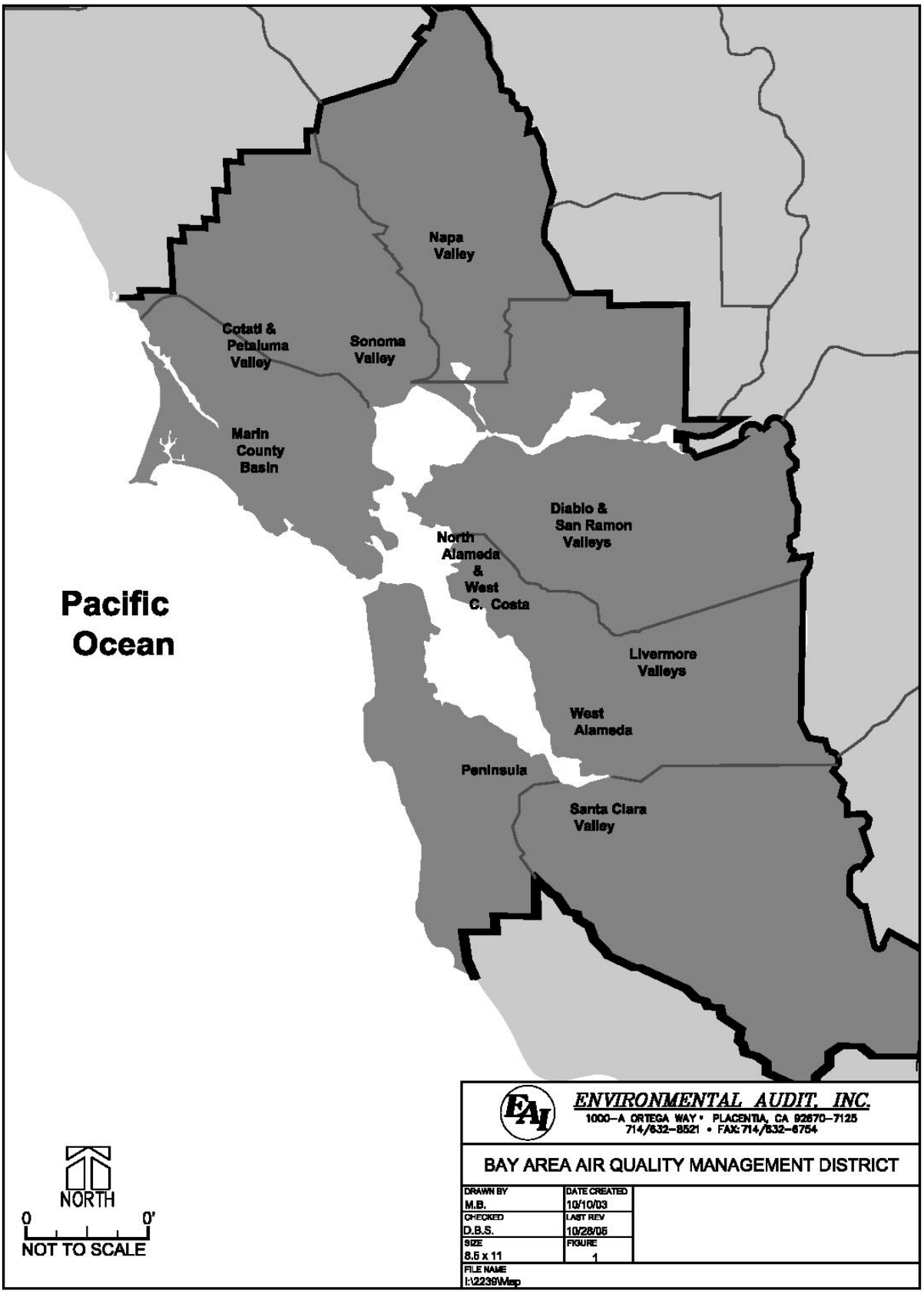
The Valero refinery is located on about 800 acres of land within the City of Benicia. The refinery is located about 0.5 mile north of I-780 and immediately west of I-680. A marine terminal is located adjacent to the Valero refinery.

The ConocoPhillips refinery is located on approximately 1,100 acres of land in the unincorporated area northeast of the community of Rodeo. The refinery property is bounded on the north by San Pablo Bay and a marine terminal, on the east by agricultural lands, on the south and southwest by a residential area and on the west by San Pablo Bay.

The Shell Oil refinery is located on about 880 acres in Contra Costa County, partially within the City of Martinez. The main portion of the refinery is bordered by Marina Vista Boulevard to the north, Interstate 680 to the east, Pacheco Boulevard to the South, Merrithew Avenue to the west, and the Shell marine terminal to the northwest.

The Tesoro refinery is located in Contra Costa County, between Martinez to the west and the community of Clyde to the east. The refinery is located south of Suisun Bay and is divided by Waterfront road and the Atchison Topeka and Santa Fe Railroad. A marine terminal is located adjacent to the refinery.

Other marine terminals may be affected by the proposed rule amendments include Darling International (located in San Francisco), Shore Terminals (with locations in Crockett and Martinez), IMTT (located in Richmond), and BP West Coast Products (located in Richmond).


Napa Valley
Cotati & Petaluma Valley
Sonoma Valley
Marin County Basin
Diablo & San Ramon Valleys
North Alameda & West C. Costa
Pacific Ocean
Livermore Valleys
West Alameda
Peninsula
Santa Clara Valley
NORTH
0 0'
NOT TO SCALE
ENVIRONMENTAL AUDIT, INC.
1000-A ORTEGA WAY • PLACENTIA, CA 92670-7125
714/632-8521 • FAX: 714/632-6754
BAY AREA AIR QUALITY MANAGEMENT DISTRICT
DRAWN BY M.B.
DATE CREATED 10/10/03
CHECKED D.B.S.
LAST REV 10/28/05
SIZE 8.5 x 11
FIGURE 1
FILE NAME I:\2239\Map

Chapter 3

Environmental Checklist

ENVIRONMENTAL CHECKLIST FORM

1. Project Title:	Bay Area Air Quality Management District (BAAQMD) Proposed Amendments to Regulation 8, Rule 44, Rule 46, and ST-34.
2. Lead Agency Name and Address:	Bay Area Air Quality Management District 939 Ellis Street San Francisco, California 94109
3.Contact Person and Phone Number:	Julian Elliot, Planning and Research Division 415/749-4705 or jelliot@baaqmd.gov
4. Project Location:	This rule amendment applies to marine tank vessel operations and marine terminals in the area within the jurisdiction of the Bay Area Air Quality Management District, which encompasses all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. Most of the marine terminals affected by the rule are located in Contra Costa and Solano Counties.
5. Project Sponsor's Name and Address:	Bay Area Air Quality Management District 939 Ellis Street San Francisco, California 94109
6. General Plan Designation:	The rule amendments apply to marine terminals and which are usually located in heavy manufacturing or industrial areas.
7. Zoning	The rule amendments apply to marine terminals that are usually located in heavy manufacturing or industrial areas.
8. Description of Project	See "Background" in Chapter 2.
9. Surrounding Land Uses and Setting	See "Affected Area" in Chapter 2.
10. Other Public Agencies Whose Approval Is Required	None

Environmental Factors Potentially Affected:

The environmental factors checked below would potentially be affected by this Project (i.e., the project would involve one impact that is a "Potentially Significant Impact"), as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology/Soils
☐ Hazards & Hazardous Materials	☐ Hydrology/Water Quality	☐ Land Use/Planning
☐ Mineral Resources	☐ Noise	☐ Population/Housing
☐ Public Services	☐ Recreation	☐ Transportation/Traffic
☐ Utilities/Service Systems	☐ Mandatory Findings of Significance	

Determination:

On the basis of this initial evaluation:

☑ I find the proposed project COULD NOT have a significant effect on the environment, and that a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be significant effects in this case because revisions to the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have an impact on the environment that is "potentially significant" or "potentially significant unless mitigated" but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION, pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

_____ _____

Signature Date

_____ _____

Printed Name For

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less-than-Significant Impact	No Impact
I.	**AESTHETICS.**				
	Would the project:				
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☑
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings along a scenic highway?	☐	☐	☐	☑
c)	Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☑
d)	Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles), so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses

The marine terminals affected by the proposed rule amendments are located in heavy industrial areas, primarily in Contra Costa and Solano Counties. Scenic highways or corridors are generally not located in the vicinities of the affected refineries and marine terminals.

Regulatory Background

Visual resources are generally protected by the City and/or County General Plans through land use and zoning requirements.

Discussion of Impacts

I a-d: The proposed amendments to Regulation 8, Rule 44 would require more stringent controls on emissions associated with the transfer of certain organic liquids between marine vessels and between existing landside terminals and marine vessels. The proposed amendments could require new structures that may be visible outside of the marine terminal. However, new control equipment would generally be compatible with the heavy industrial nature of the existing marine

terminals and would generally be within the same size as the existing structures (e.g., storage tanks) at the marine terminals. Any new control equipment would be constructed within the confines of the existing marine terminals, which are located in heavy industrial areas. Therefore, no significant adverse aesthetic impacts would be expected.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
II.	**AGRICULTURE RESOURCES.**				
In determining whether impacts on agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation. Would the project:					
a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☑
b)	Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract?	☐	☐	☐	☑
c)	Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses. Some of these agricultural lands are under Williamson Act contracts.

The marine terminals affected by the proposed rule amendments are primarily located in the industrial portions of Contra Costa and Solano Counties. Agricultural resources are generally not located in the vicinities of or within the affected refineries and marine terminals.

Regulatory Background

Agricultural resources are generally protected by the City and/or County General Plans, Community Plans through land use and zoning requirements, as well as any applicable specific plans, ordinances, local coastal plans, and redevelopment plans.

Discussion of Impacts

II a-c: The amendments to Regulation 8, Rule 44 propose more stringent controls on emissions associated with the transfer of certain organic liquids between marine vessels and between existing landside terminals and marine vessels. Any new control equipment would be constructed within the confines of the existing marine terminal boundaries, which are located within heavy industrial areas. No agricultural land would be impacted or converted to non-agricultural uses because construction activities would be limited to industrial areas. Therefore, no significant adverse impacts on agricultural resources are expected.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
III. AIR QUALITY.					
When available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:					
a)	Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☑
b)	Violate any air quality standard or contribute to an existing or projected air quality violation?	☐	☐	☐	☑
c)	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	☐	☐	☐	☑
d)	Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☑
e)	Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☑
f)	Diminish an existing air quality rule or future compliance requirement resulting in a significant	☐	☐	☐	☑

increase in air pollutant(s)?

Setting

Meteorological Conditions

The summer climate of the West Coast is dominated by a semipermanent high centered over the northeastern Pacific Ocean. Because this high pressure cell is quite persistent, storms rarely affect the California coast during the summer. Thus the conditions that persist along the coast of California during summer are a northwest air flow and negligible precipitation. A thermal low pressure area from the Sonoran-Mojave Desert also causes air to flow onshore over the San Francisco Bay Area much of the summer.

In winter, the Pacific high weakens and shifts southward, upwelling ceases, and winter storms become frequent. Almost all of the Bay Area's annual precipitation takes place in the November through April period. During the winter rainy periods, inversions are weak or nonexistent, winds are often moderate and air pollution potential is very low. During winter periods when the Pacific high becomes dominant, inversions become strong and often are surface based; winds are light and pollution potential is high. These periods are characterized by winds that flow out of the Central Valley into the Bay Area and often include tule fog.

Topography

The San Francisco Bay Area is characterized by complex terrain consisting of coastal mountain ranges, inland valleys and bays. Elevations of 1,500 feet are common in the higher terrain of this area. Normal wind flow over the area becomes distorted in the lower elevations, especially when the wind velocity is not strong. This distortion is reduced when stronger winds and unstable air masses move over the areas. The distortion is greatest when low level inversions are present with the surface air, beneath the inversion, flowing independently of the air above the inversion.

Winds

In summer, the northwest winds to the west of the Pacific coastline are drawn into the interior through the Golden Gate and over the lower portions of the San Francisco Peninsula. Immediately to the south of Mount Tamalpais, the northwesterly winds accelerate considerably and come more nearly from the west as they stream through the Golden Gate. This channeling of the flow through the Golden Gate produces a jet that sweeps eastward but widens downstream producing southwest winds at Berkeley and northwest winds at San Jose; a branch curves eastward through the Carquinez Straits and into the Central Valley. Wind speeds may be locally strong in regions where air is channeled through a narrow opening such as the Carquinez Strait, the Golden Gate, or San Bruno Gap.

In winter, the Bay Area experiences periods of storminess and moderate-to-strong winds and periods of stagnation with very light winds. Winter stagnation episodes are characterized by

outflow from the Central Valley, nighttime drainage flows in coastal valleys, week onshore flows in the afternoon and otherwise light and variable winds.

Temperature

In summer, the distribution of temperature near the surface over the Bay Area is determined in large part by the effect of the differential heating between land and water surfaces. This process produces a large-scale gradient between the coast and the Central Valley as well as small-scale local gradients along the shorelines of the ocean and bays. The winter mean temperature high and lows reverse the summer relationship in that daytime variations are small while mean minimum nighttime temperatures show large differences and strong gradients. The moderating effect of the ocean influences warmer minimums along the coast and penetrating the Bay. The coldest temperatures are in the sheltered valleys, implying strong radiation inversions and very limited vertical diffusion.

Inversions

A primary factor in air quality is the mixing depth, i.e., the vertical dimension available for dilution of contaminant sources near the ground. Over the Bay Area the frequent occurrence of temperature inversions limits this mixing depth and consequently limits the availability of air for dilution. A temperature inversion may be described as a layer or layers of warmer air over cooler air.

Precipitation

The San Francisco Bay Area climate is characterized by moderately wet winters and dry summers. Winter rains (December through March) account for about 75 percent of the average annual rainfall; about 90 percent of the annual total rainfall is received in November to April period; and between June and September, normal rainfall is typically less than 0.10 inches. Annual precipitation amounts show greater differences in short distances. Annual totals exceed 40 inches in the mountains and are less than 15 inches in the sheltered valleys.

Pollution Potential

The Bay Area is subject to a combination of physiographic and climatic factors which result in a low potential for pollutant buildups near the coast and a high potential in sheltered inland valleys. In summer, areas with high average maximum temperatures tend to be sheltered inland valleys with abundant sunshine and light winds. Areas with low average maximum temperatures are exposed to the prevailing ocean breeze and experience frequent fog or stratus. Locations with warm summer days have a higher pollution potential than the cooler locations along the coast and bays.

In winter, pollution potential is related to the nighttime minimum temperature. Low minimum temperatures are associated with strong radiation inversions in inland valleys that are protected from the moderating influences of the ocean and bays. Conversely, coastal locations experience

higher average nighttime temperatures, weaker inversions, stronger breezes and consequently less air pollution potential.

Air Quality

Criteria Pollutants

It is the responsibility of the BAAQMD to ensure that state and federal ambient air quality standards are achieved and maintained in its geographical jurisdiction. Health-based air quality standards have been established by California and the federal government for the following criteria air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter less than 10 microns (PM10), sulfur dioxide (SO_2) and lead. These standards were established to protect sensitive receptors with a margin of safety from adverse health impacts due to exposure to air pollution. The California standards are more stringent than the federal standards and in the case of PM10 and SO_2, far more stringent. California has also established standards for sulfate, visibility, hydrogen sulfide, and vinyl chloride.

The state and national ambient air quality standards for each of these pollutants and their effects on health are summarized in Table 3-1. The BAAQMD monitors levels of various criteria pollutants at 26 monitoring stations. The 2002 air quality data from the BAAQMD's monitoring stations are presented in Table 3-2.

Air quality conditions in the San Francisco Bay Area have improved since the District was created in 1955. Ambient concentrations of air pollutants and the number of days on which the region exceeds air quality standards have fallen dramatically (see Table 3-3). The District is in attainment of the state and federal ambient air quality standards for CO, nitrogen oxides (NOx), and sulfur oxides (SOx). The District also is in attainment of the federal 24-hour PM10 standard. The District is classified as a non-attainment area for the federal 8-hour ozone standard, but monitoring data show that the District now has an attainment record for the standard. However, the District does not comply with the state ozone standards or the state 24-hour PM10 standard.

The 2004 air quality data from the BAAQMD monitoring stations are presented in Table 3-2. All monitoring stations were below the State standard and federal ambient air quality standards for CO, NO_2, and SO_2. The Bay Area is designated as a non-attainment area for the California 1-hour ozone standard. The State 1-hour standard was exceeded on seven days in 2004 in the Air District, most frequently in the Eastern District (Livermore) (see Table 3-2).

All monitoring stations were in compliance with the federal PM10 standards. The California PM10 standards were exceeded on seven days in 2004, most frequently in San Jose. The Air District exceeded the federal PM2.5 standard on one day (at Concord) in 2004 (see Table 3-2).

TABLE 3-1
FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS

	STATE STANDARD	FEDERAL PRIMARY STANDARD	MOST RELEVANT EFFECTS
AIR POLLUTANT	CONCENTRATION/ AVERAGING TIME	CONCENTRATION/ AVERAGING TIME	
Ozone	0.09 ppm, 1-hr. avg. > 0.070 ppm, 8-hr	0.08 ppm, 8-hr avg>	(a) Short-term exposures: (1) Pulmonary function decrements and localized lung edema in humans and animals (2) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (b) Long-term exposures: Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (c) Vegetation damage; (d) Property damage
Carbon Monoxide	9.0 ppm, 8-hr avg. > 20 ppm, 1-hr avg. >	9 ppm, 8-hr avg.> 35 ppm, 1-hr avg.>	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; (d) Possible increased risk to fetuses
Nitrogen Dioxide	0.25 ppm, 1-hr avg. >	0.053 ppm, ann. avg.>	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; (c) Contribution to atmospheric discoloration
Sulfur Dioxide	0.04 ppm, 24-hr avg.> 0.25 ppm, 1-hr. avg. >	0.03 ppm, ann. avg.> 0.14 ppm, 24-hr avg.>	Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma
Suspended Particulate Matter (PM10)	20 µg/m^3, ann. arithmetic mean > 50 µg/m^3, 24-hr average>	50 µg/m^3, annual arithmetic mean > 65 µg/m^3, 24-hr avg.>	(a) Excess deaths from short-term exposures and exacerbation of symptoms in sensitive patients with respiratory disease; (b) Excess seasonal declines in pulmonary function, especially in children
Suspended Particulate Matter (PM2.5)	12 µg/m^3, ann. Arithmetic mean	15 µg/m^3, annual arithmetic mean> 150 µg/m^3, 24-hour average>	Decreased lung function from exposures and exacerbation of symptoms in sensitive patients with respiratory disease; elderly; children.
Sulfates	25 µg/m^3, 24-hr avg. >=		(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; (f) Property damage
Lead	1.5 µg/m^3, 30-day avg. >=	1.5 µg/m^3, calendar quarter>	(a) Increased body burden; (b) Impairment of blood formation and nerve conduction
Visibility-Reducing Particles	In sufficient amount to give an extinction coefficient >0.23 inverse kilometers (visual range to less than 10 miles) with relative humidity less than 70%, 8-hour average (10am – 6pm PST)		Nephelometry and AISI Tape Sampler; instrumental measurement on days when relative humidity is less than 70 percent

TABLE 3-2

Bay Area Air Pollution Summary 2004

MONITORING STATIONS	Ozone							CARBON MONOXIDE			NITROGEN DIOXIDE			SULFUR DIOXIDE			PM10				PM2.5				
	Max 1-Hr	Nat Days	Cal Days	3-Yr Avg	Max 8-Hr	Nat Days	3-Yr Avg	Max 1-Hr	Max 8-Hr	Nat/ Cal Days	Max 1-Hr	Ann Avg	Nat/ Cal Days	Max 24-Hr	Ann Avg	Nat/ Cal Days	Ann Avg	Max 24-Hr	Nat Day	Cal Days	Max 24-Hr	Nat Days	3-Yr Avg	Ann Avg	3-Yr Avg
NORTH COUNTIES	(pphm)							(ppm)			(pphm)			(ppb)			($\mu g/m^3$)				($\mu g/m^3$)			($\mu g/m^3$)	
Napa	9	0	0	0.0	7	0	6.6	3.7	2.0	0	6	1.1	0	--	--	--	20.7	60	0	1	--	--	--	--	--
San Rafael	9	0	0	0.0	6	0	4.9	3.2	2.0	0	6	1.5	0	--	--	--	17.9	52	0	1	--	--	--	--	--
Santa Rosa	8	0	0	0.0	6	0	5.1	2.7	1.6	0	5	1.1	0	--	--	--	18.0	48	0	0	27	0	32	8.3	9
Vallejo	10	0	1	0.0	7	0	6.5	4.0	3.4	0	5	1.2	0	5	1.3	0	19.6	51	0	1	40	0	39	11.1	11
COAST & CENTRAL BAY																									
Oakland	8	0	0	0.0	6	0	4.0	3.5	2.6	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Richmond	--	--	--	--	--	--	--	--	--	--	--	--	--	5	1.6	0	--	--	--	--	--	--	--	--	--
San Francisco	9	0	0	0.0	6	0	4.7	2.9	2.2	0	6	1.7	0	8	1.4	0	22.5	52	0	1	46	0	41	9.9	11
San Pablo	11	0	1	0.0	7	0	5.2	3.2	1.8	0	6	1.3	0	5	1.6	0	21.2	64	0	1	--	--	--	--	--
EASTERN DISTRICT																									
Bethel Island	10	0	1	0.0	8	0	7.5	1.2	0.9	0	3	0.8	0	6	1.6	0	19.5	42	0	0	--	--	--	--	--
Concord	10	0	1	0.0	8	0	7.9	2.7	2.0	0	7	1.2	0	10	1.0	0	18.6	51	0	1	74	1	40*	10.7*	11*
Crockett	--	--	--	--	--	--	--	--	--	--	--	--	--	7	1.7	0	--	--	--	--	--	--	--	--	--
Fairfield	10	0	1	0.0	8	0	7.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Livermore	11	0	5	1.0	8	0	8.3	3.5	1.8	0	6	1.4	0	--	--	--	20.0	49	0	0	41	0	37	10.3	11
Martinez	--	--	--	--	--	--	--	--	--	--	--	--	--	7	1.5	0	--	--	--	--	--	--	--	--	--
Pittsburg	9	0	0	0.0	8	0	7.3	4.1	1.9	0	5	1.1	0	7	2.0	0	21.7	64	0	1	--	--	--	--	--
SOUTH CENTRAL BAY																									
Fremont	9	0	0	0.0	7	0	6.4	3.0	1.7	0	6	1.5	0	--	--	--	18.6	49	0	0	40	0	32	9.4	10
Hayward	9	0	0	0.0	7	0	6.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood City	10	0	1	0.0	7	0	6.0	4.8	2.1	0	6	1.5	0	--	--	--	20.5	65	0	1	36	0	32	9.3	9
San Leandro	10	0	1	0.0	7	0	5.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SANTA CLARA VALLEY																									
Gilroy	9	0	0	0.0	8	0	7.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Los Gatos	9	0	0	0.0	8	0	7.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
San Jose Central*	9	0	0	*	7	0	*	4.4	3.0	0	7	1.9	0	--	--	--	23.1	58	0	4	52	0	*	11.6	*
San Jose East	9	0	0	0.0	7	0	6.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
San Jose, Tully Road	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	26.0	65	0	3	45	0	35	10.4	10
San Martin	9	0	0	0.0	8	0	8.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sunnyvale	10	0	1	0.0	8	0	6.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Bay Area Days over Standard		**0**	**7**			**0**				**0**			**0**			**0**			**0**	**7**		**1**			

(ppm) = parts per million, (pphm) = parts per hundred million, (ppb) = parts per billion

*

TABLE 3-3

Ten-Year Bay Area Air Quality Summary
Days over standards

YEAR	OZONE			CARBON MONOXIDE				NO_X	SULFUR DIOXIDE		PM10		PM2.5
	1-Hr		8-Hr	1-Hr		8-Hr		1-Hr	24-Hr		24-Hr*		24-Hr**
	Nat	Cal	Nat	Nat	Cal	Nat	Cal	Cal	Nat	Cal	Nat	Cal	Nat
1995	11	28	-	0	0	0	0	0	0	0	0	7	-
1996	8	34	-	0	0	0	0	0	0	0	0	3	-
1997	0	8	-	0	0	0	0	0	0	0	0	4	-
1998	8	29	16	0	0	0	0	0	0	0	0	5	-
1999	3	2	9	0	0	0	0	0	0	0	0	12	-
2000	3	12	4	0	0	0	0	0	0	0	0	7	1
2001	1	15	7	0	0	0	0	0	0	0	0	10	5
2002	2	16	7	0	0	0	0	0	0	0	0	6	5
2003	1	19	7	0	0	0	0	0	0	0	0	6	0
2004	0	7	0	0	0	0	0	0	0	0	0	7	1

* PM10 is sampled every sixth day – actual days over standard can be estimated to be six times the numbers listed.
** 2000 is the first full year for which the Air District measured PM2.5 levels.

Toxic Air Pollutants

The precursor chemicals that form ozone are VOCs and NOx. Some of these VOCs are toxic air contaminants (TACs) and some are known carcinogens. The BAAQMD maintains a network of monitoring stations to monitor certain TACs in ambient air. In addition, the California Air Resources Board (CARB) maintains several monitoring stations in the Bay Area as part of a statewide toxics monitoring effort. The mean ambient concentrations of monitored TACs are listed in Table 3-4 based on monitoring conducted during 2002 for the monitoring stations closest to the refineries. The Richmond station is located at 7th Street downwind from the Chevron refinery and the Richmond parkway. The Crockett station is located at the end of Kendall Avenue generally downwind of the ConocoPhillips refinery.

TABLE 3-4

CONCENTRATIONS OF TOXIC AIR CONTAMINANTS IN THE BAY AREA[(1)]

CHEMICAL	MONITORING STATION (mean ppb)				
	Crockett	Concord (Treat Blvd)	Richmond	Bethel Island	Martinez
Vinyl Chloride	0.15	0.15	0.15	0.15	0.15
Methylene Chloride (DCM)	0.74	0.25	0.30	0.27	0.30
Chloroform (CHCl3)	0.20	0.03	0.02	0.01	0.01
Ethylene Dichloride	0.05	0.05	0.05	0.05	0.05
1,1,1-Trichloroethane (TCA)	0.05	0.03	0.03	0.03	0.09
Carbon Tetrachloride (CCl4)	0.11	0.12	0.10	0.11	0.11
Trichloroethylene (TCE)	0.03	0.03	0.03	0.03	0.03
Benzene	0.20	0.43	0.35	0.24	0.33
Ethylene Dibromide	0.01	0.01	0.01	0.01	0.01
Perchloroethylene	0.01	0.03	0.02	0.01	0.01
Toluene	0.36	1.79	1.21	0.50	0.79
MTBE	0.38	0.56	0.53	0.43	0.65

(1) BAAQMD, Toxic Air Contaminant, 2004 Annual Report, June 2004.

The concentrations of TACs at these monitoring stations are similar to concentrations of TACs in the rest of the Bay Area.

Regulatory Background

Criteria Pollutants

At the federal level, the Clean Air Act (CAA) Amendments of 1990 give the U.S. EPA additional authority to require states to reduce emissions of ozone precursors and PM10 in non-attainment areas. The amendments set new attainment deadlines based on the severity of problems. At the state level, CARB has traditionally established state ambient air quality standards, maintained oversight authority in

air quality planning, developed programs for reducing emissions from motor vehicles, developed air emission inventories, collected air quality and meteorological data, and approved state implementation plans. At a local level, California's air districts, including the BAAQMD, are responsible for overseeing stationary source emissions, approving permits, maintaining emission inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality-related sections of environmental documents required by CEQA.

The BAAQMD regulates air contaminants from stationary sources. The BAAQMD is governed by a 22-member Board of Directors composed of publicly-elected officials apportioned according to the population of the represented counties. The BAAQMD has the authority to develop and enforce regulations for the control of air pollution within its jurisdiction. The BAAQMD is responsible for implementing emissions standards and other requirements of federal and state laws. It is also responsible for developing air quality planning documents required by both federal and state laws.

Toxic Air Contaminants

TACs are regulated in the District through federal, state, and local programs. At the federal level, TACs are regulated primarily under the authority of the CAA. Prior to the amendment of the CAA in 1990, source-specific National Emission Standards for Hazardous Air Pollutants (NESHAPs) were promulgated under Section 112 of the CAA for certain sources of radionuclides and Hazardous Air Pollutants (HAPs).

Title III of the 1990 CAA amendments requires U.S. EPA to promulgate NESHAPs on a specified schedule for certain categories of sources identified by U.S. EPA as emitting one or more of the 189 listed HAPs. Emission standards for major sources must require the maximum achievable control technology (MACT). MACT is defined as the maximum degree of emission reduction achievable considering cost and non-air quality health and environmental impacts and energy requirements. All NESHAPs were to be promulgated by the year 2000. Specific incremental progress in establishing standards must be made by the years 1992 (at least 40 source categories), 1994 (25 percent of the listed categories), 1997 (50 percent of remaining listed categories), and 2000 (remaining balance). The 1992 requirement was met; however, many of the subsequent standards were not promulgated as scheduled. Promulgation of those standards has been rescheduled based on court-ordered deadlines, or the aim to satisfy all Section 112 requirements in a timely manner.

Many of the sources of TACs that have been identified under the CAA are also subject to the California TAC regulatory programs. CARB developed three regulatory programs for the control of TACs. Each of the programs is discussed in the following subsections.

Control of TACs Under the TAC Identification and Control Program: California's TAC identification and control program, adopted in 1983 as Assembly Bill 1807 (AB 1807) (California Health and Safety Code §39662), is a two-step program in which substances are identified as TACs, and airborne toxic control measures (ATCMs) are adopted to control emissions from specific sources. Since adoption of the program, CARB has identified 18 TACs, and CARB adopted a regulation designating all 189 federal HAPs as TACs.

Control of TACs Under the Air Toxics "Hot Spots" Act: The Air Toxics Hot Spot Information and Assessment Act of 1987 (AB 2588) (California Health and Safety Code §39656) establishes a state-wide program to inventory and assess the risks from facilities that emit TACs and to notify the public about significant health risks associated with those emissions. Inventory reports must be updated every four years under current state law. The BAAQMD uses a maximum individual cancer risk of 10 in one million, or an ambient concentration above a non-cancer reference exposure level, as the threshold for notification.

Senate Bill (SB) 1731, enacted in 1992 (California Health and Safety Code §44390 et seq.), amended AB 2588 to include a requirement for facilities with significant risks to prepare and implement a risk reduction plan which will reduce the risk below a defined significant risk level within specified time limits. At a minimum, such facilities must, as quickly as feasible, reduce cancer risk levels that exceed 100 per one million. The BAAQMD adopted risk reduction requirements for perchloroethylene dry cleaners to fulfill the requirements of SB 1731.

Discussion of Impacts

III a. The amendments to Regulation 8, Rule 44 propose more stringent controls on emissions associated with the transfer of certain organic liquids between marine vessels and between existing landside terminals and marine vessels. The primary objective of the proposed rule amendments is to reduce emissions of ozone forming compounds (e.g., VOCs).Because the proposed amendments would reduce emissions of VOCs, they contribute to the goals set forth in both the Bay Area 2001 Ozone Attainment Plan and the Bay Area 2000 Clean Air Plan.

III b, c, d, and f. The proposed amendments to Regulation 8, Rule 44 are expected to result in an overall reduction in VOC emissions. In 2003, a total of 209,700,000 barrels of regulated material (crude oil, gasoline, fuel intermediates, organic chemicals) were shipped, including materials subject to the proposed 100^{o}F flashpoint criterion.

Expansion of the control requirements of Rule 44 to organic chemicals with a flashpoint of less than 100^{o}F is expected to result in control of as much as 8,500,000 barrels per year of additional cargo. This cargo consists of volatile organic chemicals such as benzene and toluene with a high unabated loading emission factor. The resulting emission reduction would be 34 tons per year. A significant portion of this emission reduction consists of compounds, including benzene and toluene, which are categorized as toxic air contaminants. Some cargoes included in this category may already be subject to control requirements if they are used as gasoline blending stocks. To the extent that this is the case, the emission reduction would be less.

Information from 2003 and 2004 suggests that crude oil tankers performed approximately 2 to 4 venting events per month (total) in San Francisco Bay The District has estimated that the resulting emissions could be as high as 720 tons per year if a typical venting event resulted in 15 tons of emissions. Crude oil tankers occasionally take on a different cargo after unloading crude, which may require that the cargo tanks be cleaned and vented. Even if only one 100,000 barrel tanker were cleaned per month, emissions could be as high as 180 tons/yr. If emission controls achieved a 95% emission reduction, the resulting overall emission reduction would be about 170 ton/yr. The most likely consequence is that the activities will continue to take place outside the District and well offshore. This shift to offshore locations appears to have occurred in 2004 after the District issued a compliance advisory interpreting the existing rules as prohibiting venting activity

within the District. After the District issued its advisory, the U.S. Coast Guard issued an advisory noting the District prohibition. The proposed amendments are therefore expected to ratify existing administrative actions and are not expected to result in any shift in the location of venting activities. Nevertheless, the rule amendments clarify existing restrictions and ensure that emission reductions continue to be achieved.

Additional air pollution control equipment may be required at a few marine terminals that would be required to control additional loading activities in response to the proposed requirement to control emissions from cargoes with a flashpoint of less than 100^{o}F. The methods to control these emissions could include additional vapor control devices.

Some vapor control devices, e.g., afterburners, incinerators, or flares, might also be installed resulting in combustion emissions, primarily NOx. The emission control devices require air permits to operate. Emissions from vapor control devices are generally minimized by using efficient combustion practices, therefore, secondary impacts from these control measures are not expected. Assuming that the proposed amendments would result in controls on 8,500,000 barrels of additional cargo and that all controls would utilitze combustion, expected NOx emissions would be less than 1 ton per year, well below the Air District's threshold of significance of 15 tons per year. As a result, no significant impacts are expected from NOx emissions related to the use of incineration as a control technology.

Based on the above, the total estimated VOC emission reduction associated with the proposed rule amendment would be about 204 tons per year, providing an overall air quality benefit.

III e. The proposed amendments to Regulation 8, Rule 44 propose more stringent controls on emissions associated with the transfer of certain organic liquids between marine vessels and between marine vessels and existing landside terminals. Some of the emissions associated with loading of organic materials at marine terminals can generate odor emissions. The proposed rule amendments are expected to result in an emission reduction of up to 204 tons per year, which would also reduce the potential for odors generated at these facilities. Therefore, the proposed rule amendments are expected to have a beneficial impact on odors.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☑
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or	☐	☐	☐	☑

	regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				
c)	Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☑
d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☑
e)	Conflicting with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☑
f)	Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.?	☐	☐	☐	☑

Setting

The Bay Area supports an extensive diversity of distinct vegetative communities. Broad habitat categories generally include coastal scrubs, oak woodlands, grasslands, estuaries, coastal salt marsh, riparian habitats, and eucalyptus groves, wetlands and rivers and streams. Wetlands, estuaries, rivers and streams, and urban disturbed habitats are not vegetative communities but provide wildlife habitats. The California Department of Fish and Game (CDFG) has identified several specific native vegetative communities as rare and/or sensitive. These natural communities are of special significance because the present rate of loss indicates that further habitat degradation may threaten the viability of plant and wildlife species within the community and hinder the long-term sustainability of the community or species. Natural communities within the Bay Area generally include coastal shrub and chaparral, grasslands, riparian, coastal marsh and estuaries, wetlands, woodlands, eucalyptus grove, and rivers and streams. These communities support a large diversity of wildlife.

The San Francisco Bay and Delta make up the Pacific Coast's largest estuary, encompassing roughly 1,600 miles of waterways and draining over 40 percent of California's fresh water. The Sacramento and San Joaquin Rivers flow from Northern California's inland valleys into the Delta's winding system of islands, sloughs, canals, and channels before emptying into San Francisco Bay and the Pacific Ocean (MTC, 2004). The marine environment supports a wide variety of species including fish, birds and mammals. The United States Fish and Wildlife Service recognizes several threatened and endangered species that occur in San Francisco Bay. These include the Steller sea lion (*Eumetopias jubatus*), the loggerhead sea turtle (*Caretta*

caretta), the leatherback turtle (*Dermochelys coriacea*), the olive ridley sea turtle (*lepidochelys olivacea*), and several fish species including coho salmon, steelhead, tidewater goby, delta smelt, Pacific lamprey, and Sacramento splittail. The four later species are native residents; the other species, however, are expected to use open water habitat either seasonally or infrequently (MTC, 2004).

The marine terminals affected by the proposed rule amendments are located in industrial areas, primarily in Contra Costa and Solano Counties. The marine terminal sites have been graded to develop the various structures (e.g., wharves, pipelines, etc.) and are typically, surrounded by other commercial and industrial facilities. Native vegetation, other than landscape vegetation, has been removed from operating portions of the marine terminals to minimize fire hazards.

Regulatory Background

Biological resources are generally protected by the City and/or County General Plans through land use and zoning requirements which minimize or prohibit development in biologically sensitive areas. Biological resources are also protected by the California Department of Fish and Game, and the U.S. Fish and Wildlife Service. The U.S Fish and Wildlife Service and National Marine Fisheries Service oversee the federal Endangered Species Act. Development permits may be required from one or both of these agencies if development would impact rare or endangered species. The California Department of Fish and Game administers the California Endangered Species Act which prohibits impacting endangered and threatened species. The U.S. Army Corps of Engineers and the U.S. EPA regulate the discharge of dredge or fill material into waters of the United States, including wetlands.

Discussion of Impacts

IV a – f. No impacts on biological resources are anticipated from the proposed rule amendments which would apply to existing marine terminal operations. Additional air pollution control equipment could be required at a few marine terminals that would have to control a greater volume of cargoes. The methods to control fugitive emissions could include vapor recovery devices, e.g., afterburners, incinerators, or flares. Construction activities are expected to be limited the existing wharves or adjacent terminal, which are already developed, industrial areas. Construction activities would not be expected in undeveloped areas. The proposed rule amendments neither require, nor are likely to result in, activities which would affect sensitive biological resources. Therefore, no significant adverse impacts on biological resources are expected.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
V. CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	☐	☐	☐	☑

b)	Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☐	☐	☐	☑
c)	Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☑
d)	Disturb any human remains, including those interred outside a formal cemeteries?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses vary greatly and include commercial, industrial, residential, agricultural and open space uses. Cultural resources are defined as buildings, sites, structures, or objects which might have historical architectural, archaeological, cultural, or scientific importance.

The Carquinez Strait represents the entry point for the Sacramento and San Joaquin Rivers into the San Francisco Bay. This locality lies within the San Francisco Bay and the west end of the Central Valley archaeological regions, both of which contain a rich array of prehistoric and historical cultural resources. The areas surrounding the Carquinez Strait and Suisun Bay have been occupied for millennia given its abundant combination of littoral and oak woodland resources.

Dense concentrations of the Native American archaeological sites occur along the historic margins of San Francisco and San Pablo Bays. Archaeological sites have also been identified in the following environmental settings in all Bay Area counties: along historic bayshore margins, near sources of water (such as vernal pools and springs), along ridgetops, and on midslope terraces, and at the base of hills and on alluvial flats (MTC, 2004).

The marine terminals affected by the proposed rule amendments are located in industrial areas, primarily in Contra Costa and Solano Counties. The marine terminal sites have been graded to develop the various structures (e.g., wharves, pipelines, etc.) and are typically, surrounded by other commercial and industrial facilities. Cultural resources are generally not located within the operating portions of the marine terminals.

Regulatory Background

The State CEQA Guidelines define a significant cultural resources as a “resource listed or eligible for listing on the California Register of Historical Resources” (Public Resources Code Section 5024.1). A project would have a significant impact if it would cause a substantial adverse change in the significance of a historical resource (State CEQA Guidelines Section 15064/5(b)). A substantial adverse change in the significance of a historical resource would result from an action that would demolish or adversely alter the

physical characteristics of the historical resource that convey its historical significance and that qualify the resource for inclusion in the California Register of Historical Resources or a local register or survey that meets the requirements of Public Resources Code Sections 50020.1(k) and 5024.1(g).

Discussion of Impacts

V a – d. No impacts on cultural resources are anticipated from the proposed rule amendments that would apply to existing marine terminal operations. Additional air pollution control equipment may be required at a few marine terminals that would have to control a greater volume of cargoes. The methods to control fugitive emissions could include vapor recovery devices, e.g., afterburners, incinerators, or flares. Construction activities are expected to be limited the existing wharves or adjacent terminal, which are already developed, industrial areas. Construction activities would not be expected in undeveloped areas. Therefore, no significant adverse impacts on cultural resources are expected.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
VI. GEOLOGY AND SOILS.				
Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☐	☑
• Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☑
• Strong seismic groundshaking?	☐	☐	☐	☑
• Seismic–related ground failure, including liquefaction?	☐	☐	☐	☑
• Landslides?	☐	☐	☐	☑
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☑
c) Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☑
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☑

e)	Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses. The facilities affected by the proposed rule amendments are located in industrial areas, primarily in Contra Costa and Solano Counties.

The marine terminals are located in the natural region of California known as the Coast Ranges geomorphic province. The province is characterized by a series of northwest trending ridges and valleys controlled by tectonic folding and faulting, examples of which include the Suisun Bay, East Bay Hills, Briones Hills, Vaca Mountains, Napa Valley, and Diablo Ranges.

Regional basement rocks consist of the highly deformed Great Valley Sequence, which include massive beds of sandstone interfingered with siltstone and shale. Unconsolidated alluvial deposits, artificial fill, and estuarine deposits, (including Bay Mud) underlie the low-lying region along the margins of the Carquinez Straight and Suisun Bay. The estuarine sediments found along the shorelines of Solano County are soft, water-saturated mud, peat and loose sands. The organic, soft, clay-rich sediments along the San Francisco and San Pablo Bays are referred to locally as Bay Mud and can present a variety of engineering challenges due to inherent low strength, compressibility and saturated conditions. Landslides in the region occur in weak, easily weathered bedrock on relatively steep slopes.

The San Francisco Bay Area is a seismically active region, which is situated on a plate boundary marked by the San Andreas Fault System. Several northwest trending active and potentially active faults are included with this fault system. Under the Alquist-Priolo Earthquake Fault Zoning Act, Earthquake Fault Zones were established by the California Division of Mines and Geology along “active” faults, or faults along which surface rupture occurred in Holocene time (the last 11,000 years). In the Bay area, these faults include the San Andreas, Hayward, Rodgers Creek-Healdsburg, Concord-Green Valley, Greenville-Marsh Creek, Seal Cove/San Gregorio and West Napa faults. Other smaller faults in the region classified as potentially active include the Southampton and Franklin faults.

Ground movement intensity during an earthquake can vary depending on the overall magnitude, distance to the fault, focus of earthquake energy, and type of geological material. Areas that are underlain by bedrock tend to experience less ground shaking than those underlain by unconsolidated sediments such as artificial fill. Earthquake ground shaking may have secondary effects on certain foundation materials, including liquefaction, seismically induced settlement, and lateral spreading.

Regulatory Background

Construction is regulated by the local City or County building codes that provide requirements for construction, grading, excavations, use of fill, and foundation work including type of materials, design, procedures, etc., which are intended to limit the probability of occurrence and the severity of consequences from geological hazards. Necessary permits, plan checks, and inspections are generally required.

The City or County General Plan includes the Seismic Safety Element. The Element serves primarily to identify seismic hazards and their location in order that they may be taken into account in the planning of future development. The Uniform Building Code is the principle mechanism for protection against and relief from the danger of earthquakes and related events.

In addition, the Seismic Hazard Zone Mapping Act (Public Resources Code §§2690 – 2699.6) was passed by the California legislature in 1990 following the Loma Prieta earthquake. The Act required that the California Division of Mines and Geology (DMG) develop maps that identify the areas of the state that require site specific investigation for earthquake-triggered landslides and/or potential liquefaction prior to permitting most urban developments. The act directs cities, counties and state agencies to use the maps in their land use planning and permitting processes.

Local governments are responsible for implementing the requirements of the Seismic Hazards Mapping Act. The maps and guidelines are tools for local governments to use in establishing their land use management policies and in developing ordinances and review procedures that will reduce losses from ground failure during future earthquakes.

Discussion of Impacts

VI a – d. The proposed rule amendments will not directly expose people or structures to earthquake faults, seismic shaking, seismic-related ground failure including liquefaction, landslides, mudslides or substantial soil erosion. Some structural modifications at existing affected facilities may occur as a result of installing control equipment. Existing affected facilities or modifications to existing facilities would be required to comply with relevant Uniform Building Code requirements in effect at the time of initial construction or modification of a structure.

New structures must be designed to comply with the Uniform Building Code Zone 4 requirements since the Air District is located in a seismically active area. The local cities or counties are responsible for assuring that projects comply with the Uniform Building Code as part of the issuance of the building permits and can conduct inspections to ensure compliance. The Uniform Building Code is considered to be a standard safeguard against major structural failures and loss of life. The goal of the Code is to provide structures that will: (1) resist minor earthquakes without damage; (2) resist moderate earthquakes without structural damage but with some non-structural damage; and (3) resist major earthquakes without collapse but with some structural and non-structural damage. The Uniform Building Code bases seismic design on minimum lateral seismic forces ("ground shaking"). The Uniform Building Code requirements operate on the principle that providing appropriate foundations, among other aspects, helps to protect buildings from failure during earthquakes. The basic formulas used for the Uniform Building Code seismic design require determination of the seismic zone and site coefficient, which represents the foundation conditions at the site.

Any potentially affected facilities that are located in areas where there has been historic occurrence of liquefaction, e.g., coastal zones, or existing conditions indicate a potential for liquefaction, including expansive or unconsolidated granular soils and a high water table, may have the potential for liquefaction induced impacts at the project sites. The Uniform Building Code requirements consider liquefaction potential and establish more stringent requirements for building foundations in areas potentially subject to liquefaction. Therefore, compliance with the Uniform Building Code requirements is expected to minimize the potential impacts associated with liquefaction. The issuance of building permits from the local cities or counties will assure compliance with the Uniform Building Code requirements. Therefore, no significant impacts from liquefaction are expected.

The marine terminals are located in industrial areas, which are not typically located near known geological hazards (e.g., landslide, mudflow, seiche, tsunami or volcanic hazards), no significant adverse geological impacts are expected.

Although the proposed rule amendments may require modifications at existing marine terminals, such modifications are not expected to require substantial grading or construction activities. Control equipment would most likely be built on existing wharves or within existing industrial areas. The proposed rule amendments do not have the potential to substantially increase the area subject to compaction or overcovering since the subject areas would be limited in size and, typically, have already been graded or displaced in some way. Therefore, significant adverse soil erosion impacts are not anticipated from implementing the proposed rule amendments.

VI e. Septic tanks or other similar alternative wastewater disposal systems are typically associated with small residential projects in remote areas. The proposed rule amendment would not generate construction of residential projects in remote areas. The proposed rule amendments would affect marine terminals, which already are hooked up to appropriate sewerage facilities so no impacts on septic tanks or alternative wastewater disposal systems are expected.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
VII. HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☑
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☑

c)	Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☑
d)	Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☑
e)	Be located within an airport land use plan or, where such a plan has not been adopted, be within two miles of a public airport or public use airport, and result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☑
f)	Be located within the vicinity of a private airstrip and result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☑
g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☑
h)	Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☑

Setting

Petroleum refineries and marine terminals handle and process large quantities of flammable, hazardous, and acutely hazardous materials. Accidents involving these substances can result in worker or public exposure to fire, heat, blast from an explosion, or airborne exposure to hazardous substances.

The potential hazards associated with industrial activities are a function of the materials being processed, processing systems, and procedures used to operate and maintain the facility. The hazards that are likely to exist are identified by the physical and chemical properties of the materials being handled and their process conditions, including the following events.

- **Toxic gas clouds:** Toxic gas clouds are releases of volatile chemicals (e.g., anhydrous ammonia, chlorine, and hydrogen sulfide) that could form a cloud and migrate off-site, thus exposing individuals. "Worst-case" conditions tend to arise when very low wind speeds coincide with an accidental release,

which can allow the chemicals to accumulate rather than disperse. These materials are typically shipped via rail or truck and not by marine vessel.

- **Torch fires (gas and liquefied gas releases), flash fires (liquefied gas releases), pool fires, and vapor cloud explosions (gas and liquefied gas releases):** The rupture of a storage tank containing a flammable gaseous material (like propane), without immediate ignition, can result in a vapor cloud explosion. The "worst-case" upset would be a release that produces a large aerosol cloud with flammable properties. If the flammable cloud does not ignite after dispersion, the cloud would simply dissipate. If the flammable cloud were to ignite during the release, a flash fire or vapor cloud explosion could occur. If the flammable cloud were to ignite immediately upon release, a torch fire would ensue.

- **Thermal Radiation:** Thermal radiation is the heat generated by a fire and the potential impacts associated with exposure. Exposure to thermal radiation would result in burns, the severity of which would depend on the intensity of the fire, the duration of exposure, and the distance of an individual to the fire.

- **Explosion/Overpressure:** Process vessels containing flammable explosive vapors and potential ignition sources are present at refineries. Explosions may occur if the flammable/explosive vapors came into contact with an ignition source. An explosion could cause impacts to individuals and structures in the area due to overpressure.

For all refineries and their affiliated marine terminals, risks to the public are reduced if there is a buffer zone between processes and residences, or the prevailing wind blows away from residential areas. The risks posed by handling organic materials operations are unique and determined by a variety of factors. Refineries and marine terminals tend to be located in industrial areas which helps minimize public exposure in the event of a release.

Regulatory Background

Marine Terminals

There are many federal and state rules and regulations that refiners must comply with which serve to minimize the potential impacts associated with hazards at these facilities.

Under the Occupational Safety and Health Administration (OSHA) regulations [29 Code of Federal Regulations (CFR) Part 1910], facilities which use, store, manufacture, handle, process, or move highly hazardous materials must prepare a fire prevention plan. In addition, 29 CFR Part 1910.119, Process Safety Management (PSM) of Highly Hazardous Chemicals, and Title 8 of the California Code of Regulations, General Industry Safety Order §5189, specify required prevention program elements to protect workers at facilities that handle toxic, flammable, reactive, or explosive materials. Prevention program elements are aimed at preventing or minimizing the consequences of catastrophic releases of the chemicals and include process hazard analyses, formal training programs for employees and contractors, investigation of equipment mechanical integrity, and an emergency response plan.

Section 112 (r) of the Clean Air Act Amendments of 1990 [42 U.S.C. 7401 et. Seq.] and Article 2, Chapter 6.95 of the California Health and Safety Code require facilities that handle listed regulated substances to

develop Risk Management Programs (RMPs) to prevent accidental releases of these substances, U.S. EPA regulations are set forth in 40 CFR Part 68. In California, the California Accidental Release Prevention (CalARP) Program regulation (CCR Title 19, Division 2, Chapter 4.5) was issued by the Governor's Office of Emergency Services (OES). RMPs consist of three main elements: a hazard assessment that includes off-site consequences analyses and a five-year accident history, a prevention program, and an emergency response program. Refineries are also required to comply with the U.S. EPA's Emergency Planning and Community Right-to-Know Act (EPCRA).

The facilities that store large volumes of hazardous materials are required to have a Spill Prevention Control and Countermeasures (SPCC) Plan per the requirements of 40 Code of Federal Regulations, Section 112. The SPCC is designed to prevent spills from on-site facilities and includes requirements for secondary containment, provides emergency response procedures, establishes training requirements, and so forth.

The Hazardous Materials Transportation (HMT) Act is the federal legislation that regulates transportation of hazardous materials. The primary regulatory authorities are the U.S. Department of Transportation, the Federal Highway Administration, and the Federal Railroad Administration. The HMT Act requires that carriers report accidental releases of hazardous materials to the Department of Transportation at the earliest practical moment (49 CFR Subchapter C). The California Department of Transportation (Caltrans) sets standards for trucks in California. The regulations are enforced by the California Highway Patrol.

California Assembly Bill 2185 requires local agencies to regulate the storage and handling of hazardous materials and requires development of a plan to mitigate the release of hazardous materials. Businesses that handle any of the specified hazardous materials must submit to government agencies (i.e., fire departments), an inventory of the hazardous materials, an emergency response plan, and an employee training program. The business plans must provide a description of the types of hazardous materials/waste on-site and the location of these materials. The information in the business plan can then be used in the event of an emergency to determine the appropriate response action, the need for public notification, and the need for evacuation.

Contra Costa County has adopted an industrial safety ordinance that addresses the human factors that lead to accidents. The ordinance requires stationary sources to develop a written human factors program that includes the following:

- Consideration of human factors in the process hazards analysis process;
- Consideration of human systems as causal factors in the incident investigation process for major accidents or releases or for incidents that could have led to a major accident or release;
- Training of employees in the human factors program;
- Operating procedures;
- Management of changes in staffing, staffing levels, or organization in operations or emergency response;

- Participation of employees and their representatives in the development of the written human factors program;

- Development of a program that includes issues such as staffing, shiftwork, and overtime; and

- Incorporation of the human factors program description in the facility safety plan.

Marine terminal facilities operating vapor control systems for loading marine tank vessels are subject to U.S. Coast Guard regulations that govern the design, construction, and operation of these systems. These regulations are found primarily in 33 CFR Part 154. In general, the regulations are intended to ensure the safe operation of facilities that load marine tank vessels.

Marine Tank Vessels

Marine tank vessel operations are subject to wide array of U.S. laws and regulations as well as international laws, regulations, and treaties. This body of law and regulation comprehensively governs vessel design, construction, equipment, and operation with the object of ensuring vessel safety, protecting life at sea, and reducing environmental impacts. In the United States, these various requirements are primarily imposed through U.S. Coast Guard regulations, some of which incorporate international standards developed through treaty and some of which impose requirements under U.S. law.

Most of the international agreements related to tankers have been developed through the International Maritime Organization (IMO), established by a 1948 Geneva conference under the auspices of the United Nations. The most important IMO efforts affecting tanker operations have been updates to the International Convention for the Safety of Life at Sea (SOLAS) and the development of the International Convention for the Prevention of Pollution from Ships (MARPOL). IMO develops regulations to implement SOLAS and MARPOL, and these regulations are then implemented through adoption by member states. In the United States, the regulations are typically implemented through U.S. Coast Guard regulations.

U.S. Coast Guard regulations also implement U.S. laws enacted by Congress. One significant piece of legislation is the Oil Pollution Act of 1990 (OPA 90), which establishes a schedule to phase out single-hull tankers. This schedule differs in some respects from a schedule set by a MARPOL regulation that has not been adopted by the United States.

Specific Coast Guard regulations that affect marine tank vessel operations are found in 33 CFR Part 151 (design and operational requirements for tankers, including requirements for oil record books), 33 CFR Part 156 (lightering requirements), 33 CFR Part 157 (protection of marine environment, including requirements for segregated ballast tanks), 46 CFR Part 151 (design requirements for barges), and 46 CFR Part 153 (design requirements for tankers, including requirements for inert gas systems).

Discussion of Impacts

VII a. The proposed rule amendments do not affect in any way the transport, storage or use of hazardous material into, out of, or within any of the marine terminals. The proposed rule amendments would control emissions from certain loading events but are not expected to change how the material is transported, stored or used.

The proposed amendments would prohibit venting of a marine tank vessel with a current or prior cargo of a regulated organic liquid. Because one means of complying with such requirements is by sailing outside the District or District waters (which extend to California's 3-mile seaward limit), a venting prohibition could have the effect of increasing vessel trips through the Golden Gate and, depending upon how far seaward the prohibition applies, could affect the length of those trips. Because any tanker movement carries with it attendant risks of collision and potential water pollution, there might be some impact on hazards, depending on the nature of the venting prohibition.

In the case of the proposed amendments, no increased risks are expected because the amendments are not expected to affect tanker movements. Before 2004, evidence suggests that some venting associated with tank cleaning occurred within San Francisco Bay. In a March 8, 2005 advisory, however, the District notified marine terminal operators, marine agents, ship operators, and refiners that it interpreted the existing District regulations to prohibit these venting operations within the District. The U.S. Coast Guard then issued a Local Notice to Mariners dated April 5, 2005, which notified mariners of the venting prohibition. In response to these notifications, these activities do not occur within the District. As a result, the current environmental baseline is that no venting currently occurs within the District. Anecdotal information suggests that venting associated with tank cleaning occurs sporadically at a distance between 3 miles and 25 miles off the California coast west of the District. Because the proposed amendments only apply out to 3 miles west of the District, no change in vessel activity is expected. Therefore, no significant adverse impacts on transportation, storage or use of hazardous materials are expected.

VII b – c. The proposed rule amendments are expected to reduce emissions from existing marine terminal facilities thus reducing the emissions and releases of potentially toxic air contaminants, as well as potential hazards. In addition, the proposed prohibition on venting is not expected to alter marine tank vessel activity. Therefore, no significant adverse impacts on releases of hazardous materials into the environment are expected.

VII d. No impacts on hazardous material sites are anticipated from the proposed rule amendments that would apply to existing refinery and marine terminal operations. Some of the marine terminals may be located on the hazardous materials sites list pursuant to Government Code Section 65962.5. However, the proposed rule amendments would have no affect on hazardous materials nor would the amendments create a significant hazard to the public or environment. The marine terminals already exist. The proposed rule amendments neither require, nor are likely to result in, activities that would affect hazardous materials or existing site contamination. Therefore, no significant adverse impacts on hazards are expected.

VII e – f. No impacts on airports or airport land use plans are anticipated from the proposed rule amendments that would apply to existing marine terminal operations. The proposed rule amendments neither require nor are likely to result in activities which would affect the environment outside of the marine terminal boundaries. No major construction activities are expected from the proposed rule amendments and the construction activities are expected to be limited to the confines of the existing marine terminal. Further, the marine terminals are not located within two miles of airports. Therefore, no significant adverse impacts on hazards at airports are expected.

VII g. No impacts on emergency response plans are anticipated from the proposed rule amendments that would apply to existing marine terminal operations. Each marine terminal has prepared an emergency

response plan. The proposed rule amendments neither require, nor are likely to result in, activities that would impact the emergency response plan. No major construction activities are expected from the proposed rule amendments. Therefore, no significant adverse impacts on emergency response plans are expected.

VII h. No increase in hazards related to wildfires are anticipated from the proposed rule amendments that would apply to existing marine terminal operations. No major construction activities are expected from the proposed rule amendments and no activities would occur outside the confines of the existing marine terminals. Marine terminals are generally located at or near the water. Vegetation surrounding the operating portions of the terminals has been removed to reduce the potential fire hazards. Therefore, no significant adverse impacts on fire hazards are expected.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
VIII. HYDROLOGY AND WATER QUALITY.					
Would the project:					
a)	Violate any water quality standards or waste discharge requirements?	☐	☐	☐	☑
b)	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g. the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☑
c)	Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite?	☐	☐	☐	☑
d)	Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite?	☐	☐	☐	☑
e)	Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☑
f)	Otherwise substantially degrade water quality?	☐	☐	☐	☑

g)	Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☑
h)	Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	☐	☐	☐	☑

i)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☑
j)	Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses and affected environment vary substantially throughout the area and include commercial, industrial, residential, agricultural, and open space uses.

The marine terminals affected by the proposed rule amendments are located in industrial areas, primarily in Contra Costa and Solano Counties and are generally surrounded by other commercial and industrial facilities. The marine terminals are along the shores of the San Francisco Bay, San Pablo Bay, Carquinez Strait, and Suisun Bay.

Reservoirs and drainage streams are located throughout the area and discharge into the Bays. Marshlands incised with numerous winding tidal channels containing brackish water are located near the refineries.

The marine terminals are located within the San Francisco Bay Area Hydrologic Basin. The primary regional groundwater water-bearing formations include the recent and Pleistocene (up to two million years old) alluvial deposits and the Pleistocene Huichica formation. Salinity within the unconfined alluvium appears to increase with depth to at least 300 feet. Water of the Huichica formation tends to be soft and relatively high in bicarbonate, although usable for domestic and irrigation needs.

Regulatory Background

The Federal Clean Water Act of 1972 primarily establishes regulations for pollutant discharges into surface waters in order to protect and maintain the quality and integrity of the nation's waters. This Act requires industries that discharge wastewater to municipal sewer systems to meet pretreatment standards. The regulations authorize the U.S. EPA to set the pretreatment standards. The regulations also allow the local treatment plants to set more stringent wastewater discharge requirements, if necessary, to meet local conditions.

The 1987 amendments to the Clean Water Act enabled the U.S. EPA to regulate, under the National Pollutant Discharge Elimination System (NPDES) program, discharges from industries and large municipal sewer systems. The U.S. EPA set initial permit application requirements in 1990. The State of California, through the State Water Resources Control Board, has authority to issue NPDES permits, which meet U.S. EPA requirements, to specified industries.

The Porter-Cologne Water Quality Act is California's primary water quality control law. It implements the state's responsibilities under the Federal Clean Water Act but also establishes state wastewater discharge requirements. The RWQCB administers the state requirements as specified under the Porter-Cologne Water Quality Act, which include storm water discharge permits. The water quality in the Bay Area is under the jurisdiction of the San Francisco Bay Regional Water Quality Control Board.

In response to the Federal Act, the State Water Resources Control Board prepared two state-wide plans in 1991 and 1995 that address storm water runoff: the California Inland Surface Waters Plan and the California Enclosed Bays and Estuaries Plan. Enclosed bays are indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. San Francisco Bay, and its constituents parts, including Carquinez Strait and Suisun Bay, fall under this category.

The San Francisco Bay Basin Plan identifies the: (1) beneficial water uses that need to be protected; (2) the water quality objectives needed to protect the designated beneficial water uses; and (3) strategies and time schedules for achieving the water quality objectives. The beneficial uses of the Carquinez Strait that must be protected which include water contact and non-contact recreation, navigation, ocean commercial and sport fishing, wildlife habitat, estuarine habitat, fish spawning and migration, industrial process and service supply, and preservation of rare and endangered species. The Carquinez Strait and Suisun Bay are included on the 1998 California list as impaired water bodies due to the presence of chlordane, copper, DDT, diazinon, dieldrin, dioxin and furan compounds, mercury, nickel, PCBs, and selenium.

Discussion of Impacts

VIII a – j. No significant adverse impacts on hydrology/water quality resources are anticipated from the proposed rule amendments that would apply to existing marine terminal operations. The marine terminals affected by the proposed rule amendments are required to treat and monitor wastewater discharges from their facilities. The methods to control emissions could include vapor recovery devices, e.g., afterburners, incinerators, or flares. The emission control devices do not require water to operate or generate wastewater. The proposed amendments will not create additional water runoff, place any additional structures within 100-year flood zones or other areas subject to flooding, or contribute to inundation by seiche, tsunami or mudflow. No major construction activities are expected from the proposed rule amendments and no new structures, other than air pollution control devices at a few terminals, are required. Therefore, no significant adverse impacts on hydrology/water quality are expected.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
IX. LAND USE AND PLANNING. Would the project:				
a) Physically divide an established community?	☐	☐	☐	☑
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the	☐	☐	☐	☑

	project (including, but not limited to a general plan, specific plan, local coastal program or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				
c)	Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses.

The marine terminals affected by the proposed rule amendments are located in industrial areas, primarily in Contra Costa and Solano Counties and generally adjacent to industrial and commercial land uses.

Regulatory Background

Land uses are generally protected and regulated by the City and/or County General Plans through land use and zoning requirements.

Discussion of Impacts

IX a-c. The proposed rule amendments are not expected to result in land use impact. The marine terminals affected by the proposed rule amendments are located in industrial areas. The methods to control emissions could include vapor recovery devices, e.g., afterburners, incinerators, or flares. The emission control devices would add equipment to existing marine terminals. The emission control devices are compatible with the industrial nature of the land use at marine terminals and are not expected to require land use permits. No construction activities outside of the existing marine terminals are expected. Therefore, no significant adverse land use impacts are expected.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
X. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☑

b)	Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses and the affected environment vary greatly throughout the area. The marine terminals affected by the proposed rule amendments are located in industrial areas, primarily in Contra Costa and Solano Counties.

Regulatory Background

Mineral resources are generally protected and regulated by the City and/or County General Plans through land use and zoning requirements.

Discussion of Impacts

X a-b. The marine terminals already exist and are located in industrial areas. The proposed rule amendments may require construction of new air pollution control devices within the confines of existing marine terminals. No construction activities are expected outside of the existing marine terminals. The proposed rule amendments are not associated with any action that would result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state, or of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. Therefore, no significant adverse impacts on mineral resources are expected.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XI.	**NOISE.** Would the project:				
a)	Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☑
b)	Expose persons to or generate of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☑

c)	Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☑
d)	Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☑
e)	Be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑
f)	Be located within the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses and the affected environment vary greatly throughout the area. The marine terminals affected by the proposed rule amendments are located in industrial areas, primarily in Contra Costa and Solano Counties and are typically surrounded by other commercial and industrial facilities.

Regulatory Background

Noise issues related to construction and operation activities are addressed in local General Plan policies and local noise ordinance standards. The General Plan and noise ordinances generally establish allowable noise limits within different land uses including residential areas, other sensitive use areas (e.g., schools, churches, hospitals, and libraries), commercial areas, and industrial areas.

Discussion of Impacts

XI a-f. The marine terminals already exist and are located within industrial areas. The proposed rule amendments may require existing commercial or industrial owners/operators of affected facilities to install air pollution control equipment. Potential modifications will occur at facilities typically located in appropriately zoned industrial or commercial areas. Ambient noise levels in commercial and industrial areas are typically driven primarily by freeway and/or highway traffic in the area and any heavy-duty equipment used for materials manufacturing or processing at nearby facilities. It is not expected that any modifications to install air pollution control equipment would substantially increase ambient operational noise levels in the

area, either permanently or intermittently, or expose people to excessive noise levels that would be noticeable above and beyond existing ambient levels. It is not expected that affected facilities would exceed noise standards established in local general plans, noise elements, or noise ordinances currently in effect.

It is also not anticipated that air pollution control devices measures will cause an increase in groundborne vibration levels because air pollution control equipment is not typically vibration intensive equipment. Consequently, the proposed rule amendments will not directly or indirectly cause substantial noise or excessive groundborne vibration impacts.

The marine terminals would still be expected to comply, and not interfere, with any applicable airport land use plans and disclose any excessive noise levels to affected residences and workers pursuant to existing rules, regulations and requirements, such as CEQA. It is assumed that operations in these areas are subject to, and in compliance with, existing community noise ordinances and applicable OSHA or Cal/OSHA workplace noise reduction requirements. In addition to noise generated by current operations, noise sources in each area may include nearby freeways, truck traffic to adjacent businesses, and operational noise from adjacent businesses.

The proposed rule amendments would not substantially increase ambient noise levels from stationary sources, either intermittently or permanently. Therefore, noise impacts associated with stationary source control measures are expected to be less than significant.

	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
XII. POPULATION AND HOUSING. Would the project:				
a) Induce substantial population growth in an area either directly (e.g., by proposing new homes and businesses) or indirectly (e.g. through extension of roads or other infrastructure)?	☐	☐	☐	☑
b) Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☑
c) Displace a substantial number of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses and the affected environment vary greatly throughout the area. The marine terminals affected by the proposed rule amendments are located in industrial areas, primarily in Contra Costa and Solano Counties.

Regulatory Background

Population and housing growth and resources are generally protected and regulated by the City and/or County General Plans through land use and zoning requirements.

Discussion of Impacts

XII a. The marine terminals already exist and are located within industrial areas. The proposed rule amendments may require installation of new air pollution control equipment at a few marine terminals. It is expected that the existing labor pool within the Bay Area would accommodate the labor requirements for any construction activities. In addition, it is not expected that affected facilities will be required to hire additional personnel to operate and maintain new control equipment on site because air pollution control equipment is typically not labor intensive equipment. The proposed rule amendments are not expected to result in changes in population densities or induce significant growth in population.

XII b-c. The marine terminals already exist and are located within industrial areas. No housing would be impacted or removed by the proposed rule amendments and no displacement housing would be required. Therefore, no significant adverse impacts on population/housing are expected.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact

XIII. PUBLIC SERVICES. Would the project:

a. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:

Fire protection?	☐	☐	☐	☑
Police protection?	☐	☐	☐	☑
Schools?	☐	☐	☐	☑
Parks?	☐	☐	☐	☑
Other public facilities?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses and the affected environment vary greatly throughout the area. The marine terminals affected by the proposed rule amendments are located in he industrial areas, primarily in Contra Costa and Solano Counties.

Given the large area covered by the BAAQMD, public services are provided by a wide variety of local agencies. Fire protection and police protection/law enforcement services within the BAAQMD are provided by various districts, organizations, and agencies. There are several school districts, private schools, and park departments within the BAAQMD. Public facilities within the BAAQMD are managed by different county, city, and special-use districts.

Regulatory Background

City and/or County General Plans usually contain goals and policies to assure adequate public services are maintained within the local jurisdiction.

Discussion of Impacts

XIII a. The marine terminals already exist and are located within industrial areas. There is no potential for significant adverse public service impacts as a result of adopting the proposed rule amendments. The proposed project would not result in the need for new or physically altered government facilities in order to maintain acceptable service ratios, response times or other performance objectives. No additional need for fire or police services would be expected.

Adopting the proposed rule amendments are not expected to require additional workers at the marine terminal, induce population growth or alter the distribution of existing population and would not increase or otherwise alter the demand for schools and parks in the Air District. No significant adverse impacts to schools or parks are foreseen as a result of adopting the proposed rule amendments. Therefore, no significant adverse impacts on public services are expected.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIV. RECREATION. Would the project:					
a)	Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☑
b)	Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that there are numerous areas for recreational activities. The marine terminals affected by the proposed rule amendments are located in industrial areas, primarily in Contra Costa and Solano Counties. Public recreational land uses are generally not located within the confines of industrial areas or near the marine terminals.

Regulatory Background

Recreational areas are generally protected and regulated by the City and/or County General Plans at the local level through land use and zoning requirements. Some parks and recreation areas are designated and protected by state and federal regulations.

Discussion of Impacts

XIV a-b. The marine terminals already exist and are located within industrial areas. There are no provisions in the proposed rule amendments that would affect land use plans, policies, ordinances, or regulations. Land use and other planning considerations are determined by local governments. No land use or planning requirements, including those related to recreational facilities, will be altered by the proposed rule amendments. The proposed rule amendments do not have the potential to directly or indirectly induce population growth or redistribution. As a result, the proposed control measures would not increase the use of, or demand for existing neighborhood and/or regional parks, or other recreational facilities, or require the construction or expansion of recreational facilities that might have an adverse physical effect on the

environment. Based upon the above considerations, significant adverse impacts to recreation are not expected due to implementation of the proposed rule amendments.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XV.	**TRANSPORTATION/TRAFFIC.** Would the project:				
a)	Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections)?	☐	☐	☐	☑
b)	Cause, either individually or cumulatively, exceedance of a level-of-service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☑
c)	Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☑
d)	Substantially increase hazards because of a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?	☐	☐	☐	☑
e)	Result in inadequate emergency access?	☐	☐	☐	☑
f)	Result in inadequate parking capacity?	☐	☐	☐	☑
g)	Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g. bus turnouts, bicycle racks)?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles). Transportation systems located within the Bay Area include railroads, airports, waterways, and highways. The transportation infrastructure for vehicles and trucks in the Bay Area ranges from single lane roadways to multilane interstate highways. The marine terminals affected by the

proposed rule amendments are located in industrial areas, primarily in Contra Costa and Solano Counties and are accessed via highways and local roadway systems.

The region is served by numerous interstate and U.S. freeways. On the west side of San Francisco Bay, Interstate 280 and U.S. 101 run north-south. U.S. 101 continues north of San Francisco into Marin County. Interstates 880 and 660 run north-south on the east side of the Bay. Interstate 80 starts in San Francisco, crosses the Bay Bridge, and runs northeast toward Sacramento. State Routes 29 and 84, both highways that allow at-grade crossings in certain parts of the region, become freeways that run east-west and cross the Bay. Interstate 580 starts in San Rafael, crosses the Richmond-San Rafael Bridge, joins with Interstate 80, runs through Oakland, and then runs eastward toward Livermore.

Regulatory Background

Transportation planning is usually conducted at the county level and most of the marine terminals in the Bay Area are located in Contra Costa and Solano Counties. The County of Contra Costa and the Contra Costa Transportation Authority share the duties of transportation planning and administration of improvement projects in the County of Contra Costa. The Contra Costa County Community Development Department conducts and oversees the transportation and planning for new development projects. The Contra Costa Transportation Agency implements the transportation programs and projects created by the County's Measure C, the Transportation Improvement and Growth Management Program, and also serves as the County's Congestion Management Agency.

The Solano Transportation Authority is the designated Congestion Management Agency for Solano County and develops the Congestion Management Plan (CMP) for Solano County. The CMP identifies a system of state highways and regionally significant principal arterials and specifies level of service standards for those roadways.

Discussion of Impacts

XV a-b. The marine terminals already exist and are located within industrial areas. The proposed rule amendments could require construction activities at several marine terminals for the installation of new air pollution control equipment. Construction materials will need to be transported to the affected terminals and construction workers (an estimated 10 to 20 workers) will temporarily be required during the construction period. The increased traffic associated with these construction activities is minimal and will cease following the construction period. Therefore, no significant adverse impact on traffic or congestion is expected due to implementation of the proposed rule amendments.

XV c. Neither air traffic nor air traffic patterns are expected to be directly or indirectly affected by adopting the proposed rule amendments. Controlling emissions at marine terminals, do not require constructing any structures that could impede air traffic patterns in any way.

XV d - e. It is not expected that adopting the proposed rule amendments will directly or indirectly increase roadway design hazards or incompatible risks. The proposed rule amendments are not expected to increase traffic hazards or create incompatible uses at or adjacent to the sites. Emergency access is provided at the marine terminal sites, will continue to be maintained at the sites, and will not be impacted by the proposed rule amendments.

XV f. The proposed rule amendments could require construction activities at several marine terminals for the installation of new air pollution control equipment. An estimated 10 to 20 construction workers will temporarily be required during the construction period. Sufficient parking is expected to be available at the marine terminals that require air pollution control equipment. The small increased in vehicle traffic associated with these construction activities is minimal and will cease following the construction period. No increase in permanent workers is expected. Therefore, the proposed rule amendments will not result in significant adverse impacts on parking.

XV g. The proposed rule amendments involve implementation of air quality control measures established in the ozone control plan. The proposed rule amendments are not expected to conflict with adopted policies, plans, or programs supporting alternative transportation modes (e.g., bus turnouts, bicycle racks).

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less-than-Significant Impact	No Impact
XVI. UTILITIES/SERVICE SYSTEMS. Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☑
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☑
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☑
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or would new or expanded entitlements needed?	☐	☐	☐	☑
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☑
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☑

g)	Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses and the affected environment vary greatly throughout the area. The marine terminals affected by the proposed rule amendments are located in industrial areas, primarily in Contra Costa and Solano Counties.

Given the large area covered by the BAAQMD, public utilities are provided by a wide variety of local agencies. The marine terminals have wastewater and storm water treatment facilities and discharge treated wastewater under the requirements of NPDES permits.

Water is supplied to the affected facilities by several water purveyors in the Bay Area. Solid waste is handled through a variety of municipalities, through recycling activities and at disposal sites.

There are no hazardous waste disposal sites within the jurisdiction of the BAAQMD. Hazardous waste generated at area facilities, which is not reused on-site, or recycled off-site, is disposed of at a licensed in-state hazardous waste disposal facility. Two such facilities are the Chemical Waste Management Inc. (CWMI) Kettleman Hills facility in King's County, and the Safety-Kleen facility in Buttonwillow (Kern County). Hazardous waste can also be transported to permitted facilities outside of California. The nearest out-of-state landfills are U.S. Ecology, Inc., located in Beatty, Nevada; USPCI, Inc., in Murray, Utah; and Envirosafe Services of Idaho, Inc., in Mountain Home, Idaho. Incineration is provided at the following out-of-state facilities: Aptus, located in Aragonite, Utah and Coffeyville, Kansas; Rollins Environmental Services, Inc., located in Deer Park, Texas and Baton Rouge, Louisiana; Chemical Waste Management, Inc., in Port Arthur, Texas; and Waste Research & Reclamation Co., Eau Claire, Wisconsin.

Regulatory Background

City and/or County General Plans usually contain goals and policies to assure adequate utilities and service systems are maintain within the local jurisdiction.

Discussion of Impacts

XVI a, b, d, and e. The proposed rule amendments will not generate or affect water use or wastewater discharge. Installation of air pollution control equipment that would be used to control emissions from loading organic materials onto marine vessels would generally involve incineration or carbon adsorption. Neither of these control technologies require the use of water or result in wastewater discharged. Therefore, no significant adverse impacts on water use or wastewater discharge are expected.

XVI c. Stormwater discharges associated from marine terminals are regulated according to CCR§402(p) under the NPDES. Under the NPDES permit, owners of the terminals must develop a Storm Water Pollution Prevention Plan (SWPPP), conduct monitoring and inspections, retain monitoring records, report incidences of noncompliance, and submit annual compliance by July 1 of each year. All marine terminals are required to have an SWPPP. Implementation of the proposed rule amendments is not expected to require construction outside of the existing marine terminal or result in additional storm water discharges. Therefore, the impacts of the proposed project of storm water are expected to be less than significant.

XVI f and g. The proposed control measures may generate additional solid or hazardous waste in the form of carbon used to control organic emissions, should facilities choose to comply using activated carbon filters. If carbon adsorption systems are used, the amount of hazardous waste generated on an annual basis is expected to be minimal. Most activated carbon used in carbon adsorption control devices is reclaimed and reactivated, resulting in negligible impacts on solid waste disposal facilities. Activated carbon can have a lifetime of five to 10 years; however, the operating characteristics of the control device may result in a shorter lifetime.

Spent carbon is usually recycled and reused rather than disposed in landfills. Most facilities contract out with vendors that take the spent carbon and deliver regenerated carbon. Another alternative to the land disposal of regenerated carbon is to burn the spent carbon in a thermal incinerator. With thermal incineration, the organic materials contained in the carbon are oxidized to carbon dioxide, water, and in most cases, harmless combustion by-products. Incineration destroys the toxic constituents and significantly reduces the volume of carbon to be disposed of, thus reducing solid waste impacts. The disadvantage of incineration is that without additional add-on control devices, there may be an increase in criteria pollutant emissions. Based upon the above considerations, significant adverse solid waste impacts resulting from the use of carbon adsorption are not expected due to implementation of the control measures within the proposed rule amendments.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVII. MANDATORY FINDINGS OF SIGNIFICANCE.				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☐	☑
b) Does the project have impacts that are individually limited, but cumulatively considerable?	☐	☐	☐	☑

	("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)				
c)	Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☑

Discussion of Impacts

XVII a. The proposed rule amendments do not have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory, as discussed in the previous sections of the CEQA checklist. The proposed rule amendments are expected to result in emission reductions from marine terminals, thus providing a beneficial air quality impact and improvement in air quality. No significant adverse impacts are expected.

XVII b. The proposed amendments to Regulation 8, Rule 44 include more stringent controls on emissions associated with the transfer of certain organic liquids between marine vessels and between marine vessels and existing landside terminals, thus providing a beneficial air quality impact and improvement in air quality. The proposed rule amendments are part of a long-term plan to bring the Bay Area into compliance with the federal and state ambient air quality standards for ozone. The proposed rule amendments do not have adverse environmental impacts that are limited individually, but cumulatively considerable when considered in conjunction with other regulatory control projects. The proposed rule amendments do not have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly. No significant adverse impacts are expected.

XVII c. The proposed rule amendments are expected to result in emission reductions from marine terminals and vessel to vessel loading, thus providing a beneficial air quality impact and improvement in air quality. The proposed rule amendments are part of a long-term plan to bring the Bay Area into compliance with the federal and state ambient air quality standards for ozone, thus reducing the potential health impacts due to ozone exposure. The proposed rule amendments do not have significant adverse effects (either directly or indirectly) to human beings.

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Chapter 4

References

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BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairperson Townsend and Members of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 30, 2005

Re: Public Hearing to Consider Adoption of Proposed Amendments to Regulation 8, Rule 28: Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants, and adoption of a CEQA Negative Declaration

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RECOMMENDED ACTION:

Staff is proposing amendments to the District's regulation on Pressure Relief Devices (i) to specify the type of monitoring that is required to ensure compliance with the rule, and (ii) to clarify the definition of the equipment subject to the rule, which has been the subject of confusion under the rule as currently written. Staff recommends that the Board take the following actions:

- Adopt proposed amendments to Regulation 8, Rule 28: Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants; and
- Adopt a Negative Declaration pursuant to the California Environmental Quality Act (CEQA) for this rule-making activity.

BACKGROUND

Pressure relief devices, or "PRDs", are safety devices used to protect pressurized equipment at refineries and chemical plants. PRDs work like the pressure release valve on top of a home water heater: they protect equipment from overpressures caused by upset conditions by venting excess pressure before it can build up and cause a rupture, explosion, or other catastrophic failure of the equipment. Some PRDs at refineries and chemical plants vent directly to the atmosphere. These devices are the subject of Regulation 8, Rule 28 and the proposed amendments.

The current version of Rule 8-28 was adopted in 1997 (with minor amendments in 1998). It is designed to phase out atmospheric PRDs by requiring refineries to vent them to a control system (*e.g.*, a safety flare or a vapor recovery system) whenever they install new equipment or modify existing equipment. For PRDs on existing equipment, the rule also targets the "bad actors" among the existing equipment population by requiring any process unit that experiences two releases within a five year period have its PRDs vented to a control system without waiting for an equipment modification. Finally, the rule also aims to prevent or minimize releases from all PRDs by requiring each refinery to adopt certain "Prevention Measures" for each PRD.

The rule has resulted in a significant reduction in PRD emissions. When the current Rule was adopted in 1997, emissions from PRDs were estimated to range between 27 to 150 tons per year. Since the current rule has been in place, emissions have averaged 20.5 tons per year. Furthermore, since the requirement to implement Prevention Measures took effect, emissions have averaged only 12.4 tons per year.

In the 2001 Ozone Attainment Plan, the District committed as part of Further Study Measure 8 to examine PRDs to determine if hydrocarbon emissions from petroleum refineries could be further reduced by requiring additional controls on refinery PRDs. During this rulemaking effort, staff hosted two technical workgroup meetings, as well as a public workshop on September 14, 2005, in Rodeo, a community adjacent to a refinery. Staff also met informally with representatives of refineries, chemical plants, community and environmental groups, the Western States Petroleum Association, labor unions, and Contra Costa County Health Services. Staff has considered this public input and has incorporated it into the proposed amendments, where appropriate.

In addition to the public outreach efforts, staff presented updates to the Stationary Source Committee of the Board of Directors on the progress of refinery rulemaking efforts on September 26 and November 28, 2005. At the November 28 meeting, staff presented a summary of the proposed amendments to Reg. 8-28 and heard public comments.

DISCUSSION

Staff's review of Regulation 8, Rule 28 found that although the rule has been successful in reducing emissions from PRD releases, there are several areas in which it could be improved. The rule requires that facilities report releases over ten pounds, but it does not explicitly require emissions monitoring, set standards for monitoring equipment, nor require monitoring data to be retained. Consequently, there is the potential for some releases to go undetected and there exists an inability to review the emission history of the PRDs. In addition, the rule refers to the term "source" but the term is undefined, creating the potential for confusion over how it is to be implemented, and the rule has some other undefined terms and unclear language.

In order to address these issues, the proposed amendments to Regulation 8, Rule 28 would:

- Require facilities to demonstrate that they have the capability to detect and quantify all release events, including small releases of ten pounds (the reporting threshold);
- Require data records of ventings for emissions verification;
- Clearly define the equipment subject to the rule as the process unit to ensure that the original intent of the rule – to regulate all PRDs on an individual source (i.e., process unit) in the same manner – is clarified;
- Require facilities to report to the District their analysis of the root causes of and potential corrective actions after each PRD release event;
- Make minor, non-substantive changes to the rule such as deleting obsolete references to "turnarounds," moving requirements where appropriate, and clarifying various sections of the rule.

ISSUES

During the review of the proposed amendments, two major issues emerged.

Control of all PRDs: A number of parties that participated in the rulemaking process maintain that the District should require all atmospheric PRDs to be vented to a control system. Staff examined whether a blanket requirement that all PRDs be controlled would be appropriate from two different perspectives. First, staff examined whether it would be advisable to require all PRDs to be controlled as a means of reducing emissions of VOC. Staff found that such a requirement would be prohibitively costly, with refineries having to incur costs of over $1 million per ton of emissions prevented. This cost is orders of magnitude greater than what the District normally considers cost-effective. Second, even though Further Study Measure 8 was directed at ozone issues, staff also examined whether a blanket control requirement would be advisable as a safety measure to prevent accidental releases of hazardous materials that could impact refinery workers or neighboring communities. Staff found that there already exists a comprehensive overlapping web of federal, state and local laws and regulations that require each refinery to take whatever steps are necessary to render their operations safe. These regulations include Contra Costa County's landmark Industrial Safety Ordinance. Staff therefore concluded that additional District regulation in the area of process safety would be unnecessarily duplicative of these existing provisions. In addition, staff concluded that consideration of industrial safety requirements extends far beyond the relatively narrow focus of limiting releases of ozone precursors from PRDs. In an effort to review and possibly enhance industrial safety ordinances over a broad spectrum, including District rules, staff has met with the Contra Costa County Health Services Department. Staff's goal is to hold joint meetings in refinery communities to explore whether the Contra Costa County Industrial Safety Ordinance or other rules can be improved. Although staff is not recommending additional controls beyond those already required in the rule at this time, staff will recommend any improvements to District rules that come out of this process.

Process Unit: As noted above, the current version of the rule describes the equipment subject to the rule using the ambiguous term "source". When the current rule was adopted in 1997, "source" was intended to refer to an entire "Process Unit," a grouping of multiple pieces of equipment that are operated together to produce a particular product. The proposed amendments would clarify this intent by replacing the term "source" with the term "Process Unit". The refineries contend that the definition of "source" should be narrowed to cover only the particular pieces of equipment within a Process Unit that make up a pressure-related system. They argue that this narrower definition is more appropriate because the upsets that cause the overpressures that lead to PRD releases are necessarily limited to individual pressure-related systems. But a review of the record of PRD releases since the current rule was adopted shows that this is not the case. There are a number of situations where an upset can affect multiple pressure-related systems within a process unit. Adopting this narrower definition would inappropriately change and restrict the scope of the rule, as it would excuse "bad actor" process units that have experienced multiple releases simply because the releases happened to occur on separate pressure systems.

CHANGES TO THE RULE SINCE PUBLICATION

Since the proposed amendments were circulated for public review, staff has proposed two minor revisions. Under the current rule, most refineries have implemented three or more Prevention Measures for each PRD. However, the current rule contains an exception that allows facilities to

implement fewer than three prevention measures for a particular PRD on the condition that the control requirements are triggered after a single release rather than after two releases. The proposed amendments that were published for public review delete the option of having fewer than three prevention measures, but do not provide a future compliance date, meaning that in some cases facilities may be out of compliance immediately upon adoption. Staff has made a minor change to the proposed amendments to correct this oversight, which would provide a six month period to allow facilities to implement three prevention measures for each PRD.

In addition, two provisions in the proposed amendments (Sections 8-28-502.2 and 8-28-602) cross-reference other regulatory provisions, but do not cite the correct section number being cross-referenced. Staff has made a change to the proposed amendments to correct these errors.

These changes are shown in double underline format. The revisions are not a substantive change, and they will not necessitate a continuation of the public hearing to adopt.

BUDGET CONSIDERATION/FINANCIAL IMPACTS

None

Respectfully submitted,

Jack P. Broadbent
Executive Officer / Air Pollution Control Officer

Prepared by: Victor Douglas
Reviewed by: Henry Hilken

Attachments:

1. Proposed Amendments to Regulation 8, Rule 28: Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants
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REGULATION 8
ORGANIC COMPOUNDS
RULE 28
EPISODIC RELEASES FROM PRESSURE RELIEF DEVICES AT PETROLEUM REFINERIES AND CHEMICAL PLANTS

INDEX

8-28-500 MONITORING AND RECORDS

8-28-501 Deleted December 17, 1997
8-28-502 Records
8-28-503 Monitoring

8-28-600 MANUAL OF PROCEDURES

8-28-601 Deleted December 17, 1997
8-28-602 Determination of Control Efficiency
8-28-603 Deleted December 17, 1997

REGULATION 8
ORGANIC COMPOUNDS
RULE 28
EPISODIC RELEASES FROM PRESSURE RELIEF DEVICES AT PETROLEUM REFINERIES AND CHEMICAL PLANTS

(Adopted July 16, 1980)

8-28-100 GENERAL

8-28-101 Description: The purpose of this Rule is to prevent the episodic emissions of organic compounds from pressure relief devices on ~~any~~ equipment handling gaseous organic compounds at petroleum refineries, and to collect information on episodic organic and inorganic compound emissions from pressure relief devices at petroleum refineries and chemical plants.

(Amended March 17, 1982, July 20, 1983, December 17, 1997)

8-28-110 Deleted September 6, 1989

8-28-111 Exemption, Evaporation Point: The provisions of this rule shall not apply to pressure relief ~~valves which~~ devices that exclusively handle organic compounds exhibiting a 10% evaporation point greater than 150 degrees Celsius (302 degrees Fahrenheit) when using ASTM D-86 and/or inorganic compounds not listed in Section 8-28-401.5. ~~The provisions of this rule shall also not apply to thermal relief valves that are vented to process drains or back to the pipeline.~~

(Amended September 6, 1989, December 17, 1997, March 18, 1998)

8-28-112 Exemption, Storage Tanks: The requirements of this rule shall not apply to any pressure relief devices on storage tanks. (Amended December 17, 1997)

8-28-113 Exemptions, Research and Development Facilities: The provisions of this Rule shall not apply to research or development facilities ~~which~~ that produce only non-commercial products for research and development purposes.

(Adopted June 1, 1994)

8-28-114 Limited Exemption, Small Refineries: Section 8-28-304.2 shall not apply to petroleum refineries processing less than 20,000 barrels per stream day of crude, unless the District's evaluation of the Process Hazards Analysis in Section 8-28-~~303.1~~406 determines that it is cost-effective and technologically feasible for the refinery to control the pressure relief devices.

(Adopted December 17, 1997)

8-28-115 Exemption, Thermal Relief Valves: The provisions of this rule shall not apply to thermal relief valves that are vented to process drains or back to the pipeline.

8-28-200 DEFINITIONS

8-28-201 Chemical Plant: Any facility engaged in producing organic or inorganic chemicals and/or manufacturing products by chemical processes. Any facility or operation that has ~~28~~ 325 as the first ~~two~~ three digits in the~~ir Standard Industrial Classification Code as determined from the Standard Industrial Classification Manual published in 1972 by the Executive Office of the President, Office of Management and Budget~~ North American Industrial Classification Standard (NAICS) Code. Chemical plants may include, but are not limited to the manufacture of: industrial inorganic and organic chemicals; plastic and synthetic resins, synthetic rubber, synthetic and other man-made fibers; drugs; soap, detergents and cleaning preparations, perfumes, cosmetics and other toilet preparations; paints, varnishes, lacquers, enamels and allied products; agricultural chemicals; safflower and sunflower oil extracts; and re-refining, not including petroleum refineries.

(Adopted July 20, 1983, Amended December 17, 1997)

8-28-202 Pressure Relief Valve: The automatic pressure-relieving device actuated by the static pressure upstream of the valve. (Renumbered July 20, 1983)

8-28-203 Rupture Disk: The thin metal diaphragm held between flanges.

(Renumbered July 20, 1983)

8-28-204 **Deleted December 17, 1997**

8-28-205 **Deleted December 17, 1997**

8-28-206 **Deleted December 17, 1997**

8-28-207 **Modified Source:** The same definition contained in District Regulation 2~~-2-223~~, Rule 1.

(Adopted December 17, 1997)

~~**8-28-208 Parallel Service:** Additional pressure relief devices which protect a common piece or pieces of equipment. These additional pressure relief devices may be installed as spares to facilitate maintenance or because the design relieving capacity cannot be obtained with a single pressure relieving device. The pressure relieving devices do not need to have the same pressure setting to be considered parallel.~~

~~(Adopted December 17, 1997)~~

8-28-209 **Petroleum Refinery:** Any facility that processes ~~products~~petroleum as defined in ~~Standard Industrial Classification Manual as Industry No. 2911, Petroleum Refining~~the North American Industrial Classification Standard No. 32411 (1997).

(Adopted December 17, 1997)

8-28-210 **Pressure Relief Device:** The automatic pressure-relieving device for discharges of ~~organic compounds~~ material ~~which~~ that prevents safety hazards, prevents pressures from exceeding the maximum allowable working pressure of the operating process equipment, or prevents equipment damage. Such devices include, but are not limited to, pressure relief valves, emergency de-pressuring vents ~~or~~ and rupture disks.

(Adopted December 17, 1997)

8-28-211 **Prevention Measure:** A reliable component, system, or program that will prevent ~~a Release Event~~releases from pressure relief devices. Examples of prevention measures include, but are not limited to: (1) flow, temperature, level and pressure indicators with interlocks, deadman switches, monitors, or automatic actuators, (2) documented and verified routine inspection and maintenance programs, (3) inherently safer designs, (4) deluge systems. Operator training and documented and verified routine inspection and maintenance programs may count as only one of the 3 Prevention Measures required by Section 8-28-405 ~~302.2, 8-28-303.2, and 8-28-304.1~~. A component, system or program with a high probability for failure shall not be considered a Prevention Measure.

(Adopted December 17, 1997)

8-28-212 **Process Hazards Analysis (PHA):** A ~~PHA is a~~n organized effort to identify and analyze the significance of hazardous scenarios associated with a process or activity. For the purposes of this rule, PHA's are used to pinpoint weaknesses in the design and operation of facilities that could lead to ~~a Release Event~~ releases from pressure relief devices and to provide the facility with information to aid in making decisions for preventing such ~~events~~ releases.

(Adopted December 17, 1997)

8-28-213 **Qualified Person:** An APCO-approved person who is qualified to attest to the validity of the ~~Prevention Measures Procedures~~ Process Safety Requirements and who is a registered professional engineer in the State of California with expertise in chemical, mechanical or safety engineering.

(Adopted December 17, 1997)

8-28-214 **Release Event:** Any release of organic or inorganic pollutants greater than 10 pounds ~~resulting~~ from a pressure relief~~ving~~ device, subject to this Rule, ~~opening~~ to the atmosphere. These events do not include releases that are vented to a vapor recovery or disposal system with at least 95% by weight organic compound control efficiency.

(Adopted December 17, 1997)

8-28-215 **Responsible Manager:** A person who is an employee of the facility or ~~corporation~~ business entity that owns or operates the facility who possesses sufficient ~~corporate~~ authority ~~and who is responsible for the management of the facility~~ to ensure the implementation of Process Safety Requirements.

(Adopted December 17, 1997)

8-28-216 **Process Unit:** A functionally independent processing plant located at a petroleum refinery that is comprised of various equipment (such as distillation and fractionating columns, process reaction vessels, boilers, heat exchangers, piping, pumps, compressors and valves) that operate interdependently to refine a feed stock and/or produce a certain product or products.

8-28-217 Tell-tale Indicator: A physical non-electronic device installed on a pressure relief device that can visually indicate whether or not that pressure relief device has had a release. Tell-tale indicators include, but are not limited to, socks, rupture disks, and flags.

8-28-300 STANDARDS

8-28-301 Deleted December 17, 1997

8-28-302 Pressure Relief Devices at New or Modified Sources at Petroleum Refineries: Any person installing a new refinery source or modifying an existing refinery source, that is equipped with at least one pressure relief device in organic compound service, shall meet all ~~of the following conditions:~~

~~302.1 Meet the~~ applicable requirements of Regulation 2, Rule 2, including Best Available Control Technology~~, and~~

~~302.2 Meet the Prevention Measures Procedures specified in Section 8-28-405~~.

(Adopted December 17, 1997)

8-28-303 Existing Pressure Relief Devices ~~at Existing Sources~~ at Petroleum Refineries: ~~After the next scheduled turnaround following July 1, 1998, use~~ Use of a pressure relief device in organic compound service on any equipment at a Petroleum Refinery is prohibited, except when the device meets at least one of the following conditions ~~prior to the equipment startup~~:

303.1 ~~Vent all~~ The pressure relief device~~s~~ is vented ~~from the source~~ to a vapor recovery or disposal system with at least a 95 percent by weight organic compounds control efficiency, and the control system ~~shall be~~ is properly sized per manufacturer's recommendations to handle the material from all devices it is intended to serve, or

303.2 ~~Meet~~ The facility has implemented the ~~Prevention Measures Procedures~~ Process Safety Requirements specified in Section 8-28-405~~,~~ for the pressure relief device.

(Adopted December 17, 1997; Amended March 18, 1998)

8-28-304 Repeat Release – Pressure Relief Devices at Petroleum Refineries: ~~After the next scheduled turnaround following July 1, 1998, any~~ Any petroleum refinery ~~source~~ process unit equipped with at least one atmospheric ~~that has at least one reportable Release Event from a~~ pressure relief device in organic compound service~~, including those in parallel service, in any consecutive five calendar year period~~ shall meet the following conditions:

304.1 ~~Within 90 days of the first Release Event from a pressure relief device, the facility shall conduct an additional, separate Process Hazard Analysis and meet the Prevention Measures Procedures specified in Section 8-28-405; and conduct a failure analysis of the incident, to prevent recurrence of similar incidents.~~ Within 120 days of ~~the first~~ a Release Event from any pressure relief device on the process unit, the facility shall either (i) equip each pressure relief device of that ~~source~~ process unit with a ~~tamperproof~~ tell-tale indicator that will show whether ~~that~~ a release has occurred since the last inspection; or (ii) equip each pressure relief device of that process unit with a monitoring system that complies with the requirements of Sections 8-28-503.1 through 503.3, and demonstrate to the APCO that each pressure relief device is so equipped in a report that complies with the requirements of Sections 8-28-407.1 through 407.6. ~~The Process Hazard Analysis shall include an evaluation of the cost-effectiveness and technical feasibility of control devices to remedy the incident. This evaluation of control devices shall include, but shall not be limited to, the following: (1) installing additional flare gas compressor recovery capacity and (2) venting the pressure relief device that caused the Release Event to existing vapor recovery or disposal systems, and~~

304.2 If, within five years of a first Release Event, a second Release Event occurs on the same process unit, ~~Within~~ within one year of the second Release Event ~~from a pressure relief device in organic compound service on the same source, including those in parallel service~~, the facility shall vent all the pressure relief devices from the process unit ~~that vent the second Release Event, including those in parallel service,~~ to a vapor recovery or disposal system with at least 95 percent by weight organic compounds control efficiency, and shall ensure that the control system ~~shall be~~ is properly sized per manufacturer's recommendations to handle the material from all devices it is intended to serve.

~~The five calendar year period of this section shall begin at the time that the District receives a Prevention Measure Plan as specified in Section 8-28-304.1~~.

(Adopted December 17, 1997; Amended March 18, 1998)

8-28-400 ADMINISTRATIVE REQUIREMENTS

8-28-401 Reporting at Petroleum Refineries and Chemical Plants: ~~A~~ Any indication of a Release Event at a petroleum refinery or chemical plant ~~from a pressure relief device at petroleum refineries and chemical plants~~ shall be reported to the APCO ~~on~~ no later than the next working day following the venting. In addition, the following information shall be submitted in writing to the APCO within 30 days following the Release Event:

401.1 Date, time, and duration of the Release Event in minutes.

401.2 The ~~Identification of the~~ pressure relief device involved, identified by its unique number as required in Section 8-28-404 as well as its name and service commonly referred to by the facility.

401.3 ~~Identification of t~~ The incident number assigned by the APCO for the Release Event ~~when the event is reported within one working day~~.

401.4 Type and size of device.

401.5 Type and amount of material released in pounds, accurate to two significant digits. Reportable materials are: total organic compounds, ammonia, hydrogen sulfide, chlorine, sulfur dioxide, sulfur trioxide, hydrofluoric acid, and difluoroethane.

401.6 ~~Necessary i~~Information and assumptions used to report the duration and amount released during the event.

401.7 Cause of the event.

401.8 A schedule for action to prevent re-occurrence of the event.

401.9 Results of fugitive emission inspection of the device done in accordance with the requirements of section 8-28-402.2.

(Amended February 18, 1981; December 17, 1997; March 18, 1998)

8-28-402 Inspection: Any person subject to this Rule shall comply with the following inspection requirements:

402.1 Any pressure relief device subject to this Rule that is equipped with a telltale indicator shall be inspected at least once per day to determine if a release has been indicated, unless and until the pressure relief device has been equipped with a monitoring system pursuant to Section 8-28-503 and the facility has submitted a monitoring system demonstration report pursuant to Section 8-28-407.

402.2 Any pressure relief device in organic compound service ~~which~~ that has a Release Event and is subject to this Rule shall be inspected within 5 working days after ~~actuation~~ the release to confirm compliance with Regulation 8, Rule 18 and the results reported in accordance with Regulation 8-28-401.9.

(Amended September 6, 1989, June 1, 1994, December 17, 1997)

8-28-403 ~~Records~~: ~~Any person subject to this Rule shall comply with the following recordkeeping requirements:~~

~~403.1 Prevention measure records to demonstrate compliance with the standards in sections 8-28-302, 8-28-303, 8-28-304, and 8-28-405~~.

~~(Adopted September 6, 1989, amended June 1, 1994, December 17, 1997)~~

8-28-404 Identification: ~~Any person subject to this rule shall comply with the following identification requirements:~~

~~404.1 All~~ Any pressure relief ~~valves~~ device subject to this rule shall be identified with a unique permanent identification code approved by the APCO. This identification code shall be used to refer to the pressure relief ~~valve~~ device location. Records and reports for each pressure relief ~~valve~~ device shall refer to this identification code.

(Adopted June 1, 1994; Amended December 17, 1997)

8-28-405 ~~Prevention Measures Procedures~~Process Safety Requirements: All facilities using pressure relief devices in organic compound service ~~which~~ that are subject to the standards in Section 8-28-300 ~~and which~~ that have a potential for a Release Event shall comply with the following process safety requirements:

405.1 Explicitly establish training, equipment, inspection, maintenance and monitoring ~~levels~~ requirements such that the pressure relief device releases are minimized ~~and~~;

405.2 Using a Process Hazards Analysis, ~~predict, plan and~~ implement ~~either:~~

~~2.1~~ ~~A~~at least 3 ~~consecutive~~ redundant Prevention Measures ~~for the Release Event~~ before a ~~pressure relief device will~~ release~~:~~. ~~or~~

~~2.2 At least one Prevention Measure for the Release Event before a pressure relief device will release. For single Prevention Measure pressure relief devices that vent a Release Event, within one year of the Release Event, the facility shall vent these pressure relief devices, including those in parallel service, to a vapor recovery or disposal system with at least 95% by weight organic compound efficiency;~~

Until July 1, 2007, as an alternative method of complying with this Section 8-28-405.2, a facility may operate a pressure relief device with only one or two Prevention Measures in place, but if such a device experiences a Release Event then the facility shall vent all devices on the Process Unit served by the device to a vapor recovery or disposal system with at least 95% by weight organic compound control efficiency. By July 1, 2007, all atmospheric pressure relief devices must be equipped with at least three redundant Prevention Measures.

405.3 The Process Safety Requirements m~~M~~ust be approved and signed by a Qualified Person and a Responsible Manager; and

405.4 The Process Safety Requirements m~~M~~ust be submitted for review to the APCO to determine if the plan meets the requirements of subsections 8-28-405.1 through 405.3. The APCO shall provide a 30-day public comment period and will consider all comments received during this period prior to approval or disapproval of the procedures.

(Adopted December 17, 1997; Amended March 18, 1998)

8-28-406 Process Hazard Analysis: Within 90 days of the first Release Event from a pressure relief device subject to this Rule at a petroleum refinery, the facility shall conduct an additional, separate Process Hazard Analysis and conduct a failure analysis of the incident to prevent recurrence of similar incidents. The Process Hazard Analysis shall include an evaluation of the cost-effectiveness and technical feasibility of control devices to remedy the incident. This evaluation of control devices shall include, but shall not be limited to, the following: (1) installing additional flare gas compressor recovery capacity and (2) venting the process unit that caused the Release Event to vapor recovery or disposal systems. The owner or operator of the facility shall submit the Process Hazards Analysis to the APCO.

8-28-407 Monitoring System Demonstration Report: No later than June 1, 2007, each facility shall submit to the APCO a Monitoring System Demonstration Report that demonstrates that each pressure relief device subject to this Rule that has the potential to release to the atmosphere is monitored by a monitoring system that satisfies the requirements of Section 8-28-503. The Monitoring System Demonstration Report shall include the following elements:

407.1 A listing of each pressure relief device covered by the report, including the nominal set pressure for each device and the range of pressures over which each device could reasonably be expected to release;

407.2 A description of the monitoring system for each pressure relief device covered by the Report, including a narrative description and diagrams or charts, that clearly identifies all elements of the system and how they operate to monitor releases as required under Section 8-28-503;

407.3 A listing of all operating parameters that are directly monitored by the system (*e.g.* temperature, pressure, flowrates, *etc.*) with a description of (i) the sensitivity and accuracy of the device(s) monitoring each parameter an the frequency with which each parameter is monitored, and (ii) how the sensitivity and frequency of monitoring is sufficient to allow the Monitoring system to detect releases of 10 pounds;

407.4 A listing of any calculations that are used to derive Release Event emissions information from data on operating parameters, including any assumptions on which such calculations are based and the basis for those assumptions;

407.5 A description of the alarms or other indication that the system provides to alert operators that a Release Event has or may have occurred; and

407.6 A description of how the information obtained by the monitoring system is recorded and maintained;

8-28-408 Process Unit Identification Report: No later than March 1, 2006, each petroleum refinery shall submit to the APCO a report listing all process units equipped with atmospheric PRDs, a listing of all associated pressure relief devices subject to this Rule identified in accordance with Section 8-28-404, and the date of the first turnaround following July 1, 1998, for each of the process units.

8-28-500 MONITORING AND RECORDS

8-28-501 Deleted December 17, 1997

8-28-502 Records: Any person subject to this Rule shall maintain the following records for a period of no less than two years and make them available to the APCO upon request:

502.1 Prevention measure records to demonstrate compliance with the standards in Sections 8-28-303 and 8-28-405;

502.2 Records of all of the pressure relief devices in accordance with Section 8-28-404~~.1~~ including a description of all equipment served by those devices;

502.3 Records of daily inspection of pressure relief devices subject to this Rule that are equipped with telltale indicators, including the time of inspection, and the identity of operator conducting the inspection;

502.4 Records of monitoring of any pressure relief device subject to this Rule as required by Section 8-28-503.

(Adopted September 6, 1989; Amended June 1, 1994, December 17, 1997)

8-28-503 Monitoring: Effective June 1, 2007, any person subject to this Rule shall monitor all atmospheric pressure relief devices using a Monitoring System that satisfies the following requirements:

503.1 The Monitoring System shall be designed, installed, maintained, and operated so that it is capable of detecting any Release Event and notifying operators that the Release Event has occurred;

503.2 The Monitoring System shall be designed, installed, maintained and operated so that it is capable of determining the date and time at which a Release Event occurred, the duration of the Release Event and the type and amount of material released.

503.3 The Monitoring System shall include a mechanism for ensuring that all elements of the system are functioning properly by checking the components of the system at least once per day. Such mechanisms may include equipment inspections, instrument calibrations or other means to ensure that equipment, personnel, and systems are operating properly.

8-28-600 MANUAL OF PROCEDURES

8-28-601 Deleted December 17, 1997

8-28-602 Determination of Control Efficiency: The control efficiency as specified in Sections 8-28-214~~302.1~~, 8-28-303.1, 8-28-304.2, and 8-28-405.2~~.2~~ (with the exception of non-enclosed flares) shall be determined as prescribed by any of the following methods: 1) BAAQMD Manual of Procedures, Volume IV, ST-7; 2) EPA Method 25 or 25A; 3) Flare control efficiency calculations approved by the APCO and EPA in writing; or 4) other methods to demonstrate control efficiency approved by the APCO and EPA in writing. A source shall be considered in violation if the VOC emissions measured by any of the referenced test methods exceed the standards of this rule.

(Adopted June 1, 1994; Amended December 17, 1997)

8-28-603 Deleted December 17, 1997

Bay Area Air Quality Management District

939 Ellis Street
San Francisco, California 94109

Staff Report

Proposed Amendments to Regulation 8, Rule 28: Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants

November 2005

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I. EXECUTIVE SUMMARY

This Staff Report outlines the rule development efforts by the Staff of the Bay Area Air Quality Management District with regard to pressure relief devices at petroleum refineries and chemical plants, which are subject to District Regulation 8, Rule 28. The Staff Report provides the technical analysis and policy rationale behind the proposed amendments to Regulation 8, Rule 28.

Pressure relief devices, or "PRDs", are safety devices used to protect pressurized equipment from overpressures caused by upset conditions. If equipment experiences an upset, the PRD will allow any excess pressure to be vented rather than building up and potentially causing a rupture or other catastrophic failure. The District committed in Further Study Measure 8 in the 2001 Ozone Attainment Plan to examining these devices to determine if hydrocarbon emissions from petroleum refineries could be further reduced by requiring additional controls on refinery PRDs.

To fulfill the commitment of Further Study Measure 8, District staff has reviewed the performance of Regulation 8, Rule 28. This review has shown that in general the current rule has been very effective. The Rule aims to phase out all atmospheric PRDs[i] eventually by requiring them to be routed to a control system (such as a safety flare or vapor recovery system) when new equipment is installed or when existing equipment is modified. The Rule also targets existing "bad actor" PRDs that have demonstrated a propensity for repeated releases, and requires them to be controlled immediately. Finally, for all PRDs, the Rule requires facilities to implement Prevention Measures designed to prevent or minimize releases.

The rule has resulted in a significant reduction in PRD emissions. When the current Rule was adopted in 1997, emissions from PRDs were found to be approximately 27 to 150 tons per year. Since the current rule has been in place, emissions have averaged 20.5 tons per year. Furthermore, since the rule's requirement to implement Prevention Measures took effect, emissions have averaged only 12.4 tons per year.

Notwithstanding these successes, staff has identified several areas where the current rule could be improved. The rule requires that facilities report releases over 10 pounds to the District, but it does not explicitly require emissions monitoring or set standards for monitoring equipment. As a result, some facilities are not monitoring their PRDs well, and have the potential for releases to go undetected. In addition, the rule is somewhat ambiguous about what "sources" it covers, and has some other undefined terms and ambiguous or unclear language. Staff is proposing that the Board of Directors adopt amendments to the current rule to address these issues.

[i] Atmospheric pressure relief devices (PRDs) vent directly to the atmosphere. Many PRDs vent to containment and processing such as a gas recovery system, to a thermal oxidizer, or to a flare.

Beyond these proposals, staff also considered whether it would be reasonable and appropriate to require refineries to control all existing atmospheric PRDs now, rather than waiting for them to be phased out over time as equipment is modified or replaced, as the current rule requires. Staff has found that such a requirement be prohibitively costly, with refineries having to incur costs of over $1 million per ton of emissions prevented, which is orders of magnitude greater than what the District normally considers cost-effective. Staff is therefore not recommending additional controls beyond those already required in the rule.

Finally, Staff also examined whether the District should require all PRDs to be vented to control systems as a safety measure to reduce the chance of accidental releases of acutely hazardous materials. Such industrial safety issues were not part of the mandate of Further Study Measure 8, which was aimed at reducing emissions of ozone precursors. Staff nevertheless investigated them because of a strong concern for worker and community safety. Staff found that a comprehensive overlapping web of industrial safety laws and regulations already exists, which requires operators to "design and maintain a safe facility taking such steps as are necessary to prevent releases," in the language of the federal Clean Air Act. Staff believes that additional District regulation in the area of process safety would be duplicative of existing regulations and would not be well directed towards reducing community and worker risks. This conclusion reaffirms the determination of the Board of Directors' Ad Hoc Committee on Accidental Emissions in connection with the adoption of the current rule that additional District requirements aimed at process safety would not be appropriate in Regulation 8, Rule 28. Safety at petroleum refineries and chemical plants is a high priority, however, and the District will continue to consult with local authorities to assure that adequate regulatory safeguards are in place.

Summary of Proposed Amendments:

Based on this review, staff proposes the following amendments to Regulation 8, Rule 28:

1. Require facilities to ensure that they have the capability to detect and quantify all release events, including small releases of 10 pounds (the reporting threshold), and require facilities to demonstrate this capability to the District;
2. Require data recording and recordkeeping for venting and emissions verification;
3. Clearly define the equipment subject to the rule as the process unit to ensure that the original intent of the rule – to regulate all PRDs on an individual source (i.e., process unit) in the same manner – is clarified;
4. Require facilities to report to the District their analysis of the root causes and potential corrective actions after each PRD release event;

5. Make minor, non-substantive changes to the rule such as deleting obsolete references to "turnarounds," moving requirements where appropriate, and clarifying various sections of the rule.

Rule Development Process:

During this rulemaking effort, staff hosted two technical workgroup meetings, as well as a public workshop in Rodeo, a community adjacent to a refinery. Staff also met informally with representatives of refineries, chemical plants, community groups, the Western States Petroleum Association and Contra Costa County Health Services. Staff has considered this public input and has incorporated it into the proposed amendments, where appropriate.

Economic Analysis:

The proposed amendments are aimed primarily at improving the clarity and enforceability of the current rule. They do not add additional substantive requirements or require the addition of new control equipment. The proposed amendments thus will not impose any significant additional costs on affected facilities beyond what is required under the current rule. Some facilities may not currently have adequate monitoring equipment to satisfy the rule's requirements, in part because those requirements are not explicitly spelled out in the current rule. Such facilities may have to install additional monitoring equipment to do so, but these are not costs imposed by the proposed amendments, and in any case they are expected to be minimal.

Environmental Impacts:

Pursuant to the California Environmental Quality Act (CEQA), the District has had an initial study for the proposed amendments prepared by Environmental Audit, Inc. The initial study indicated there are no potential significant adverse environmental impacts associated with the proposed amendments. Staff is proposing that the Board of Directors adopt a CEQA Negative Declaration for the proposed amendments.

Conclusions:

The proposed amendments will ensure that all facilities have the capability to detect PRD releases. They will also clarify the rule so that it can be more easily understood and enforced. Additional costs to affected facilities will be minimal. Staff therefore recommends that the Board of Directors adopt the proposed amendments along with the CEQA Negative Declaration.

II. BACKGROUND

Pressure relief devices are a means to safely relieve excessive pressures to prevent process equipment, piping, and other components from rupturing or causing other safety hazards. PRDs are designed to vent, or "lift", at a prescribed "set pressure" to relieve excess pressure before it can exceed safe

operating and/or equipment design levels. In new refinery construction, PRDs in VOC service must relieve to a control system that recovers the process gases or routes them to a disposal system such as a safety flare or thermal oxidizer. However, many older installations still have PRDs that vent directly to the atmosphere, resulting in the emission of VOCs and/or other material when the PRDs lift or if the valves leak at pressures below the set point. These PRDs are called "atmospheric" PRDs and are the subject of Regulation 8, Rule 28.

A. Types of Pressure Relief Devices

PRDs can be classified into the following general categories:

Pressure Relief Valves: The basic pressure relief valve must open automatically and quickly during a rise in system pressure beyond a specified set pressure, must close with minimal leakage when normal operating pressure is restored, and must be highly reliable. A pressure relief valve typically consists of a valve inlet or nozzle mounted on the pressurized system, a disc held against the nozzle to prevent flow under normal operating conditions, a spring to hold the disc closed, and a body/bonnet to contain the operating elements.[1] The spring load is adjustable to vary the pressure at which the valve will open. This design is illustrated in Figure 2.1.[2] Figure 2.2 is a photo of pressure relief valves.

Figure 2.1
Spring-Loaded Pressure Relief Valve

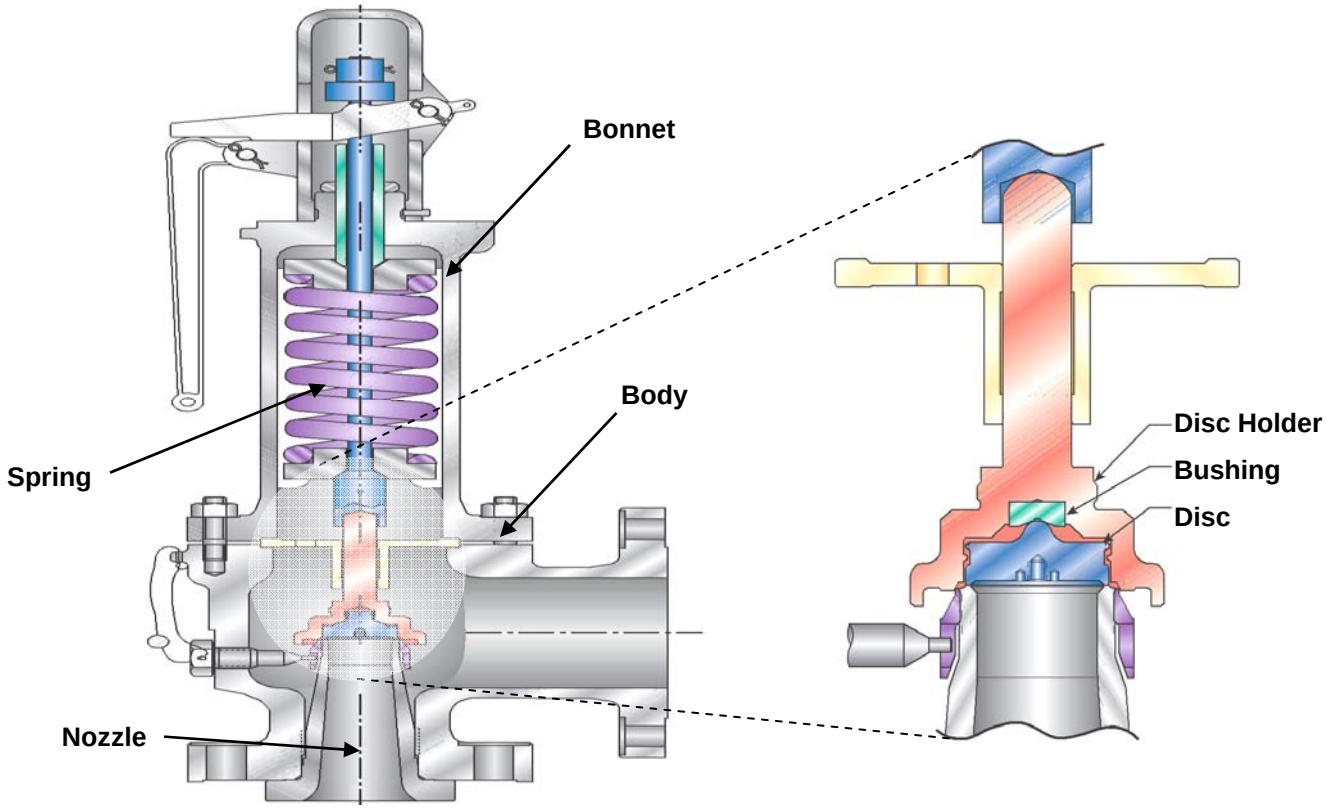


Figure 2.2
Seven 6" Diameter Pressure Relief Devices and Exhaust "Horns"
Valero Refinery

Thermal Relief Valves: Thermal relief valves protect liquid pipelines from over-pressurizing. Since the compressibility of liquid is minor, releases from thermal relief valves are normally small. These valves close as soon as the pressure in the closed system is relieved. These valves are generally vented to process drains, back into a pipeline, or into the atmosphere.

Rupture Disks: A rupture disk is a thin metal disk or diaphragm set between flanges often located on the pressure side of the relief valve or downstream from a block valve. Rupture disks are used to protect relief valves from the process pressure. They are designed to burst at the relief valve setting. Owing to their "one-time" use, rupture disks are applicable for relief devices where the component will be taken out of service after a release, for repairs or retrofits. Because they can only be used once, they are installed with block valves that will ensure that the piping can be closed once the emergency is contained. Rupture disks can also be used in place of relief valves in certain applications.

B. Emissions from PRDs

PRDs emit air pollutants when they "lift" to relieve pressure in the equipment they are serving. Such releases are often referred to as "episodic" releases because they occur only during process upsets when the PRD opens to relieve overpressures. In general, episodic emissions from PRDs can vary greatly, from a few pounds to many tons of material. Also, the duration of releases can vary greatly – from as little as seconds to as much as a day. Emissions may not correlate with the duration of venting because the components equipped with

PRDs process a range of materials and operate under a wide range of pressures.

PRDs can also release material through leaks. Emissions from leaks are often referred to as "fugitive" emissions, and are addressed in District Regulation 8, Rule 18: Equipment Leaks, which requires periodic leak inspections of all PRDs.

C. Detecting and Characterizing Emissions from PRDs

Facility operators rely on a variety of indicators to determine whether or not a PRD has vented and what kind of release was involved.

Telltale Indicators:

A telltale indicator, a physical device placed on the PRD's exhaust outlet in such a way that it will be moved or otherwise impacted if any material is vented out of the PRD, is one method of determining whether a PRD has experienced a release. Operators can readily determine whether there has been a release by simply looking at the device to see whether it has been activated. Some common telltale indicators are:

- Socks – Socks are pieces of cloth or other material placed over the exhaust of a PRD such that when the PRD releases, the sock is blown off by the releasing gas. If the sock is absent, that is a telltale sign that there has been a release.
- Flags – Flags are brightly colored metal tabs that are activated during a venting and become visible and can be easily seen by an operator.
- Rupture Disks – As mentioned above, rupture disks are thin metal diaphragms held between flanges. When the PRD releases, the disk will rupture. A ruptured disk is a telltale sign that there has been a release.

Telltale indicators are very useful in determining whether there has been a release. However, they do not provide any information about the release, such as when it occurred, how long it lasted, how much material was involved, or the nature of the material released.

Other Indicators:

In addition to a telltale indicator, there are other ways to determine whether a PRD has lifted. These include:

- Audible indicators – When PRDs vent, they normally make a loud distinctive sound.
- Pressure indicators – PRDs are pressure relieving devices that are set at a specific pressure. When a process has an overpressure that causes a PRD to lift, it normally leaves a characteristic "pressure signature" that indicates that a release occurred. This pressure signature is marked by rising pressure as the system approaches the PRD's set point, then a leveling off of the pressure as the PRD opens to vent the accumulated gases, and then falling pressure after the PRD closes and the process

returns to a more stable state. Monitoring the pressure within the system can thus provide a good indicator that a release has occurred. Pressure monitoring is most useful when there is a device that measures the actual pressure at the PRD. In many situations, however, the monitoring is in the vessel or equipment protected by the PRD, and the actual pressure experienced by the PRD must be calculated based on engineering calculations.

- Temperature – Temperature can be used as a way to indicate the release of a PRD. As temperature increases, pressure will also increase, triggering a release. A decrease in temperature indicates pressure relief.
- Flowrates – Process flowrate can also indicate the venting of a PRD. An initial increase in a process flowrate from a vessel indicates a pressure increase. A leveling off or decrease in the flowrate would indicate flow being released at another point, such as at a PRD. Although the process flowrate is a surrogate indicator, this information taken along with pressure readings can be used to indicate and quantify a release event.

None of these mechanisms, by itself, provides an ideal record of a release. For example, an audible indicator may be missed if there is nobody in the vicinity to hear it, or if the sound is masked by other noises at the facility. Indications from a pressure, temperature or flowrate monitor may be missed if the operator is not actively watching the monitor at the time of the release or if the monitor is not equipped with an alarm or notification system. Telltale indicators, as mentioned above, do not quantify the type or quantity of a release, and may indicate a release where none has occurred, such as when a sock is blown off in bad weather. Used in combination, however, these mechanisms can create a comprehensive monitoring system that will reliably detect and alert operators of any PRD releases.

Such monitoring systems can also reliably characterize PRD releases and provide the information that must be reported to the District under Rule 8-28 for any release over 10 pounds, such as the type and quantity of the emission.[ii] This information can normally be obtained by reviewing operating data from the equipment involved in the release. For example, a review of operating pressure may reveal a PRD release "pressure signature" described above: pressure increasing at a certain time, then leveling off at the PRD's set point, and then decreasing after a short time. By reviewing the type of material that the equipment was processing at the time, the pressure at which the PRD opened, the size of the PRD opening, the time period over which the PRD was open, and other factors, one can characterize the release fairly accurately.

Leak Detection:

PRDs can easily be inspected for leak-tightness with a portable analyzer that is placed near the PRD to detect any vapors that are leaking out. Using such

[ii] Current requirements of Rule 8-28 are discussed in Section III. B. 2.

equipment, facility staff and District inspectors can determine if any PRDs are leaking, and if so to what extent. Facilities are required by Rule 8-18 to inspect all PRDs regularly, and District inspectors conduct their own inspections to verify compliance.

D. PRDs Currently In Service In The Bay Area

There are 324 atmospheric PRDs located at the five Bay Area refineries. Of the 324 PRDs, approximately 50 are either rupture disks or pressure relief valve / rupture disk combinations, with the remaining being pressure relief valves. Approximately ten of the PRDs are equipped with socks as telltale indicators and the vast majority have some type of pressure monitoring, although some monitoring devices are remotely located and do not directly measure the pressure experienced at the PRD. Table 2.1 summarizes the total number of atmospheric PRDs located at each refinery.

Table 2.1
Population of Atmospheric PRDs at Each Refinery

Refinery	Atmospheric PRDs
Chevron-Texaco	41
ConocoPhillips	12
Shell	107
Tesoro	99
Valero	65
Total	**324**

Chemical Plants in the Bay Area also use PRDs on various process units. These PRDs usually service components containing non-hydrocarbon compounds, and have experienced only five reportable releases (over 10 pounds) since the 1997 amendments to Rule 8-28, involving only 2 tons of material in total. Further Study Measure 8 and the current rule development effort are focused on hydrocarbon emissions from PRDs at refineries.

III. REGULATORY HISTORY

Control of emissions from PRDs has been a focus of the District's regulatory attention for over 25 years. This section provides an overview of how Regulation 8-28 has evolved over the years into its current form, in order to provide some context for the proposed amendments.

A. 1980 – Adoption of a PRD Leak Standard

Rule 8-28 was originally adopted July 16, 1980, and regulated fugitive emissions (leaks). The rule established a leak standard of 10,000 parts per million for PRDs, but it did not place any restrictions on PRD venting as long as the venting was reported and the PRD reseated (closed) after releasing any excess

pressure. The rule also required quarterly leak inspections for accessible PRDs and annual inspections for inaccessible PRDs. Since adoption in 1980, minor amendments were made to the rule in 1981, 1982, 1983, and 1994.

B. 1997 – Addition of Prevention Measures and Targeted PRD Control Requirements

In the 1990s, the District undertook a comprehensive review and overhaul of Rule 8-28, which changed the focus of the rule from fugitive emissions from leaks to episodic emissions from PRDs venting to prevent equipment over-pressurization. District staff spent a considerable amount of time over a number of years on this effort, and the District's Board of Directors convened an ad-hoc committee to look into PRD-related issues and provide direction at the Board level. That process, and the amendments that resulted from it in 1997, are outlined below.

1. The Rulemaking Process

1991 Clean Air Plan Control Measure C1:

The District's efforts to overhaul Rule 8-28 began with Control Measure C1 in the 1991 Clean Air Plan. Measure C1 directed staff to examine Rule 8-28 further in order to determine whether there were any additional opportunities to reduce emissions of ozone precursors (effectively, hydrocarbons). Upon adoption of the 1991 Clean Air Plan, staff began to work on the issue.

Concern Over Acutely Hazardous Materials Releases:

As this process was underway, concern arose over the potential for releases of "Acutely Hazardous Materials" – highly toxic substances such as chlorine and ammonia, and flammable gases that could ignite and cause an explosion – as a result of recent industrial accidents. This concern led the Board of Directors to establish an Ad Hoc Committee on Accidental Emissions ("Ad Hoc Committee").[iii] The charge of the Ad Hoc Committee was to assess the need for any additional District regulation, above and beyond existing laws and regulations addressing environmental impacts from industrial accidents. The charge of the Ad Hoc Committee was set forth in the following "Policy on the Accidental Release of Acutely Hazardous Materials," which was approved by the full Board of Directors on February 16, 1994:

> The District Board will consider adoption of procedures or regulations designed to minimize the possibility of public exposure to accidental releases of Acutely Hazardous Materials by supplementing or supporting, not duplicating, current federal, state and local regulations designed to prevent or minimize such releases.

[iii] Of the current membership of the Board of Directors, Director Harold C. Brown Jr. served on the Ad Hoc Committee.

The creation of the Ad Hoc Committee, and its mission of addressing the potential for industrial accidents, led staff to expand the focus of their ongoing efforts to implement Control Measure C1 from the 1991 Clean Air Plan. District staff, along with members of the public, industry representatives, and other interested persons, participated in a number of Ad Hoc Committee meetings from 1993 through 1996. The Committee looked in great detail at all types of emissions from PRDs, including acutely hazardous materials as well as other materials that may not be considered acutely hazardous but are still of concern from an ambient air quality perspective (*e.g.*, ozone precursors).

The Committee examined existing legal framework covering environmental and public health impacts from industrial accidents. In addition to presentations from District staff, the Committee heard testimony from a large number of agencies with jurisdiction over these issues, including:

- The United States Environmental Protection Agency;
- The California Environmental Protection Agency;
- The Contra Costa County Health Services Department, and in particular the Department's Hazardous Materials Division;
- The San Francisco Bay Regional Water Quality Control Board;
- The California Occupational Safety and Health Administration;
- The United States Coast Guard;
- The California State Lands Commission;
- The California Public Utilities Commission;
- The Contra Costa County Fire Protection Department;
- The Richmond Fire Department; and
- The California State Fire Marshal Association.

These investigations highlighted the comprehensive nature of existing laws and regulations addressing industrial safety and the prevention of accidental releases of acutely hazardous materials. The centerpiece of these legal requirements is Section 112(r) of the federal Clean Air Act (42 U.S.C. § 7412(r)), which requires that owners and operators of industrial facilities handling acutely hazardous materials "design and maintain a safe facility taking such steps as are necessary to prevent releases. . . ." This Clean Air Act requirement complements the requirement in Section 5(a) of the federal Occupational Safety and Health Act (29 U.S.C. § 654(a)) that employers ensure that their workplaces are "free from recognized hazards that are causing or are likely to cause death or serious physical harm" to employees. The Clean Air Act requirement broadens the Occupational Safety and Health Act requirement and forces facilities to address risks to off-site communities in addition to risks to employees of the facility. These authorities establish the basic legal requirements that each facility must take whatever steps necessary to render their operations safe to workers and to neighboring communities.

Clean Air Act Section 112(r) also established a mechanism to ensure that facilities are taking the steps necessary to make their operations safe. Section 112(r) requires that any facility handling acutely hazardous materials above certain threshold quantities must develop a risk management program that includes: (i) an assessment of all hazards associated with a facility's operations, including absolute "worst-case" accidental releases; (ii) an integrated prevention program containing procedures to prevent accidents from occurring; (iii) an emergency response plan setting forth procedures to respond to accidents; and (iv) preparation of a Risk Management Plan ("RMP") document summarizing the program, which must be submitted to the agency with oversight for facility safety (which in the Bay Area is the local city or county hazardous materials agency).

At the state level, the California Accidental Release Prevention ("CalARP") Program imposes similar requirements. The CalARP requirements, which are set forth in Health & Safety Code Sections 25531-25543.3, implement the federal program in California and are intended to further the twin goals of "reducing regulated substances accident risks and eliminating duplication of regulatory programs . . . ." (Health & Safety Code § 25531(e).) To that end, the CalARP Program requires the preparation of a Risk Management Prevention Program ("RMPP") that satisfies the federal RMP requirements as well as certain additional California-specific requirements. The Governor's Office of Emergency Services ("OES") administers the CalARP program and has adopted implementing regulations in Title 19, Division 2, Chapter 4.5 of the California Code of Regulations.

The RMPP process is implemented at the local level by cities and counties. These "administering agencies" (also known as "Certified Unified Program Agencies" or "CUPAs") are specifically directed to coordinate their efforts with the local air quality management district (Health & Safety Code § 25533(b)), and may authorize the local air district to conduct a technical review of a facility's RMP (Health & Safety Code § 25535(a)). In addition, many cities and counties have adopted ordinances imposing their own city- or county-specific requirements. One example the Ad Hoc Committee reviewed in detail was the Santa Clara County Toxic Gas Ordinance (Ordinance No. NS-517.44).

Finally, in addition to the legal framework outlined above, the Ad Hoc Committee also investigated the cooperative efforts of the various agencies with jurisdiction over acutely hazardous materials issues to coordinate their regulatory activities. One prime example was the Contra Costa County Hazardous Materials Interagency Task Force, or "HIT Team." The HIT Team (which continues to operate today) is a coalition of agencies with responsibility for public and environmental health and safety that have joined in a cooperative and voluntary effort to enhance their level of service. The agencies represent federal, state, regional and local governments in the San Francisco Bay Area; local agencies are from Contra Costa County. The Task Force provides members with a continuing forum to coordinate and improve efforts in accident prevention;

emergency response; communication, outreach, and public participation; and efficiency, including the identification of both gaps and overlaps in policies and programs to protect the public's health and safety. District staff participates in the HIT Team and adds their expertise and support to furthering the Team's mission.

Given the level of existing regulation regarding accidental releases of acutely hazardous materials, and mindful of the Committee's charge that the Board did not want to duplicate existing federal, state, and local regulatory efforts unnecessarily, Staff ultimately concluded that no additional District regulation in the are was needed. Staff concluded that additional regulation would be duplicative and would disrupt the existing regulatory system, and that the District's efforts would be better spent in participating with the other agencies to share District staff's knowledge, information, and expertise.[3] Based on these conclusions, the Ad Hoc Committee did not recommend any additional District regulation aimed at preventing industrial accidents, over and above what was already being done by other agencies.

The Ad Hoc Committee process did reaffirm the need for additional regulation on PRD releases to address air quality issues from emissions that are not acutely hazardous. For example, situations where hydrocarbons are emitted at petroleum refineries from the top of a tall stack, where they are not near an ignition source and will dissipate into the atmosphere, do not present acute health hazards to employees and neighbors of the refinery. Such emissions can still be very important from an ambient air quality perspective, however, because they contribute to ozone formation. Hydrocarbons, along with oxides of nitrogen ("NOx"), are the main focus of the District's efforts to control ozone. The Ad Hoc Committee therefore recommended moving forward with efforts to address episodic emissions of hydrocarbons from PRDs, as contemplated by Control Measure C1 from the 1991 Clean Air Plan.

Regulatory Approaches Considered:

Based on this direction from the Ad Hoc Committee, staff then went forward with its rulemaking efforts along those lines. Staff conducted meetings with the regulated community and interested members of the public, prepared a Rule Effectiveness Study and a Technical Assessment Document, and ultimately proposed the current Rule to Board of Directors in December of 1997. During this process staff considered three approaches to controlling episodic PRD emissions (in addition to the option of doing nothing). The approaches considered were the following:

- Prevention Measures Only, With No Controls:

  This approach would have required affected facilities to implement a Process Hazards Analysis to identify and analyze potentially hazardous scenarios. For each hazard identified, the facility would be required to implement at least three "Prevention Measures" designed to minimize the

potential for releases. This approach would not have required any PRDs to be vented to control equipment.

- Blanket Control Requirement:

  This approach would have required all PRDs to be vented to a control system, such as a flare or a vapor recovery system. Affected facilities would have to pipe all of their existing PRDs to a control system, so that if any of them experienced a release, the emissions would either be captured or returned to the refinery's process or be incinerated before they reached the atmosphere.

- Targeted Control Requirement:

  This approach was essentially a hybrid of the prevention measures approach and the blanket control approach. It embodied the goal of eventually eliminating all PRD emissions to the atmosphere, but did not require all existing PRDs to be controlled immediately. Instead, it was designed to phase out atmospheric PRDs over time as the equipment they serve is replaced. It required facilities to vent PRDs on all new equipment to control systems, and to vent PRDs on existing equipment to control systems when the equipment is "modified" – that is, expanded or upgraded. In addition, this approach attempted to target the "bad actors" among the existing PRD population – those in service on potentially unstable processes that have a higher potential for an upset that might lead to over-pressurization and result in a PRD release. The approach required any process unit that experienced a PRD release twice within a five year period to be controlled within a year, without waiting for upgrade or overhaul. These targeted control requirements were in addition to the prevention measures outlined above, which would be required for all PRDs.

Staff evaluated the cost of each of these approaches and the emissions reductions each one could be expected to achieve. Staff found that the blanket control approach would be the most effective at reducing emissions, because it would essentially eliminate all PRD releases to the atmosphere. But staff found that it would be prohibitively expensive given the extensive capital improvements that would be necessary in relation to the amounts of emissions reductions involved. Staff calculated that requiring controls would likely require each affected facility to construct a new flare system, at a total annualized cost of approximately $27 million, or approximately $40,000 per ton of emissions reductions.

By contrast, staff found that the targeted control approach would be far more cost-effective, because it would not require expensive control systems for the bulk of PRDs that have low hydrocarbon emissions potential. Yet it still would obtain significant emissions reduction benefits because it would control the problem PRDs that are the worst contributors of smog-forming emissions, and

would minimize the likelihood of releases from all PRDs. Staff found that this approach could obtain emissions reductions at around half the cost-per-ton of the blanket control approach, and potentially as little as $3,450 per ton. Staff therefore identified the targeted control approach as the preferred alternative, and proposed amendments to the Board of Directors to codify that approach. The Board adopted the amendments on December 9, 1997, and made minor technical amendments in March of 1998.

2. Current Requirements of Regulation 8, Rule 28

The current version of Regulation 8, Rule 28 that the Board adopted in 1997 (with minor subsequent amendments) implements this targeted control approach in the following manner.

New Sources

When a facility installs a new source, Rule 8-28 requires that any PRDs on the equipment must meet District Best Available Control Technology (BACT) requirements, as defined in Regulation 2, Rule 2 and the District BACT Guidelines. BACT requires PRDs to be vented to a fuel gas recovery system, furnace, or flare with a control efficiency of at least 98 percent. This means that no new PRD may vent directly to the atmosphere.

Existing Sources

For existing sources with atmospheric PRDs, Rule 8-28 requires that the facility meet the BACT requirements – *i.e.*, venting all PRDs on the source to a control system – when the equipment undergoes a major modification. This provision means existing atmospheric PRDs will eventually be phased out as existing equipment is upgraded. There is no set timetable for equipment upgrades, and some equipment may remain in service for a long time before it undergoes a "major modification", but ultimately when equipment is upgraded, any atmospheric PRDs will have to be vented to a control system.

The rule also requires existing sources with atmospheric PRDs to implement Prevention Measures designed to prevent or minimize any releases. These Prevention Measures include: enhancing training, equipment, inspection, maintenance and monitoring procedures; installing process flow, temperature, level, and pressure indicators with interlocks; implementing documented and verified routine inspection and maintenance programs; using inherently safer designs; and installing deluge systems to cool and condense emissions before they can reach the atmosphere.

Finally, for existing sources, the rule also targets process units that show a propensity for releases. If a source experiences a release from a PRD over 10 pounds, it must: (1) conduct a failure analysis to discovery the cause of the release; (2) review the prevention measures for the source and address any

deficiencies; (3) evaluate whether it would be technologically feasible and cost-effective to vent the PRDs on the source to a control system; and (4) install telltale indicators on all of the PRDs on that source to ensure that any further releases are detected. If the same source experiences a second release within 5 years, that source must have all of its PRDs vented to a control system within one year. In this manner, the rule requires facilities to target their efforts to control existing PRDs towards sources that demonstrate a propensity for upsets and releases.

Reporting Requirements for Refineries and Chemical Plants

All Release Events (PRD releases over 10 pounds) at petroleum refineries or chemical plants must be reported to the District by the next working day. PRDs must be inspected within five days of a Release Event to ensure that they have re-seated properly and are not leaking. Within 30 days, the facility must report:

- the date, time, and duration of the Release Event;
- the device that experienced the Release Event;
- the District-assigned episode number;
- the type and size of device;
- the type and amount of material released;
- any information used to estimate duration and amount released;
- the cause of the release;
- the schedule for implementation of measures to prevent re-occurrence; and
- the results of the fugitive emission inspection.

The requirement to report this information implies that facilities must monitor PRDs to determine whether a Release Event has occurred and if so, the duration, cause, type and amount of material released must be quantified. There are currently, however, no explicit monitoring requirements in the rule.

C. Other District Regulations Applicable to PRDs

There are three other District regulations that are directly applicable to PRDs: Regulation 8, Rule 5 (Rule 8-5); Regulation 8, Rule 18 (Rule 8-18); and Regulation 8, Rule 22 (Rule 8-22).

Rule 8-5: Storage of Organic Liquids

Rule 8-5 requires the pressure vacuum valves (a type of PRD) on tanks used to store organic liquids be set at a pressure within 10 percent of the maximum working pressure of the tank and that the valves be properly installed and maintained in good working order.

Rule 8-18: Equipment Leaks

Rule 8-18 addresses fugitive emissions of VOCs from various components, including PRDs, at petroleum refineries, chemical plants, gasoline bulk terminals

and bulk plants. Fugitive emissions are those that escape from non-airtight fittings or connections. Rule 8-18 prohibits VOC leaks from PRDs over 500 ppm, subject to certain qualifications.

Rule 8-22: Valves and Flanges at Chemical Plants

Rule 8-22 addresses fugitive emissions of VOCs from small chemical plants. When fugitive emissions rules were amended in 1990, large chemical plants were made subject to the more stringent rules for petroleum refineries. Rule 8-22 was maintained for small (fewer than 100 valves) chemical plants.

IV. RULE EVALUATION

In the San Francisco Bay Area 2001 Ozone Attainment Plan for the One-hour National Ozone Standard, the District committed to study several activities at petroleum refineries to determine if additional reductions in emissions of ozone precursors could be achieved. One commitment, set forth in Further Study Measure 8, was to evaluate the potential for obtaining further ozone-precursor (*i.e.*, hydrocarbon) reductions at refineries by venting more refinery PRDs to control systems.

Staff has evaluated the effectiveness of the current rule and has concluded that overall, Rule 8-28 has been very effective and has resulted in a significant reduction in hydrocarbon emissions from PRDs. As noted above, the Rule is designed to phase out atmospheric PRDs by requiring them to be vented to control systems when new equipment is installed and when existing equipment is modified. For existing atmospheric PRDs that have not yet been phased out, the rule requires operators to implement Prevention Measures designed to prevent or minimize releases. The rule also targets "bad actors" out of the current population of existing atmospheric PRDs – *i.e.*, those demonstrating a high potential to have an upset that leads to a release – by requiring any source that experiences multiple releases to vent all of its PRDs to a control system within one year. In this way, the rule balances the desire to have state-of-the-art equipment in place on all equipment, with the reality that there are very many existing atmospheric PRDs and it would be highly burdensome to require them all to be upgraded immediately.

The merits of this targeted approach in reducing emissions are clearly evident when PRD emissions before prevention measures were required are compared to emissions after the prevention measures were required. The average annual emissions before the requirement became effective were 32.4 tons; average annual emissions after the implementation of the prevention measures is 12.4 tons.[iv] This difference represents an overall reduction in annual average emissions of 61 percent. Further, the average amount of emissions per release

[iv] Annual average emissions values are PRD population weighted. Since July 1, 1998, there have been 31.0 PRD-months before the prevention measures were implemented and 57.9 PRD-months after the prevention measures were implemented.

was 3.4 tons before the prevention measures were required; after the prevention measures requirement went into effect, the average was 3.3 tons. Before the prevention measures, there were six release events with emissions of five tons or more; since were required, there have been only three. (A full emission-reduction analysis is provided in Section VI.)

These successes notwithstanding, staff has concluded that there are several areas where the rule can be improved. Staff has reached this conclusion after several years of rule evaluation efforts. Beginning at the end of 2001 and continuing through mid-2002, District staff conducted an audit of PRDs located at the five Bay Area refineries. Staff reviewed data made available by the refineries that would indicate PRD venting, such as pressure, temperature, and flow data. The goals of the audit included (1) identifying all PRDs that vent directly to the atmosphere at units common to all refineries (*e.g.*, hydrotreaters and hydrocrackers), (2) verifying the PRD set points, and (3) determining to what degree of confidence the District can establish whether the PRDs at the refineries experienced releases during the audit period.

The 2002 Audit concluded that for many PRDs, the refineries do not have a means of adequately monitoring PRD releases. In some cases, the facilities do not have equipment capable of monitoring parameters that would indicate a release has occurred. Often, operators simply rely on sound to detect releases. In other cases, the facilities may have monitoring equipment, but it does not present an accurate picture of whether the PRD released, for example because pressure monitors are remote from the PRD and do not reflect actual pressure conditions at the PRD itself. In still others, the facilities may have monitoring equipment, but it records data in one-minute averages, which may miss short ventings. The Audit further concluded that the refineries do not routinely record data on operating parameters that could be used to indicate releases, and where they do record such data, in some cases they do not retain it for any length of time. The audit also discovered two small PRD releases during the audit period that had not been detected by refinery staff. These were both below the 10 pound reporting threshold and so did not trigger any requirements of the rule. But the existence of undetected small releases raises a concern that the refineries may have failed to detect some larger releases as well.

After completion of the PRD Audit, staff then proceeded to draft a Technical Assessment Document, which was published in December, 2002. The draft Technical Assessment Document reiterated the findings of the PRD Audit report and recommended several actions to improve Rule 8-28, including the addition of an explicit monitoring requirement to ensure that all PRD ventings are detected and addressed.

Based on these investigations and subsequent rule evaluation work, Staff has identified the following areas where Rule 8-28 could be improved.

A. Areas for Improvement of Current Rule

Detecting and Characterizing Releases

Section 8-28-401 of Rule 28 requires that facilities report all releases of over 10 pounds of any air pollutant from a PRD. Facilities must provide detailed information about each release, such as the duration of the release and the type and amount of material released, along with the data and assumptions used in calculating this information. However, there is no explicit requirement that facilities have equipment installed to enable them to detect all such releases and collect the information that must be reported, and there is no standard by which to determine compliance. As a result, facilities are using a variety of different monitoring approaches for their various processes and equipment, which vary greatly in their ability to detect and quantify releases. For example, the vast majority of PRDs have some sort of pressure monitoring of the system being served by the PRD, but few of them actually measure the pressure at the PRD itself. Some monitoring systems are not sensitive enough to detect small releases, and may not be detecting releases near the 10 pound threshold that triggers the reporting requirement. For these reasons, staff believes that facilities need to ensure that they have the capability to detect, characterize, and record all PRD releases, and that they need to demonstrate this capability to the District.

Data Recording and Retention

In cases where facilities do currently have monitoring equipment in place that can detect PRD releases, monitoring data are often not recorded or retained. The lack of data retention for some PRDs makes it difficult for District Enforcement staff to independently verify the pressure and venting history of those devices. Enforcement would be enhanced if measurements and recordings of the pressures experienced by the PRD were maintained for an explicit period of time in the rule. The time period should be long enough to allow a facility and/or District staff to go back and review the details of an incident some time after the fact, in situations where it was not immediately obvious that there were issues of interest to be investigated.

Definition of Equipment Subject to the Rule

Several provisions of Rule 8-28 use the term “source.” These include the provision that requires the installation a telltale indicator on each PRD on a refinery “source” within 120 days following a release event from that source (§ 8-28-304.1); and the provision that requires each PRD on a “source” to be piped to an emissions control device following a second release within five years from any PRD on the “source” (§ 8-28-304.2).

However, the term “source” as it is used in the rule can be interpreted in various ways, which can lead to confusion on how the rule is to be implemented. Typically, petroleum refineries have a vast array of interconnected pieces of process equipment and a large number of pumps, compressors, and piping to move petroleum products between the various stages of refining. Because these

equipment typically do not operate in isolation, various equipment and groups of equipment have been defined as "sources" over time for different regulatory purposes. For example, in one context "source" may be used to refer to an individual piece of equipment, such as a pressure vessel. In other contexts, "source" may be used to refer to an entire process unit, which may be made up of a large number of pressure vessels, piping, and related equipment. The rule does not explicitly indicate which definition should be used in the context of Regulation 8-28, and the general definitions in other regulatory provisions (*e.g.*, Regulation 1, Rule 1) are not specific enough to provide further guidance.

The lack of a clear definition of "source" can lead to confusion in how the rule is applied, given that all PRDs on a "source" need to be fitted with a telltale indicator after a first release event and must be piped to an emissions control device if there is a second release event within five years. If "source" is defined narrowly, for example as an individual pressure vessel, these requirements are triggered only for the PRDs on that particular vessel. If "source" is interpreted broadly, for example as an entire process unit comprised of multiple interconnected vessels, then these requirements will be triggered for all of the PRDs anywhere on that process unit, which would likely be a larger number.[v]

Staff has reviewed the history of the 1997 rule amendments that included these requirements and has determined that the intent of District staff in proposing the amendments, and the intent of the Board in adopting those amendments, was that "source" was to be defined broadly to encompass an entire process unit.[4, 5] The rationale for this definition is that Section 304 is targeted towards the "bad actors" – sources that are identified problems because they have demonstrated a propensity for repeat releases – and it is most appropriate to look to the entire process unit to determine which are the "bad actors." This is true for several reasons. First, a problem that causes a process upset resulting in an overpressure and PRD release will not necessarily be limited to a single pressure vessel. A fire in a process unit, for example, could lead to an upset in any pressure system anywhere on the unit. Second, even problems that arise a single pressure system could subsequently spread to other pressure systems within the process unit, for example as increased process rates in one part of the unit feed higher volumes of material than normal, or material at a higher temperature than normal, into downstream equipment causing a further upset there. Third, many of the Prevention Measures that must be implemented to prevent or minimize releases are implemented on a process-unit basis. If for whatever reason those Prevention Measures are not working as effectively as they should, the entire process unit on which the Prevention Measures are

[v] A "process unit" is generally understood to be a discrete component of the refining process that may contain one or more vessels and other pieces of equipment. Generally, it is physically distinct from other process units and can be isolated from the others process units and shut down if necessary. The equipment making up a process unit is normally closely grouped together physically and controlled from a common control room. The entire process unit is normally shut down as a unit for maintenance turnarounds. District permitting staff often (but not always) assign Source Numbers to refinery sources on a process-unit basis.

implemented should be considered suspect. For all of these reasons, it makes the most sense to look at the entire process unit when assessing which sources are considered problematic as a result of a history of frequent releases. Staff continues to believe that this approach is the most appropriate and that "source" should be explicitly defined to encompass all of the PRDs on an entire process unit. Providing an explicit definition to make the meaning of the rule clear would simply be a clarification of the existing requirements, and would not impose any additional requirements.

Defining "source" for purposes of Rule 8-28 differently than elsewhere in District regulations could cause further confusion, however. The term would have different meanings depending on the context in which it is used. A different term should be substituted for "source" in Rule 8-28 to avoid any potential for confusion. "Process unit" would be appropriate, as it describes the concept involved.

Definition of "Telltale Indicator"

The rule as currently written requires affected facilities to install "telltale indicators" whenever a source experiences a PRD release. Although facilities may have a general concept of what a telltale indicator is, it is not clear that there is a specific definition that is commonly accepted among those affected by this Rule. To ensure that there is a clear understanding of what a telltale indicator is and how to comply with the associated provisions, this term should be explicitly defined.

Reporting of Failure Analyses

Section 8-28-304.1 of the Rule requires affected facilities to undertake a failure analysis after experiencing a release event. This failure analysis must include an additional Process Hazards Analysis in which the facility must review its Prevention Measures for the equipment involved, as well as an analysis of the feasibility and cost-effectiveness of venting the PRDs on the source to a control system. The current rule requires that this failure analysis be completed, but it does not require that the analysis be submitted to the District or be retained for any period of time. Facilities should be required to submit the information to the District, or should be required to retain it and make it available on request, to allow District inspectors to readily verify compliance with this requirement.

Non-Substantive Amendments and Clarifications

Finally, the District's review identified several areas where the current language of the rule has become obsolete or is confusing in some way. These are not areas where the substantive requirements of the rule need to be changed. All that is needed are minor, non-substantive changes to make the rule more clear and workable.

B. Potential For Additional Control of PRD Emissions

The District has long believed that ideally, all atmospheric PRDs should be re-plumbed to control systems, which is the Best Available Control Technology.[vi] This belief was the basis of the targeted control approach that was adopted in 1997, which is intended eventually to phase out all atmospheric PRDs. The District did not require all existing atmospheric PRDs to be controlled immediately only because the large costs involved meant that it would not have been cost-effective compared to the emissions reductions that could be achieved. Instead, the District adopted the current targeted approach, which focuses on the few problem PRDs with a high potential to contribute to ozone formation without requiring control on the bulk of the PRD population that is not a significant ozone concern.

In Further Study Measure 8, the District committed to reevaluating its 1997 determination and examining whether additional reductions in refinery hydrocarbon emissions could be achieved by requiring additional refinery PRDs to be controlled. To do so, staff evaluated the emissions reductions that could be achieved from additional control requirements, as well as the costs that would be associated with such requirements. Staff has determined that requiring affected facilities to install control systems with capacity to handle all 324 existing atmospheric PRDs would likely cost between $1 million and $3.2 million per ton of emissions reductions achieved. These costs are roughly two orders of magnitude greater (*i.e.*, 100 times greater) than what the District normally considers to be cost-effective. Staff has therefore concluded that a blanket rule requiring all PRDs to be controlled would not be a cost-effective means to achieve Further Study Measure 8's goal of reducing emissions of ozone precursors from petroleum refineries. From the perspective of achieving additional reductions in ozone precursors, it would be preferable to maintain the current targeted approach and seek further reductions in other areas where the same level of benefit could be achieved at far less cost. (Full details of Staff's analyses of emissions reductions and associated costs are set forth in detail below in Sections VI and VII.)

Beyond reductions in ozone-precursor emissions, staff also considered the potential benefits of a blanket control rule in preventing or minimizing catastrophic industrial accidents. These issues are beyond the mandate of Further Study Measure 8, which is an ozone control measure from the 2001 Ozone Attainment Plan, an ozone planning document. Staff nevertheless examined catastrophic accidental release issues because of the importance of community and worker safety, and because there was significant public interest in these issues voiced during the rule development process. PRDs are safety devices designed to vent material in a pressure vessel quickly in order to prevent the vessel itself from rupturing or exploding. But by venting the material to

[vi] "Best Available Control Technology," or BACT, is a regulatory term used to refer to the current state of the art in emissions control technology.

relieve the pressure, PRDs can be implicated as the pathway through which acutely hazardous materials inside the vessel can reach the atmosphere. Piping PRDs to a control system could thus potentially help prevent or minimize certain types of impacts from industrial accidents. Staff, therefore, examined whether amendments to Rule 8-28 could help enhance facility safety.

Staff reviewed the existing regulatory environment covering facility safety and the prevention of hazards from accidental releases of acutely hazardous materials. Staff have reached the same conclusion that the Board's Ad Hoc Committee on Accidental Releases reached in connection with the 1997 Amendments: The current system of federal, state, and local laws and regulations provides a robust and comprehensive regulatory safety net designed to ensure that regulated entities "design and maintain a safe facility taking such steps as are necessary to prevent releases," in the words of Clean Air Act section 112(r). Staff found that the system has even been enhanced by further developments beyond what existed in 1997. Notably, Contra Costa County, the home of four of the five Bay Area refineries and multiple chemical plants, adopted a landmark Industrial Safety Ordinance in December of 1998 (with subsequent amendments in 2000).[vii] (*See* Contra Costa County Code, Title 4, Chapter 450-8.) The Industrial Safety Ordinance requires all affected facilities to develop a Safety Program to prevent releases, using inherently safer systems wherever feasible. The Ordinance requires each facility to document its Safety Program in a Safety Plan, which is then reviewed by the County and circulated to the public for comment. If the facility's compliance is determined to be deficient in any way – including with respect to the requirement to use all feasible inherently safer systems – the County can require the facility to revise its Safety Program to comply. In this way the Industrial Safety Ordinance provides yet another mechanism to ensure that facilities conduct their operations in a safe manner. Staff believes that these comprehensive and overlapping mechanisms, taken as a whole, provide a sound framework for preventing accidental releases of acutely hazardous materials, through PRDs or via any other avenue.

Staff has therefore concluded that adding additional control requirements to Rule 8-28 as a process safety measure is not warranted. Adopting Rule 8-28 amendments as a safety requirement, as opposed to a smog-control requirement as was contemplated by Further Study Measure 8, would be duplicative of these comprehensive safety requirements that are already in place. Duplicative regulation would be unwise as a matter of policy, and it is prohibited by Section 40727(b)(5) of the Health & Safety Code, which requires that the Board of Directors make a finding of non-duplication of existing regulations before adopting or amending a District rule.

Furthermore, even if the District were regulating in a vacuum without these existing safety requirements, requiring all PRDs to be controlled as a safety

[vii] District Director Mark DeSaulnier sponsored the Industrial Safety Ordinance in his capacity as Contra Costa County Supervisor for District IV.

measure would not be an advisable regulatory approach. A blanket District rule requiring control of all PRDs would be a crude instrument that would both over-regulate and under-regulate the problem. Such an approach would over-regulate the problem because it would require facilities to control PRDs on all processes, even those that have a very low potential for releases, or that serve low-volatility or low-toxicity substances that present very little acute risk to workers and neighbors should a release occur. There would be little to gain by controlling such low-risk PRDs, and the costs involved would essentially be wasted. By the same token, such an approach would under-regulate the problem because it would address only the potential for harm from air contaminants that are emitted from the operation through PRDs. It would not address safety risks from other categories of accidental releases, such as toxic liquids that could impact surface- or ground-waters. Similarly, it would not address the possibility of accidental air emissions from mechanisms other than PRD lifts, such as ruptures in pipes or other equipment that would allow emissions directly into the atmosphere regardless of whether PRDs were vented to control systems. Staff therefore believes that a blanket requirement that all existing atmospheric PRDs must be controlled would not be the most effective approach to addressing accidental release issues.

For all of these reasons, staff is not proposing that the Board of Directors adopt a blanket requirement that all existing atmospheric PRDs be vented to control systems.

V. PROPOSED AMENDMENTS

The rule review described above illuminated several areas in which the rule could be made more effective. Staff is therefore proposing that the Board of Directors adopt certain amendments to the current rule. The proposed amendments would:

- Explicitly require a monitoring system for all atmospheric PRDs. Section 8-28-503 in the proposed amendments establishes an explicit monitoring requirement. The requirement specifies that any monitoring system shall be designed, installed, operated and maintained so that operators are notified of releases as defined in the rule, and that the system can quantify them. This requirement is proposed to become effective June 1, 2007.
- Require facilities to demonstrate that they have adequate monitoring systems in place for all of their atmospheric PRDs subject to the rule. Section 8-28-407 is proposed to require facilities to submit a monitoring demonstration report that will enable staff to enforce the monitoring requirements. The report will require descriptions of the monitoring equipment, operating parameters and engineering calculations used to quantify releases.
- Require data recording and recordkeeping for venting and emissions verification. Section 8-28-502 is proposed to require that records of

pressure relief devices, prevention measures, equipment served, inspections, and monitoring equipment are kept and made available for inspection. Some of these records were required to be kept under Section 8-28-403, which is proposed for deletion.

- Clearly define the equipment subject to Section 304 of the rule to ensure that the original intent of the rule – to regulate all PRDs on process units that demonstrate a propensity for releases – is preserved. A definition of "process unit" is proposed in Section 8-28-216 and the term replaces the term "source" in Section 8-28-304.
- Add a definition of "telltale indicator." Facilities are required to install telltale indicators after a first release event, but the term is not defined. Defining the term will prevent any confusion over exactly what is required under such circumstances. The definition is in Section 8-28-217.
- Require facilities to identify all process units equipped with atmospheric PRDs and provide an inventory of all PRDs serving them. In order for staff to clearly understand all of the equipment subject to the rule, proposed Section 8-28-408 would require facilities to submit a list of all process units equipped with PRDs, identify all the PRDs on each process unit, and state when the first turnaround occurred at each process unit after 1998. The latter information is necessary to determine when the requirements of Section 304 came into effect for each process unit.
- Make minor, non-substantive changes to the rule, such as, deleting obsolete references to "turnarounds"; moving requirements where appropriate; and clarifying various sections of the rule. Initial compliance dates (the first turnaround after July 1, 1998) have been deleted in the proposed amendments; and the requirement to conduct a Process Hazards Analysis, an administrative requirement, has been moved from Section 8-28-304 to proposed Section 8-28-406.

VI. EMISSIONS

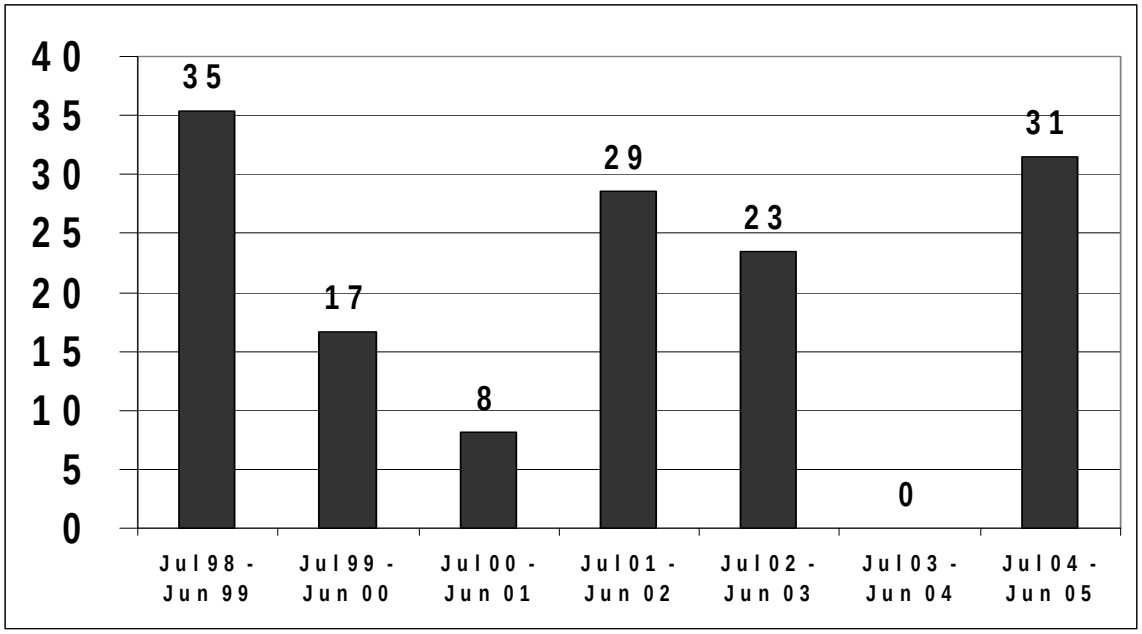
Episodic emissions from excess pressure in facilities' process units occur at the exhaust of the atmospheric PRD. These pressure releases result from problems in the process that could result in catastrophic failure of the process equipment if the pressure is not released in a controlled manner. Smaller amounts of emissions can also occur during normal pressure conditions if a PRD leaks.

A. Current Emissions Summary

1. Episodic Emissions

There have been 43 release events reported by the five Bay Area refineries since the current version of the Rule took effect in 1998 (through September 2005). These 43 release events vented an estimated 144 tons of VOC emissions in total. This record represents an average of 6.1 release events per year over this period, involving an average of 20.5 tons of emissions per year. The average release event involved 3.3 tons of emissions. Emissions during this period are summarized in Table 6.1 on a year-by-year basis.

Table 6.1
Summary of Annual Emissions from PRDs
Total tonnage, 1998-2005
(rounded to the nearest whole number)



In citing annual average emissions figures, it must be noted that although annual averages can provide a useful metric for assessing the scope of PRD releases within the Bay Area in general, they are of more limited value in assessing the amount of emissions to be expected from PRDs on any given day. PRDs normally go for long periods of time without ever opening, interspersed with short periods of significant emissions – sometimes as much as tens or hundreds of tons – when there is a process overpressure. This is the reason that the current rule requires controls on those PRDs with a high propensity for releases, even though control requirements are not cost-effective when looked at from an annual-average-emissions standpoint: A PRD that has one very large release per

year will have low annual average emissions, but it should still be controlled to prevent the significant ozone impact that would occur on the particular day that the release occurs.

It must also be noted that these emissions figures may be somewhat underestimated because of the potential that some releases may not have been discovered and reported to the District. As noted above, when staff audited refineries' current PRD practices they found that some PRDs do not have comprehensive monitoring systems and may have experienced some releases that were never detected. The refineries are confident that they have detected most (if not all) of the releases that have occurred, however. If any releases did go undetected, it is most likely that they were smaller events, as it would be hard not to detect a large release even without a comprehensive monitoring system. In addition, the emissions summaries do not account for emissions of less than 10 pounds because these small releases are not required to be reported to the District. But again, these are small events and the annual total of these emissions is not expected to be significant. Staff, therefore, believes that the data on current levels of PRD emissions are sufficiently reliable.

2. Fugitive Emissions

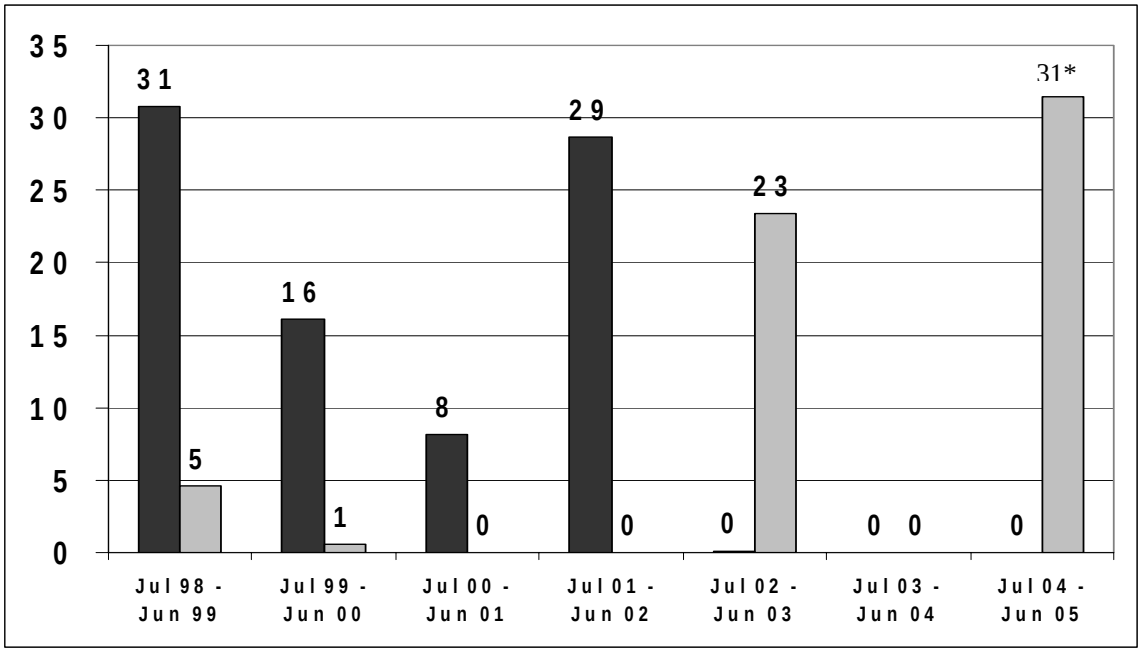
As noted above, the fugitive emissions requirements applicable to PRDs were moved to Rule 8-18 in connection with the 1997 rule amendments. Rule 8-18 currently establishes a very stringent 500 ppm leak standard, and requires periodic inspections to ensure PRDs are complying. Emissions from PRD leaks are currently estimated at approximately 10 pounds per day (as of 2003). This is a very substantial reduction from the 3300 pounds per day that staff estimated from leaks during the 1997 rule development process. The reduction can be attributed to several developments, including the tightening of the Rule 8-18 leak standard to 500 ppm and changes to the EPA method for calculating emissions from leaks. Staff believes that these reductions are further evidence of the success of the District's VOC emission rules, although in this case the success is attributable to Rule 8-18, not Rule 8-28.

B. Emission Reductions Since Adoption of the Current Rule in 1997

In assessing current emissions from PRDs, staff also examined the effect of the requirement that facilities implement Prevention Measures pursuant to Section 8-28-303 of the 1997 amendments. That section required each affected facility to take a number of steps to reduce the chance of PRD releases, such as operator training, improved equipment, inherently safer process designs, enhanced maintenance protocols, and monitoring systems. Affected facilities had to implement these Prevention Measures during the first "turnaround" (scheduled shutdown for routine maintenance) after the amendments took effect in 1998. To assess the effectiveness of this Prevention Measures requirement, staff compared emissions before the Prevention Measures requirement went into

effect (*i.e.*, before the first post-1998 maintenance turnaround for each process unit) and after the requirement was triggered (*i.e.*, after the first post-1998 turnaround).[viii] The results of this evaluation are presented in Table 6.2.

Figure 6.2
Comparison of PRD Release Event Emissions Before and After the Prevention Measures Requirement Took Effect
Total tonnage, 1998 – 2005
(rounded to the nearest whole number)



■ = Emissions before Prevention Measures were required
□ = Emissions after the Prevention Measures requirement took effect

* The large emissions spike shown for 2004-2005 was primarily the result of two large releases at an alkylation unit at the Tesoro Refinery that vented 9.3 tons and 20.4 tons of hydrocarbons, respectively. Under Section 8-28-304.2, the PRDs on that unit will now be required to be vented to controls so that any further releases will not reach the atmosphere.

The results of this comparison show the effectiveness of the Prevention Measures requirement in reducing PRD emissions. Before the Prevention Measures requirement came into effect, emissions averaged 32.4 tons/year from these PRDs; after the Prevention Measures were required, the annual average

[viii] To make this comparison, staff looked at each process unit equipped with atmospheric PRDs and determined when the Prevention Measures requirement went into effect – the date of the process unit's first maintenance turnaround after July 1, 1998. Staff then compared the frequency and size of releases from that process unit before the Prevention Measures requirement took effect with the frequency and size of releases after the Prevention Measures requirement took effect. Staff then aggregated the data for all PRDs District-wide to obtain an overall comparison between emissions before and after the Prevention Measures requirement took effect.

has dropped to 12.4 tons per year. Furthermore, overall amount of material released has decreased; with a total of 83.8 tons released before the prevention measures were required compared with 60.1 tons after the Prevention Measures were required. The number of significant releases has declined. Before prevention measures were required, there were six release events greater than five tons; since the prevention measures requirement became effective, there have been only three. The distribution of release events by size is set forth in Table 6.3, and shows that the most common type of release before the Prevention Measures requirement came into effect was 1,000 to 10,000 pounds, whereas the most common type after the Prevention Measures requirement came into effect has been in the 10- to 100-pound range.

Table 6.3
Release Events Distributed by Amount of VOCs Released

Size of Release (pounds emitted)	Number of Releases Before Prevention Measures	Number of Releases After Prevention Measures
10 – 100	2	6
100 – 1000	6	2
1000 – 10,000	11	7
10,000 – 100,000	6	3

Staff believes that these demonstrated declines in the number of PRD releases, the amount of emissions per release, and overall PRD emissions, demonstrate the effectiveness of the Prevention Measures requirement in the current rule.

Staff also looked back even further and compared recent PRD emissions rates with historical emissions data prepared in connection with the 1997 Amendments. In the process of developing the Amendments, Staff documented 51 reported releases in the three years from 1993 through 1995 totaling an estimated 459 tons of emissions, which included a single very large event in 1993 that involved an estimated 371 tons. These figures represent an average of 17 release events per year during this period. On a mass basis, average emissions were 153 tons per year when the very large 459 ton release is included, or 27.2 tons per year if that single event is treated as an outlier and excluded from the calculation.(6) These historical emissions rates are significantly larger than the rates the region has experience since the 1997 amendments went into effect, both in terms of the number of releases per year and mass of emissions released per year. Release events dropped from an average of 17 per year in 1993-95 to an average of 6 per year since July of 1998. Total annual emissions dropped from an average of 27.2 tons per year or 153 tons per year in 1993-95 (depending on whether the very large 459 ton release is included) to an

average of 17.9 tons per year since July of 1998. These comparisons further highlight Rule 8-28's successful track record in reducing emissions.[ix]

C. Potential Further Emissions Reductions

Staff evaluated the emissions reductions that could be expected in two scenarios: (i) requiring a demonstration that every facility has comprehensive monitoring equipment in place for all PRDs in atmospheric service; and (ii) requiring all atmospheric PRDs to be vented to a control system with a destruction efficiency of 95 percent or greater. For each scenario, staff evaluated emissions reductions based on the 20.5 tons per year average emissions that the region has experienced overall since 1998, and also based on the smaller 12.4 tons per year average emissions that have occurred since the Prevention Measures requirement went into effect.

1. Reductions from Monitoring Demonstration

Establishing explicit standards for monitoring will allow the District to ensure that all facilities are adequately monitoring all atmospheric PRDs. Ensuring that such monitoring is in place will ensure that facilities are fully aware of release events, which will allow operators to better target their release prevention and mitigation efforts and will ensure that repeat-release "bad actors" are identified and subjected to additional control requirements. These effects, in turn, are expected to lead to fewer release events and reduced emissions.

US EPA has estimated from time to time in various rulemakings that enhanced monitoring can result in a ten to twenty percent emissions reduction. Here, staff believes that the proposal to add an explicit monitoring requirement should more appropriately use a five percent emissions reduction factor, because many PRDs are already subject to some form of monitoring and it appears that most releases – and especially the larger ones – are being detected.

Using the 20.5 tons-per-year average emissions figures from the period 1998-2005, a five percent reduction would result in emissions reductions of approximately 1.0 tons per year. Using the 12.4 tons-per-year average from the period after the Prevention Measures requirement came into effect, a five percent reduction would result in emissions reductions of 0.62 tons per year.

[ix] It must be recognized that other factors besides the adoption of the 1997 Amendments likely contributed to some of the observed emission reductions. For example, the Pacific Refining facility closed in 1997, taking a number of PRDs out of service and removing them as potential emissions sources. Any emissions reductions from independent influences such as this would have occurred even if the 1997 Amendments had never been adopted.

2. Reductions from Controlling Additional PRDs

Facilities can achieve a 98 percent reduction in emissions by venting releases to a control system such as a flare or recovery system. Using the 20.5 tons per year overall average annual emissions since 1998, a blanket control requirement could therefore be expected to result in emissions reductions of 20.1 tons per year. Using the 12.4 tons-per-year average since the Prevention Measures requirements came into effect, a blanket control requirement could be expected to result in emissions reductions of 12.2 tons per year.

VII. ECONOMIC IMPACTS

This section presents the economic impacts of the proposed amendments, and also addresses the economic feasibility of a blanket requirement that all atmospheric PRDs be controlled immediately.

A. Costs That Would Be Incurred by Affected Facilities

1. Demonstration Reports

The proposed rule amendments require that each affected refinery prepare and submit to the District a "Monitoring System Demonstration Report." This report would provide information that would demonstrate that the refineries have adequate monitoring systems in place for all of their atmospheric PRDs subject to the rule. Section 8-28-407 is proposed to require facilities to submit a monitoring demonstration report that will enable staff to enforce the monitoring requirements. The report will require descriptions of the monitoring equipment, operating parameters and engineering calculations used to detect and quantify releases. Staff estimates that preparing the needed information for inclusion in the report for each PRD would take about two man-hours per PRD. (Most of this information is already available and must be utilized in the event of a release event and the subsequent report to the District.) The hourly labor cost is estimated to be approximately $100 per hour. Because there are 324 PRDs in total at the five Bay Area refineries, staff estimates the total one time cost of this provision to be about $64,800.

The proposed amendments also require each affected refinery to provide a listing of each process unit equipped with atmospheric PRDs and the associated PRDs. This information is already generally available and would not require any additional man-hours to generate. Preparation of the report for submission should take no longer than one hour for each refinery. Staff, therefore, estimates the cost associated with this provision to be approximately $100 per refinery; this translates to $500 District-wide.

The total costs of the demonstration reporting requirements are therefore expected to be approximately $65,300.

2. Monitoring Equipment

The current rule implicitly requires that facilities monitor their PRDs so that they will know when they have a release that has to be reported in accordance with Section 8-28-401. A requirement to report release information implies a duty to investigate whether releases have occurred, which cannot be done without monitoring. The proposed amendments would simply make the monitoring requirement explicit. Simply making the requirement explicit should not involve any additional costs beyond what is currently required. Indeed, staff has found that most PRDs already have sufficient monitoring equipment to satisfy the requirements being proposed.

Staff recognizes that some facilities do not currently have comprehensive monitoring systems for all PRDs, however. Staff has therefore evaluated the costs of implementing monitoring systems, even though they are not technically additional costs imposed by the proposed amendments, and even though the many PRDs that already have comprehensive monitoring systems in place will not need to incur such costs.

Staff evaluated several types of equipment that could be used to implement a monitoring system that would satisfy the proposed monitoring requirements. Staff's evaluation was based on conversations with refinery personnel and cost quotes from vendors. The cost of installing of a telltale indicator, such as a sock, would range from $500 to $1000 per PRD. Costs for installation of pressure sensing devices to provide pressure monitoring capability would likely range between $1,000 and $1,500 per PRD.[7 8 9 10] Staff does not believe that any facility will be unduly burdened by such costs. Moreover, staff believes that any such costs would be more than justified in situations where facilities are not currently monitoring their PRDs.

3. Controlling Additional PRDs

Staff also examined what it would cost to expand the Rule to require all existing atmospheric PRDs to be retrofitted and vented to control systems. Staff examined costs under two scenarios:

(1) Refineries would have to install additional control systems to handle the PRD emissions (the more likely scenario); and

(2) Refineries would be able to use spare capacity in existing control systems to handle the additional PRD emissions, and would not have to install new equipment (a more conservative but far less likely scenario).

Staff has found that under either scenario, requiring all PRDs to be controlled would not be cost effective. Each scenario is described in more detail below.

Cost of Installing New Control Systems:

Most if not all affected facilities would be required to install a new control system (or multiple systems) if they were required to control all existing atmospheric PRDs. PRDs are designed to vent large amounts of material very quickly in order to protect equipment from overpressures. As a result, control systems handling PRD emissions (safety flares, predominantly) have to be designed to handle large amounts of material from each PRD. Moreover, to accommodate all foreseeable upset conditions that might trigger PRD releases, such systems need to be able to handle emissions from multiple PRDs simultaneously. As a result, requiring all PRDs to be controlled would require a very significant amount of control capacity. Staff does not believe that affected facilities have spare capacity in their existing systems to handle all of their atmospheric PRDs, and would thus have to install new flare systems instead. Staff has concluded that it would cost approximately $192.5 million District-wide to install new flare systems with a capacity great enough to handle all existing atmospheric PRDs.

Staff derived this $192.5 million estimate from two sources: (1) a cost study undertaken Jacobs Engineering, Inc. ("Jacobs Engineering"), a large refinery engineering and construction contractor, in connection with the 1997 Amendments; and (2) a recent cost estimate performed by the Shell refinery in Martinez pursuant to District Regulation 8-28-304.1.

Jacobs Engineering Estimate:

Jacobs Engineering concluded that it would cost approximately $20 million to install a new flare system capable of handling 50 PRDs.[11] This estimate was based on an accuracy range of +/- 30 percent, which translates to a cost range of approximately $14 million to $26 million. A summary of the Jacobs Engineering estimate is set forth in Table 7.1, broken out by line-item.

Table 7.1
Jacobs Engineering Cost Estimate for a Safety Flare Recovery System to Handle 50 PRDs

Component Descriptions	Cost Estimates
50 PRDs and relief lines, ¾" to 8"	$1,180,000
Relief Headers and Knockout Drum	$2,970,500
Flare Gas Recovery system	$4,864,000
Flare	$3,553,000
Pipeway adjustment	$ 662,050
Subtotal	**$13,229,550**
Shipping	$ 123,000
Sales Tax	$ 508,000
Engineering	$2,790,000
Contingency	$3,094,000
Total	**$19,744,550**

Staff updated the Jacobs Engineering estimate to 2005 dollars by adjusting the costs for inflation. Staff looked at a number of annual inflation measures, as set forth in Table 7.2. Staff ultimately used an average of 1.39 percent to convert to 2005 dollars.

Table 7.2
Various Inflation Adjustment Factors: 1993 to 2005

Bureau of Labor Statistics Consumer Price Index [12]	1.38
Solomon & Associates Plant Replacement Value[13]	1.26
Turner Construction Cost Index[14]	1.54
Average Inflation Factor	**1.39**

Adjusted for inflation, the Jacobs Engineering estimate for a flare system capable of handling 50 PRDs is $27.5 million in 2005 dollars, with a plus or minus 30 percent confidence range of $19.2 million to $35.7 million in 2005 dollars.

Given the age of the Jacobs Engineering estimate, staff also compared the estimate with current construction and materials costs to assess whether the estimate, adjusted for inflation, continues to provide a reliable picture of what it would actually cost to install a flare system today. Staff contacted contractors with experience in design and construction of flare systems, as well as affected facilities that have recently installed flares and/or similar equipment. In some cases, these contacts were able to review the Jacobs Engineering study and provide an overall opinion on whether the methodology was generally valid and whether the cost inputs used, adjusted for inflation, generally reflect current realities. In other cases, they were able to give current cost data for individual components of a flare system (including labor and/or materials), which allowed

District staff to compare the Jacobs Engineering estimate with current realities on a line-item by line-item basis. Several examples demonstrate how these inquiries served to validate the Jacobs Engineering estimates.

- *Flare, Knockout Drum, and Water Seal:*

Staff first compared the Jacobs Engineering estimates for the various materials and equipment needed for a flare system with the current costs for such items. Staff contacted John Zink, Inc., a flare manufacturing contractor, who provided current cost information for a 200-foot self supported flare, a knockout drum built right into the bottom of the flare base, and a water seal. The company estimated that this equipment would cost roughly $500,000 today.(15) This estimate corresponds very closely with the Jacobs Engineering estimate, which comes to $505,960 (in 2005 dollars) for a flare, knockout drum, and water seal.

- *Thermal Incinerator*

Staff also examined cost estimates published by the United States Environmental Protection Agency ("EPA") for a thermal incinerator and associated piping.(16) A thermal incinerator is a control device that combusts hydrocarbon vapors before they are emitted to the atmosphere in a manner similar to a flare. This similarity makes it a good comparator to a flare. EPA estimates that the cost of the thermal incinerator itself (without the lines to connect it to the PRDs and all of the other parts of the complete system) would cost between $25 and $90 per standard cubic foot per minute (scfm) of capacity. For a 60,000 scfm system that could handle 50 PRDs – the capacity used in the Jacobs Engineering estimate – the total cost would be $1,500,000 to $5,400,000. The analogous Jacobs Engineering estimate for the flare equipment is $3,633,500 (in 2005 dollars), which is squarely within the range of EPA's estimate.

- *Piping:*

Staff also examined the costs of installing piping to carry PRD emissions to the flare system, which is another large portion of the costs of a new flare system. Staff examined the piping costs that the Tesoro refinery incurred when they had two releases within five years and had to pipe certain PRDs to a control system under Section 8-28-304.2 of the current rule. In Tesoro's experience, it cost approximately $30,000 to $32,500 per 100 linear feet of pipe.(17) This is slightly higher than the Jacobs Engineering piping estimate, which ranged from $9,750 to $24,310 in 2005 dollars, but is well within an order of magnitude. Again, this recent experience corresponds well with the estimates drawn from the work Jacobs Engineering did in connection with the 1997 Amendments.

- *Labor Inputs:*

To examine whether the estimates of labor inputs that Jacobs Engineering used are accurate, Staff contacted Rex Kenyon & Associates, a maintenance consulting services company. Kenyon provided labor estimates for a large number of particular tasks that would be involved in installing a flare system. Kenyon has generated these estimates from trades estimating manuals, and has compiled them into Excel spreadsheet estimating tool which District staff used to

compare the Kenyon estimates of current labor inputs with the Jacobs Engineering estimates.[18] Staff identified 32 tasks included in the Jacobs Engineering Estimate that had direct comparators in the Kenyon estimates. Of these 32 common tasks, the Jacobs estimate was lower for 20 of them (ranging from 39 percent to 96 percent of the Kenyon estimates) and higher for 11 of them (ranging from 111 percent to 229 percent of the Kenyon estimates), with one task being exactly the same. This comparison shows that the labor estimates that Jacobs Engineering used continue to be valid today for estimating the costs involved in installing a new flare system.

Given this close correlation between the cost inputs used in the Jacobs Engineering estimate (as adjusted for inflation) and current costs for similar inputs, Staff believe that the Jacobs Engineering cost estimate, adjusted for inflation, provides a reliable estimate of what it would cost to install a new flare system today.

Shell Estimate:

The District also examined an estimate prepared by Shell for installing a new flare to handle PRD emissions at its refinery in Martinez. Shell prepared this estimate pursuant to Section 8-28-304.1 of the Rule, which requires facilities to analyze the cost-effectiveness of controlling PRDs that experience release events. In connection with this requirement, Shell examined the costs of installing a new flare, liquid knockout drum, flare gas recovery, major headers, and individual sub-headers servicing individual PRDs. Shell estimated that it would cost the refinery $50 million for a system that could serve 39 PRDs in one area of the refinery and $25 million for a system that could serve ten PRDs in another area of the refinery. Shell estimated that it would need two separate flare systems because the relatively long distance between the two areas and the relatively low design pressures involved made it unreasonable to expect that a single flare system could serve both areas.[19]

This estimate is slightly higher than the Jacobs Engineering estimate of $27.5 million (in 2005 dollars) for a system capable of handling 50 PRDs, but it is within a factor of two of that estimate.

Costs to Control All PRDs District-Wide:

Staff then used the estimates referenced above to estimate what it would cost to control all PRDs District-wide. Using the more conservative estimate of $27.5 million for a system to handle 50 PRDs, Staff then looked at how many new flare systems would be needed to control all 324 PRDs currently in atmospheric service around the Bay Area. Staff assumed that one new flare system with a capacity to handle 50 PRDs would be sufficient to control the PRDs at three of the refineries, and that two new flare systems would be required at each of the remaining two refineries because they have around 100 PRDs each. Staff therefore estimated that seven new flare systems would be needed in total to

control the PRDs at all five refineries.[x] These calculations are summarized in Table 7.4.

Table 7.4
Flare Systems Required to Control PRDs at the Five Bay Area Refineries

Refinery	Atmospheric PRDs	Additional Flare Systems Needed
Chevron-Texaco	41	1
ConocoPhillips	12	1
Shell	107	2
Tesoro	99	2
Valero	65	1
Totals	**324**	**7**

At approximately $27.5 million per flare system, controlling all 324 PRDs with flares would thus result in a total capital cost of approximately $192.5 million District-wide. As with any estimate, there is some uncertainty inherent in this number. Staff is confident that it is reasonably accurate, however, and certainly is accurate to within an order of magnitude.

Costs of Using Existing Control Systems:

Staff also examined the costs of piping existing atmospheric PRDs to existing control systems. As noted above, it is highly unrealistic to assume that there is currently excess capacity to handle all 324 PRDs throughout the District: PRDs are designed to release large volumes of material in a short period of time, and control systems need to be capable of handling combined emissions from many PRDs simultaneously in case of an upset involving multiple units. Furthermore, to the extent that there is existing excess capacity, the current rule contemplates that any such existing excess capacity would be reserved for handling "bad actor" PRDs that have repeat releases and trigger the control requirements. It would be preferable to target any existing excess capacity to these PRDs, rather than use it for PRDs that may have a very low potential for release. Staff therefore believes that although there is most likely some spare capacity, it is unrealistic to assume that all existing PRDs can be vented to existing control systems. Staff have nevertheless analyzed the costs of controlling all existing PRDs assuming that sufficient spare capacity exists as an ultra-conservative estimate of the very least it could possibly cost to control all existing PRDs.

[x] There is a certain level of approximation inherent in these calculations, because PRDs do not exist at facilities in neat multiples of 50. Staff believes that such approximation is appropriate, however, because the experience of refineries with fewer than 50 PRDs – which will be able to install a smaller flare system and incur fewer costs – will balance out the experience of facilities that have more than 50 PRDs and will require a larger flare system at greater cost. Notably, the two refineries that staff estimate will need two flare systems have very close to 100 PRDs each (99 and 107), almost exactly double the 50 PRDs that staff used as the basis for their cost estimate. Staff therefore believes that their assumptions are supportable and appropriate for this cost estimation exercise.

Staff first examined the experience of one refinery that was able to reroute emissions from eight PRDs back into its process unit in a closed loop, without having to send them to a flare or vapor recovery system. The refinery was able to do so because unlike most PRDs, the devices involved served a liquid-packed unit, which (unlike gaseous equipment) can alleviate an overpressure without having to vent a lot of material. The refinery found that it could pipe the PRDs to a knockout drum to recover liquids vented from the PRDs, and then vent the relatively small amount of remaining vapors back into the system without risking any over-pressure problems. The refinery was able to accomplish this modification at a cost of $2 million for eight PRDs.[20] Extrapolating this experience District-wide – which is not a reasonable assumption given that only a small subset of PRDs is likely to be eligible for such treatment – the cost would be $81 million for all 324 PRDs.

Staff also reviewed an estimate by another refinery for piping PRDs to existing control capacity, which was prepared pursuant to Section 8-28-304.1 of the current rule. The refinery estimated that it would be able to vent an individual PRD to an existing flare system at a cost of $75,000.[21] The refinery noted that existing spare capacity was limited, making it unreasonable to assume that all PRDs could be treated this way. Assuming they all could, however, this estimate would translate into a District-wide cost of $24.3 million for all 324 existing atmospheric PRDs.

Assuming there was existing capacity for all PRDs District-wide, the only costs that facilities would incur would be the cost of installing piping to carry emissions from the PRD to the control device. Based on the estimates outlined above of $9,750 to $32,500 for 100 linear feet of piping per PRD, which was the average length of piping used in the Jacobs Engineering analysis, the costs of piping alone would be approximately $1.6 million to $5.3 million for 50 PRDs. For the 324 atmospheric PRDs District-wide, this corresponds to a total cost of $10.5 million to $34.8 million.

Based on these estimates, Staff has concluded that even if facilities had existing capacity to control all existing atmospheric PRDs, it would still cost $10.5 million to $81 million to control all PRDs District-wide. Again, staff does not believe that this is a realistic estimate given that it is highly unlikely that facilities have sufficient existing capacity for 324 PRDs.

Cost Effectiveness:

Based on the cost estimates of the various control scenarios outlined above, and the emissions reductions that would be expected from each of them, staff has calculated the cost-effectiveness of each option. Staff amortized the costs over a 10 and 20-year period at seven percent to determine the annualized costs. Staff then compared the annualized costs with the anticipated annual emissions

reductions based on the 20.5 tons-per-year emissions average since 1998 and based on the lower 12.4 tons-per-year average since the Prevention Measures requirements took effect. The results of these calculations are set forth below.

Cost-Effectiveness If New Control Systems Required:

For new flare systems to control all existing atmospheric PRDs, the cost-effectiveness calculations are as follows.

Estimated total cost District-wide: $192.5 million
Cost annualized over 10 years: $26.8 million per year
Cost annualized over 20 years: $17.9 million per year

Estimated emissions reduction efficiency: 98%
Tons of reductions from 20.5 tons-per-year baseline: 20.1 tons per year
Tons of reductions from 12.4 tons-per-year baseline: 12.2 tons per year

Based on these calculations, the cost-effectiveness of flare systems under different scenarios is set forth in Table 7.5.

Table 7.5
Cost Effectiveness Calculations for New Control Systems

Annualization Period	Cost-Effectiveness Based on 20.5 tpy of emissions	Cost-Effectiveness Based on 12.4 tpy of emissions
10 years	$1.3 million per ton	$2.2 million per ton
20 years	$890,000 per ton	$1.5 million per ton

Cost-Effectiveness Assuming Existing Spare Control Capacity:

If there were existing flare or vapor-recovery capacity to handle all existing atmospheric PRDs, and all that was needed was piping from the PRDs to the existing flares or vapor recovery systems, the cost-effectiveness calculations are as follows.

Estimated total cost District-wide: $10.5 million - $81 million
Cost annualized over 10 years: $1.5 million - $11.4 million per year
Cost annualized over 20 years: $977,000 - $7.6 million per year

Estimated emissions reduction efficiency: 98%
Tons of reductions from 20.5 tons-per-year baseline: 20.1 tons per year
Tons of reductions from 12.4 tons-per-year baseline: 12.2 tons per year

Based on these calculations, the cost-effectiveness of simply piping PRD emissions to existing flare or vapor-recovery capacity, assuming such capacity is available, is set forth in Table 7.6 for the different scenarios evaluated.

Table 7.6
Cost Effectiveness Calculations Assuming Existing Spare Capacity

Annualization Period	Cost-Effectiveness Based on 20.5 tpy of emissions	Cost-Effectiveness Based on 12.4 tpy of emissions
10 year	$75,000 - $567,000 per ton	$123,000 - $934,000 per ton
20 year	$49,000 - $378,000 per ton	$80,000 - $623,000 per ton

In each of these cases, the costs associated with controlling all existing atmospheric PRDs would be far higher than what the District normally considers to be cost-effective. To give some perspective, the costs associated with the 1997 amendments were estimated to be $20,000 per ton of VOC emissions, which is at the high end of cost effectiveness for District regulatory proposals. Because of the very high cost, staff is not recommending that all PRDs be required to be piped to control systems.

B. Incremental Cost Effectiveness

Under California Health and Safety Code Section 40920.6, the District is required to perform an incremental cost analysis for a proposed rule under certain circumstances. To perform this analysis, the District must (1) identify one or more control options achieving the emissions reduction objectives for the proposed rule, (2) determine the cost effectiveness for each option, and (3) calculate the incremental cost effectiveness for each option. To determine incremental costs, the District must calculate the difference in the dollar costs divided by the difference in emission reduction potentials between each progressively more stringent control option as compared to the next less expensive option.

As explained above, staff examined two options in connection with the proposed amendments: an option to enhance the clarity and enforceability of the current rule, and an option to require all existing PRDs to be controlled. The first option would require facilities to demonstrate that they have the ability to detect release events and report them as required by the rule, which staff estimates will cost $65,300. Amortized over 10 or 20 years, this cost comes to approximately $9,300 or $6,200 in annualized costs, District-wide. The second option would require all PRDs to be controlled, and would cost between $26.8 million a year (annualized over 10 years) or $17.9 million (annualized over 20 years), assuming new control systems would be required. The incremental difference in

annualized costs would therefore be $26.8 million or $17.9 million, depending on which amortization period is used.

It is difficult to estimate the emissions reductions associated with monitoring and reporting requirements because they do not directly lead to emissions reductions. At the same time, comprehensive monitoring and reporting are necessary to ensure adequate compliance with the rule, so these requirements are essential to all the reductions expected from a regulation. Staff recognizes these inherent difficulties in analyzing the cost-effectiveness of such requirements, but has nevertheless estimated a five percent emissions reduction factor from these requirements. A five percent reduction would generate 1.0 tons per year in emissions reductions if the 20.5 tons-per-year baseline is used, or 0.62 tons per year if the 12.4 tons-per-year baseline is used. The emissions reductions that could be achieved by controlling all PRDs would be 20.1 tons or 12.2 tons, depending on which baseline is used. The incremental difference in emissions reductions would therefore be 19.1 tons or 11.5 tons depending on which baseline is used.

Based on these incremental emissions reductions and incremental costs, the incremental cost-effectiveness of the second option would be $1.08 million - $1.40 million per ton if the 20.5-ton emissions baseline is used or $1.56 - $2.33 million per ton if the 12.4-ton baseline is used.

Under the unlikely scenario that no additional control systems would be required, the same calculations generate an incremental cost-effectiveness of $50,800 - $598,000 per ton if the 20.5 ton emissions baseline is used, and $83,900 - $988,000 per ton if the 12.4 ton baseline is used.

C. Socioeconomic Impacts

Section 40728.5 of the Health and Safety Code requires an air district to assess the socioeconomic impacts of the adoption, amendment, or repeal of a rule if the rule is one that "will significantly affect air quality or emissions limitations." Applied Economic Development of Berkeley, California has prepared a socioeconomic analysis. The analysis concludes that the affected facilities should be able to absorb the costs of compliance with the proposed rule without significant economic dislocation or loss of jobs. The socioeconomic analysis is attached as Appendix A.

VIII. ENVIRONMENTAL IMPACTS

Pursuant to the California Environmental Quality Act, the District has had an initial study for the proposed amendments prepared by Environmental Audit, Inc. The initial study indicated there are no potential significant adverse environmental impacts associated with the proposed amendments. The District intends to file a negative declaration for the proposed amendments to this rule.

IX. REGULATORY IMPACTS

California Health and Safety Code Section 40727.2 requires the District to identify existing federal air pollution control requirements for the equipment or source type affected by the proposed rule or regulation. The District must then note any differences between these existing requirements and the requirements imposed by the proposal. Regulation 8, Rule 28: Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants applies to emissions from atmospheric pressure relief devices located at refineries and chemical plants. The proposal does not expand the applicability or the current rule. No federal air pollution control requirement or other District rule regulates episodic emissions from pressure relief devices.

X. RULE DEVELOPMENT PROCESS

In developing the proposed amendments to Rule 8-28, District Staff went through an extensive rule development process to solicit and receive input from affected facilities, interested organizations, and other members of the public. This section summarizes that work.

A. PRD Audit – May, 2002

Staff's rule development efforts commenced with a detailed examination of the current rule. Staff began by conducting an audit of PRDs at all five petroleum refineries in the Bay Area to investigate whether those facilities have been detecting and reporting PRD releases as required by the Rule. The audit did not find any definitive evidence of reportable releases (over 10 pounds) that had gone undetected or unreported. Staff could not conclude that all reportable releases have been detected, however, because the refineries did not have comprehensive data available for many of their PRDs, either because they do not monitor the PRDs or because they do not maintain data for any length of time. Indeed, staff discovered several small releases of which the facility was not aware. These involved less than 10 pounds of material so they are exempt from the Rule and would not have had to be reported, but they highlight the possibility that reportable releases could have gone undetected as well. Staff concluded from this review that the potential exists for reportable releases to go undetected by refinery operators, and recommended that Regulation 8-28 should contain explicit monitoring and recordkeeping requirements to alleviate this problem.

B. Technical Assessment Document – December 2002

Staff then conducted a technical assessment of the current Rule that assessed options for further improvements. The resulting Technical Assessment Document ("TAD") echoed the findings of the PRD Audit that facilities are not monitoring all of their PRDs sufficiently to ensure that any reportable release is detected and reported to the District. The TAD recommended that an explicit

monitoring requirement be added to the rule to ensure that all releases can be detected and quantified, among other ideas.

C. Technical Workgroup Meeting – May 9, 2005

Staff next convened a public workgroup meeting to discuss the findings of the Rule Audit and Technical Assessment Document and potential improvements to the rule. The workgroup meeting was held on May 9, 2005, at the District's offices, and was attended by representatives of the five Bay Area refineries, the Western States Petroleum Association ("WSPA"), and Communities for a Better Environment ("CBE"), as well as by staff of the District and the California Air Resources Board. The workgroup discussed the following regulatory concepts:

- Clarification of the term "source" as used in the rule. Representatives of WSPA and the refineries suggested that "source" should be limited to pressure-related equipment, while representatives of CBE suggested that "source" should be defined to include any equipment that could be affected by a process upset, even if it is not pressure-related.
- Making explicit the duty to monitor for PRD releases. All parties were in general agreement that the rule should explicitly require monitoring to detect and characterize PRD releases. Representatives of CBE contended that current monitoring systems are deficient and that the refineries' reported information on releases underestimates actual emissions. Representatives of the refineries contended that current monitoring is sufficient to detect all releases, but agreed that further improvements could be made.
- Requiring telltale indicators on all PRDs. Representatives of WSPA and the refineries contended that pressure monitoring systems are preferable to telltale indicators as methods to detect and quantify releases. They suggested that facilities be given a choice to use telltale indicators or pressure monitors, instead of allowing pressure monitors only where telltale indicators are infeasible.
- Requiring additional controls on PRDs, beyond what is already required by the Rule. Representatives of CBE suggested that the District should require all PRDs to be piped to control systems, and that the District should at least go back and review its previous analyses on what level of controls should be required to determine if its earlier conclusions are still valid.
- Removal of obsolete provisions and other minor non-substantive amendments.

D. Public Workshop Meeting – September 14, 2005

Staff then took this input and developed a draft of the proposed rule amendments, along with a draft staff report. Staff disseminated these documents among interested parties and the public, and then convened an early-evening public workshop meeting in Rodeo, Contra Costa County, to receive public input on them. The meeting was attended by representatives of the refineries, WSPA, Dow Chemical, CBE, the Contra Costa County Health Services Department, and the District, as well as a number of interested individuals. The discussion focused on the following principal areas.

- Success of current approach. Representatives of WSPA noted that the current version of the rule has worked well in reducing the frequency and severity of PRD releases.
- Definition of "source". Representatives of CBE again commented that "source" should not be limited to pressure-related equipment, but should include all equipment in a given process unit. They claimed that this was the intent of the current version of the rule, and that limiting "source" to pressure-related equipment would amount to backsliding.
- Additional control requirements. Representatives of CBE and several members of the public suggested that the District should require all PRDs to be piped to controls. Representatives of CBE commented that such a requirement would be cost-effective, and suggested that staff need to conduct further analysis on that issue. They and other commenters also stated that all PRDs should be controlled regardless of costs. Representatives of CBE claimed that the "Precautionary Principle" states that all feasible pollution prevention measures should be implemented regardless of the costs and that application of that principle here would require controls on all PRDs. Several commenters suggested that a blanket control requirement could be made less onerous by phasing it in over a long lead time.
- Acutely hazardous materials. Representatives of CBE stated that staff should consider requiring controls on all PRDs to reduce the likelihood of a catastrophic release of acutely hazardous materials that could affect workers and nearby residents. They stated that allowing any PRDs to vent to the atmosphere presents an unacceptable risk.
- Fugitive emissions. Representatives of CBE commented that staff needs to consider the potential for reduced fugitive emissions (leaks) from PRDs that would result from requiring all PRDs to be controlled. They commented that this is an additional benefit to a blanket control requirement that staff needs to consider.

At the conclusion of the meeting staff also invited the public to submit written comments on the draft rule and staff report, and several entities did so.

E. Informal Office Meetings with Interested Parties – September 2005

Staff also met individually during this time period (immediately before and after the public workshop) with representatives from the refineries and WSPA, CBE, Contra Costa County Health Services Department, and Dow Chemical to discuss the proposed regulations. Following up on these meetings, each of these entities (except Dow Chemical) also submitted written comments on the public workshop draft summarizing their positions.

F. Further Technical Workgroup Meeting – October 20, 2005

Staff also held a further technical workgroup meeting to discuss additional cost-effectiveness information on which Staff wanted to receive input. Staff also sought additional input on how the term "source" should be defined, and on how to specify minimum requirements for monitoring systems for PRD releases. Some participants also voiced a desire to have the District prohibit the use of atmospheric PRDs altogether.

G. Changes to the Proposal in Response to Public Input

In response to the public input received during this process, Staff took further action in several areas, including the following.

- Telltale indicators and monitoring: Several parties suggested that pressure monitoring systems are better than telltale indicators in many instances. Staff agrees with these commenters, and has removed the preference for telltale indicators that it initially proposed. The current proposal would allow affected facilities to choose whichever system of monitoring they deem most appropriate, as long as it meets the standards set forth in Section 8-28-503. In addition, Staff has made the monitoring requirement more generic so that it can accommodate situations where pressure is not the principal indicator of whether the PRD has released and if so how much material was involved. Any monitoring system will require a demonstration (in a report to the District) of its ability to effectively monitor PRD releases.
- "Source" Definition. Staff initially proposed that "source" be defined as all equipment within a pressure-related system. Commenters pointed out that the intent of the current rule is that "source" is a broader term encompassing all equipment within a given process unit, because of the potential for a process upset leading to a PRD release is not limited to a particular pressure-related systems within a process unit. Staff researched the intent of the current rule further and determined that this is correct. Staff reviewed the rationale behind the intent of the current rule and believes that it is sound from a technical and policy perspective, and so has changed its proposal. Staff now proposes to define "source" as a

process unit, the definition that was intended in the 1997 amendments and has added a definition of "process unit" to clarify the intent of the rule.

- Further cost analysis. In response to comments that staff should re-evaluate the costs and benefits of piping all PRDs to control systems, staff conducted additional cost analysis, and done additional work to verify costs used for the 1997 amendments. Staff contacted major engineering firms to estimate costs from piping and controls regarding the Jacobs Engineering report prepared in connection with the 1997 amendments and found that the costs, as adjusted for inflation to 2005 dollar values, are valid. Engineering firms contacted to validate costs are listed in the Reference Section at the end of this staff report.
- Further catastrophic release analysis. In response to comments that staff should consider provisions directed at preventing catastrophic releases of acutely hazardous materials, staff has reviewed the existing requirements and the work of the Board's Ad Hoc Committee on Accidental Releases in the 1990s. There are numerous federal, state and local ordinances that create programs to plan, prevent and mitigate accidents and releases of materials as a result of accidents. The District has been involved in the development of these programs for various Bay Area facilities, including refineries. Of note is the Contra Costa County Industrial Safety Ordinance (ISO), adopted in 1998. The ISO requires process hazards analyses, implementation of action items from those analyses, review of prevention measures and root cause analyses when accidents occur, strengthening existing review, inspection, auditing, and safety requirements, including public input on results of inspections and audits, and expansion of federal and state programs to additional industrial processes. These issues are addressed in detail in Section IV.B of the Staff Report.
- Fugitive Emissions. Comments suggested that staff should assess fugitive emissions from PRDs. Fugitive emissions from leaks at pressure relief devices were estimated to be 3300 pounds (1.65 tons) per day in 1997. Because of the requirements in Rule 8-28 and in Rule 8-18: Equipment Leaks, inspection programs and stricter standards imposed since 1997 have reduced emissions to approximately 10 pounds per day.

Detailed responses to all of the comments received -in response to the public hearing notice and final draft rule are provided in Appendix B.

XI. CONCLUSIONS

The 1997 amendments to Regulation 8, Rule 28 have been successful in preventing releases, reducing emissions, and requiring control of those pressure relief devices that need it most. The rule has required refiners to consider these releases and integrate control technologies into their future plant modifications.

The proposed amendments to Regulation 8, Rule 28 meet the commitment made as part of 2001 Ozone Attainment Plan Further Study Measure 8. The proposed amendments will enhance the District's ability to enforce the rule and enhance the operator's ability to detect releases. The proposed amendments also clarify the rule so that it can be more easily understood.

Pursuant to the California Health and Safety Code Section 40727, before adopting, amending, or repealing a rule the Board must make findings of necessity, authority, clarity, consistency, non-duplication and reference. The proposed regulation is:

- Necessary to supplement the District's ability to enforce the regulation and ensure that all provisions in the regulation are complied with;
- Authorized by California Health and Safety Code Section 40702;
- Clear, in that the new regulation specifically delineates the affected industries, compliance options and administrative and monitoring requirements for industry subject to this rule,
- Consistent with other District rules, and not in conflict with state or federal law,
- Non-duplicative of other statutes, rules or regulations, and
- The proposed regulation properly references the applicable District rules and test methods and does not reference other existing law.

A socioeconomic analysis prepared by Applied Development Economics has found that the proposed amendments would not have a significant economic impact or cause regional job loss. A California Environmental Quality Act analysis prepared by Environmental Audit, Inc., concludes that the proposed amendments would not result in any adverse environmental impacts. A Negative Declaration for the proposed amendments has been prepared and was circulated for comment. All public noticing requirements for adoption of this rule have been met.

Staff recommends the adoption of the proposed amendments to Regulation 8, Rule 28: Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants, and approval of a CEQA Negative Declaration.

XII. RESPONSE TO PUBLIC COMMENTS

Staff published the proposed amendments to Regulation 8, Rule 28, on November 7, 2005, and solicited comments from interested parties. Staff received comments from the Western States Petroleum Association ("WSPA") (through its attorneys Pillsbury Winthrop Shaw Pittman LLP); Shell Oil Products US Martinez Refinery ("Shell") (which submitted a comment letter and also an email comment); and Tesoro Refining & Marketing Co. (Tesoro).[xi] Staff has considered all of the comments and has the following responses. The comments and responses are grouped by issue area, in no particular order.

Comment 1: Commenters expressed support for the targeted approach in the current rule, which aims to control "bad actor" sources that experience multiple releases within a 5 year period. (Tesoro comment letter at p. 3.) Commenters expressed significant differences in opinion on how to define a "source" that is a bad actor (as discussed further below), but there has been general agreement that throughout the rulemaking process that the approach of identifying "bad actors" that have a propensity for repeated releases is appropriate.

Response: Staff agrees that the targeted approach is appropriate, and is not proposing any changes to the requirement that the PRDs on a source that experiences repeated releases must be vented to a control system.

Comment 2: Several commenters suggested that releases caused by mechanical failures should not be counted when determining which sources are "bad actors." (Shell Comment Letter at p. 1; WSPA Comment Letter at p. 5, fn. 5.) Presumably, these commenters would prefer to count only releases caused by operator error or some other type of negligent conduct.

Response: Staff disagrees with this comment. Staff believes that any source that experiences multiple release events within a five-year period should be considered a "bad actor," regardless of the reasons for the releases.

Comment 3: A number of commenters contended that the term "source" used to define the "bad actors" regulated under the current rule should be defined as a pressure-related system of equipment, and not as an entire Process Unit as the current rule does. Commenters supported their position by contending that process upsets resulting in overpressures and ultimately in PRD releases are limited to individual pressure systems and cannot cascade from one pressure system to another, contrary to statements in the Staff Report. Commenters also

[xi] After the close of the public comment period, staff also received a "proprietary and confidential" letter from the Valero Refining Company. As the letter was not received during the public comment period and it purports to be a confidential communication that the District cannot make public, Staff do not believe this letter to be a public comment that the District must consider and respond to. But the relevant points raised in the letter are essentially the same as those raised in other public comments, and so Staff are responding to the substance of the points Valero raised through these Responses.

contended that the PRD release Prevention Measures required by the current rule are always implemented on a pressure-system basis and never on a Process-Unit-wide basis, contrary to statements in the Staff Report. Based on these points, the commenters concluded that there is no technical justification for defining "source" as "Process Unit". (Tesoro Comment Letter at pp. 3-5; WSPA Comment Letter at pp. 5-7.)

Response: Staff continues to believe that it is more appropriate to treat the entire Process Unit as the "bad actor" that needs to be controlled if it demonstrates a propensity for releases. Staff disagrees that upsets that cause PRD releases are necessarily limited to individual pressure-related systems. To the contrary, in many situations a process upset or similar problem that ultimately results in a PRD release could potentially affect any or all of the pressure-related systems within a Process Unit. Using the more limited definition of "source" proposed by these commenters – an individual pressure-related system instead of the entire Process Unit – would therefore allow some "bad actor" units with a demonstrated history of multiple releases to go uncontrolled.

One prime example that illustrates why these commenters' arguments are misplaced is the No. 50 Crude Unit at the Tesoro refinery. Tesoro has had recurring upsets at this Process Unit that have affected multiple pressure systems. According to Tesoro, the problems have arisen when the crude feed pumps experience abrupt rate changes, which causes a "pressure transient throughout the crude train." (*See* Letter from Alan A. Savage III, Environmental Manager, Tesoro Golden Eagle Refinery, to Christine Schaufelberger, Director of Enforcement, BAAQMD, December 11, 2002.) The first time this happened after the provisions of the 1997 Rule took effect, the upset caused PRDs to release on one pressure-related system, the first stage desalter. (See District Episode Nos. 03R32 and 03S04.) Then, the next time it happened the upset caused PRDs to release on a *different* pressure-related system, the second stage desalter. (See District Episode Nos. 03U11 and 03U68.) Tesoro took the position advocated by the refineries now: that the 50 Crude Unit was not a "bad actor" with a history of multiple releases because the repeat releases occurred on separate pressure-related systems – even though they were caused by a common, recurring problem. Tesoro therefore did not vent any of the PRDs involved to control systems, leaving both pressure systems unregulated even though the Unit had a demonstrated history of feed pump problems causing pressure transients and resulting in releases. Further problems then caused more releases at the first stage desalter again. (See District Episode Nos. 03Y27, 04A38, and 04F12.) Tesoro conceded that it had to control that pressure system, but it continued to maintain that the second stage desalter was a different "source" and thus exempt from the control requirement because it was a different pressure system. Again, that approach – which the refineries are urging here – would have left the second stage desalter unregulated, even with a demonstrated history of feed pump problems creating pressure transients that can cause PRD releases from that

pressure system.[xii] This is just one example from the record of releases since the current rule took effect that illustrates why it would be inappropriate to define "source" more narrowly as limited to individual pressure-related systems. To do so would exempt repeated upsets from the regulation where they happen to affect different pressure systems within a common Process Unit.

The commenters are similarly incorrect that the Prevention Measures designed to prevent or minimize releases are applied only on a pressure-system basis. The record indicates that many of the Prevention Measures apply to the entire Process Unit, not simply individual pressure systems. For example, one common type of Prevention Measure is to ensure that Unit operators are adequately trained on how to respond to upset conditions before they can result in a PRD release. This type of Prevention Measure applies to all pressure systems within a Process Unit, and if it should fail as a result of inadequate training the failure could result in a release on any of the pressure systems within the Process Unit. And again, this type of failure has actually happened in the record staff has examined. For example, operator training is one of the Prevention Measures the Tesoro refinery identified for its #1 HDS Process Unit. (*See* Avon Refinery Atmospheric PSV Prevention Measures Report, July 14, 2000.) That Prevention Measure failed when maintenance workers were left in charge of the Process Unit while they were working on the Unit's computer control system. The maintenance workers lacked adequate training to understand the significance of process alarms, and as a result they ignored a high-level alarm on the Unit's prefractionator surge drum, which overfilled and caused a PRD release. (*See* District Episode No. 02N76.) The upset happened to occur in this particular vessel on this particular day, but the problem that led to the PRD release – operators failing to respond to alarms properly – was a Process-Unit-wide problem. It could have led to a release from any of the pressure systems within the Process Unit if they had happened to experience upsets on that particular day. Again, this is just one of many examples in the record of PRD Prevention Measures reports the District has compiled since the current rule was adopted.

These examples, as well as many more like them in the record the District has examined, show why the rule cannot be limited to individual pressure-related systems. The causes of release events are not limited to individual pressure-related systems, and so a regulation limited to individual pressure-related systems would be too narrow.

Comment 4: Several commenters also contended that the term "source" in the current version of the rule that was adopted in 1997 was intended to be limited to pressure-related equipment, not an entire Process Unit. These commenters

[xii] Tesoro eventually controlled the PRDs on both pressure systems. But it maintains that it did so because there were multiple releases on each individual system, not because it viewed the pump problem and ensuing pressure transients as a repeat upset affecting the Process Unit. (*See* Tesoro Comment Letter at 1.)

argue that the District should adopt the narrower definition of "source" to conform to what they contend was the original intent in 1997. (Tesoro Comment Letter at p. 4; WSPA Comment Letter in its entirety.[xiii])

Response: Staff disagrees that the intent behind the current version of the rule adopted in 1997 was to limit the definition of "source" to individual pressure-related systems. The regulatory language adopted in 1997 uses the ambiguous term "source," which could be used to refer to either a Process Unit or a narrower grouping of equipment. But the Staff Report that accompanied the 1997 Amendments and the presentation made at the Public Hearing make it clear that the rule was intended to regulate all PRDs on a Process Unit, requiring telltale indicators after a first release event and requiring controls after a second release event within 5 years. The issue was initially raised by a public comment, which stated that the control requirements triggered by a second release event within five years "should apply to a second release *from any PRD serving the same process unit*, not merely the same PRD nor even those in parallel service." Staff agreed, and made clear that where there is a second release within 5 years from any PRD serving the same process unit, "*any PRD serving the same source (process unit)* must be vented to control." (1997 Staff Report, p. 30, Comment 18 & Response (emphasis added).) Staff also made this interpretation clear at the public hearing at which the Board of Directors adopted the current version of the rule, explaining that in the event of a second release within 5 years, "ultimately, the refinery will be required to vent *all of the devices associated with the process unit* to a gas recovery system or safety flare." (Testimony of Barry Young, Principal Air Quality Engineer, December 9, 1997 (emphasis added).)

The commenters are correct in pointing out that staff used some language that was less than perfectly clear in certain places in the 1997 Staff Report when referring to the PRD groupings that the rule applies to. For example, in some places the 1997 Staff Report uses the term "parallel service", and in some places it suggests that only the individual PRD that experiences two releases must be controlled, and nothing more. (*See* WSPA Comment Letter at p. 7.) But all of those statements were made in discussions of other issues unrelated to the issue of what was intended by the term "source". The only place in the 1997 Staff Report where that issue is squarely addressed is in the Response to Comments cited above, where Staff were unambiguously clear that the term was intended to mean "Process Unit." Taken in conjunction with the discussion at the Public Hearing, there is only one conclusion that can be drawn from the record: the intent behind the 1997 Amendments was that the "sources" covered by Section 304 of the Rule are entire Process Units, not simply individual pressure-related systems within Process Units.

[xiii] WSPA appears to be confused about the year in which the current rule was adopted. The material provisions of the current rule were adopted in 1997. Minor typographical revisions were adopted in 1998, but they did not impact any of the issues involved in the current proposal or any of the points raised by the commenters.

The commenters are also correct in pointing out that the language that staff ultimately proposed for Section 8-28-304.2 in 1997 was less than perfectly clear, stating that upon a second release event within five years on the same "source", "the facility shall vent all the pressure relief devices that vent the second Release Event, including those in parallel service," to a control system. (WSPA Comment Letter at 7.) This language is ambiguous and confusing. It suggests that the group of PRDs that have to be controlled after the second release event "includ[es] those in parallel service," which implies that the group is *larger* than those in parallel service – *i.e.*, all those on the Process Unit. But it does not explicitly use the term "Process Unit," or even the similar term "source" that is used elsewhere in Section 304. As a result, it is impossible to determine conclusively from the language of the regulation by itself what must be controlled. Faced with such ambiguity, one must look to the statements made on the subject in the Staff Report and at the Public Hearing. As outlined above, those statements clearly demonstrate that the intent was that all PRDs on a Process Unit must be controlled when the Process Unit experiences two release events within five years.

Comment 5: Several commenters claimed that applying the regulation to Process Units is inconsistent with the District's past practice. (WSPA Comment Letter at 8-9; Tesoro Comment Letter, pp. 1-2.) One commenter contended that it is "inequitable" to apply the rule to Process Units in light of the District's purportedly inconsistent past practice. (Tesoro Comment Letter, pp. 1-2.)

Response: The District's past practice has been to interpret "source" as "Process Unit", as was intended when the rule was adopted in 1997. This practice was first documented just two months after the current rule was adopted, on February 9, 1998, when WSPA representatives met with District staff to explain that WSPA believed that using a "Process Unit" definition was too burdensome. The refineries contended then – as they do now – that the term "source" was overly broad, and asked that it be narrowed to cover only those PRDs on the individual vessel or other piece of equipment involved in a release, not on the entire Process Unit. District staff disagreed (as Staff continues to do now), and declined to propose narrowing the regulation when minor non-substantive amendments were adopted in March of 1998.[xiv]

The District then applied this same interpretation in 1999 at the Benicia Refinery (operated by Exxon at the time, and now operated by Valero). There, Exxon experienced a PRD release at one of the three towers at its Crude Light Ends Unit, which are each a separate pressure system. Exxon approached the District to ask whether it had to install telltale indicators on all of the PRDs on the Unit, or

[xiv] One commenter appears to suggest that the District's failure to clarify explicitly that "source" was intended to mean Process Unit in the 1998 revisions indicates that the District acquiesced in WSPA's desire to have a narrower definition. (WSPA Comment Letter at p. 7.) But the District's refusal to adopt WSPA's position shows that the District *disagreed* with WSPA's arguments for the narrower definition, *not* that the District agreed.

only those on the pressure system where the release occurred. The District made clear that telltale indicators were required on the entire Unit, and that in the event of a second release event within 5 years all 4 of the PRDs on the Unit would have to be controlled.[xv] (*See* letter from William de Boisblanc, Director, BAAQMD Permit Services Division, to Eric R. Hengst, Exxon Company, USA, August 16, 1999.)

Finally, the District is also applying this interpretation currently with Tesoro's Alkylation Unit. The Process Unit has experienced the two release events that trigger the requirement to control the PRDs on the Unit. The District will require Tesoro to control all of the PRDs on the Unit by May 1, 2006, one year after the second release event occurred.

The commenters are correct that the Tesoro refinery used the narrower interpretation in connection with the repeated releases at the 50 Crude Unit (described above in connection with Comment 3), and the District did not take action to enforce the broader definition. But the failure of an agency to take enforcement action in a particular situation where a facility has not complied with a regulation does not re-write the regulation to excuse the non-compliance, whatever the reason. And as described above, the 50 Crude Unit is a prime example of why the regulation should not be limited to regulating individual pressure systems. The pump problems and resulting pressure transients that were causing the PRD releases there were affecting multiple pressure systems. Addressing only the individual pressure systems that experienced multiple releases allowed the potential for further releases at the other pressure systems affected by the pump problems and resulting pressure transients. Thus, to the extent this situation was an example of inconsistent application of the regulation, it should be considered as an aberration to be corrected and not as evidence of what was intended by the rule. Indeed, the situation further demonstrates why the language of the rule should be clarified to make its meaning unambiguous.

Comment 6: One commenter also contended that an early draft version of the current proposed amendments that was circulated in connection with a public workshop meeting in August of this year proposed to define "source" as "process component". The commenter pointed out that the definition of "process component" in that early draft was essentially limited to pressure-related equipment and did not encompass the entire Process Unit. The commenter noted that the draft staff report accompanying that workshop draft stated that the

[xv] Valero now contends that there were 8 additional PRDs on equipment "associated with" the Virgin Light Ends Unit for which the District did not require controls. (WSPA Comment Letter at p. 9.) But Valero never brought this issue to the District's attention in 1999. Valero simply asked if it had to address all of the PRDs on the Virgin Light Ends Unit, or simply those on the pressure system that had the release. Faced with that question, the District applied the "Process Unit" approach and responded that all of the PRDs on the Unit needed to be addressed. Had Valero informed the District that there was additional equipment that was also part of the Process Unit, the District would have concluded that it had to be addressed as well.

term “source” was intended to be limited to pressure-related equipment. The commenter contended that these drafts suggest that “source” in the current rule should be limited to pressure-related systems. (WSPA Comment Letter at pp. 8-9.)

Response: The commenter is correct that staff initially concluded that “process component” was a more appropriate definition for “source”. But this was only a preliminary assessment contained in a public workshop draft, which staff prepared in order to publish their initial assessment of the issue and to allow interested parties to comment on it. That is exactly what happened. As detailed in Section X of the Staff Report, the discussion at the public workshop revealed that the intent of the current rule was to regulate all the PRDs on a Process Unit, because the upsets that trigger PRD releases are not limited to particular pressure-related systems. (*See generally* Comments 3 and 4 above and the Responses thereto.) After the public workshop meeting, Staff went back and researched the issue in more detail and concluded that this was correct: “source” should properly be defined as “Process Unit” as was intended in the 1997 Amendments. Given this situation, Staff’s erroneous initial determination in the workshop draft does not suggest that the definition of “source” should be limited to individual pressure systems.

Comment 7: Commenters stated that controlling all PRDs on a Process Unit when the Process Unit experiences two releases within 5 years is costly, and contended that doing so will likely require the refineries to construct new flare systems. These commenters contended that the costs of such control systems are not justified by the resulting emissions reduction benefits. Most of these comments were couched in terms of “cost effectiveness” and suggested that controlling all the PRDs on a problem Process Unit would not be “cost effective.” Commenters also stated that staff have not conducted an adequate cost-effectiveness analysis as required by California law for the use of “Process Unit” as the definition, either in 1997 when the rule was initially adopted or in connection with the current proposed amendments. (Tesoro Comment Letter at pp. 3-5; WSPA Comment Letter at pp. 10-15; Shell Comment Letter at p. 1.)

Response: Staff recognizes that requiring PRDs to be vented to control systems on “bad actor” Process Units that experience two release events within five years may require refineries to incur substantial costs. As explained in the Staff Report, venting PRDs to control systems is costly, regardless of whether a new control system needs to be installed. But for “bad actor” Process Units, such expenditures would achieve important corresponding air quality benefits. Controlling the PRDs on these units will eliminate potentially enormous episodic releases at volatile processes that have demonstrated a propensity for recurring problems. Historically, such releases have resulted in emissions of tens and even hundreds of tons of ozone precursors in a single day – amounts that are very significant from the perspective of preventing violations of the applicable ambient air quality standards for ozone. Where there is a substantial risk of a

release that could contribute to a violation of a public health standard, even very large costs could be justified under certain circumstances. "Bad actor" Process Units that have a demonstrated propensity for releases present such circumstances.

It is important to note that this conclusion holds for "bad actor" units that have demonstrated a propensity for repeat releases, but it is much more tenuous with respect to the bulk of the PRD population that has not shown a high release risk. Where PRDs have a very low potential for upsets and releases, and hence present a far lower ozone concern, it is not possible to justify very large expenditures on control equipment. For this reason, staff continues to believe that a blanket control requirement that *all* existing PRDs be vented to a control system would not be justified given the costs involved, whereas the targeted approach requiring controls only on "bad actor" Process Units is worth the costs involved.

With respect to the comments to the effect that targeting "bad actor" Process Units "does not meet standard tests for cost effectiveness" (Tesoro Comment Letter at p. 1; *see also* WSPA Comment Letter at pp. 10-15.), the commenters have apparently misunderstood the concept of cost-effectiveness. There is no such thing as a "standard test for cost-effectiveness." Cost-effectiveness is a useful tool for comparing alternative emission reduction strategies to determine which alternative can achieve the same goal at the least cost. It is not a bar to adopting certain regulations simply because they may be expensive. To the extent that the concept is applicable here, it would be to compare the rule's current approach with alternative approaches that would achieve the same result in controlling episodic emissions from the "bad actor" PRDs that have demonstrated a propensity for repeat releases (although this is a hypothetical exercise because no such alternative approaches have been identified). It is not appropriate to use "cost-effectiveness" expressed in terms of annual emissions to compare a regulation aimed at episodic emissions with other regulations that address steady-state emissions produced day in and day out at a constant rate, as most District regulations do. This is because episodic releases occur relatively rarely and thus do not present large totals on an annual basis. They may still be a large problem on a daily basis, however, because they can emit large amounts of material in a short time. Using the concept of "cost-effectiveness" as these commenters suggest ignores these benefits of controlling episodic releases.

Finally, with respect to the formal cost-effectiveness analysis required by California law, the targeted control approach set forth in the current rule – regulating "bad actor" Process Units that experience multiple releases within five years – was supported by the cost-effectiveness analysis that was conducted in connection with the adoption of the current rule in 1997. Staff has conducted a further formal cost-effectiveness analysis for the changes that are being proposed to the rule, but the analysis did not revisit the issue with respect to the

targeted control approach because staff is not proposing any changes to this approach. Staff's response to the comments that the "Process Unit" clarification constitutes a change from the existing rule is set forth above in connection with Comment 4.

Comment 8: Commenters contended that applying the regulation to entire Process Units involves certain negative environmental effects because of the natural gas usage and other aspects of flare systems that may be required for "bad actor" Units that demonstrate a propensity for repeat releases. These commenters stated that the District has not conducted a CEQA analysis of these impacts. (Tesoro Comment Letter at pp. 4, 5; WSPA Comment Letter at pp. 15-18.)

Response: Staff recognizes that there are certain environmental impacts associated with flares. Such impacts are outweighed by the potential for very large releases from "bad actor" process units that show a propensity for upsets, however. For example, a small negative impact from emissions from pilot or purge gas used in a flare on a daily basis would be outweighed by the large positive impacts from having a flare in place when a PRD vents a large volume of material to relieve a process overpressure. Staff therefore believes that overall, this rule has a positive effect on the environment.

With respect to the legal requirements of CEQA, the current rule was adopted pursuant to a negative declaration in 1997 that found that the requirement to control PRDs on a Process Unit that experiences multiple releases would have no significant adverse environmental impacts. The District is not changing that requirement in any way, and so there are no additional or different environmental impacts to be analyzed. The District has prepared a CEQA initial study that evaluates the effects of the changes to the rule that staff are proposing. This CEQA document does not address the impacts of the targeted control approach that requires repeat-release Process Units to be controlled because that is not something that is being proposed in this rulemaking. Staff's response to the comments that the "Process Unit" clarification constitutes a change from the existing rule is set forth above in connection with Comment 4.

Comment 9: Several commenters identified certain items of equipment at certain refineries that the commenters claim would be inappropriately grouped together for regulatory purposes under the "Process Unit" definition. These commenters were concerned that if they have two releases from such equipment within 5 years, the rule would unfairly require them to control all of the PRDs on all of the equipment involved. (Tesoro Comment Letter pp. 4-5, Summary Points 1 & 5; Shell Comment Letter at p. 1; Valero communication referenced in footnote 1 above.)

Response: How the regulation applies to individual pieces of equipment at individual facilities is necessarily a fact-specific determination that must be made

on a case-by-case basis after a full investigation of all relevant circumstances. Staff are not in a position in the context of a rulemaking effort to provide a conclusive determination of how the regulation will work in hypothetical future situations. As a result, Staff cannot provide a meaningful response to these comments regarding particular Process Units at particular refineries.

As a general principle, however, Staff intends to apply the regulation in a reasonable manner, and does not intend to require controls in situations where it would be ill-advised from an air quality perspective. Staff has built in a mechanism to achieve this goal in Section 8-28-409 of the proposed amendments, which requires each refinery to submit to the District a list of the Process Units that are equipped with PRDs, as the refineries would define them. Staff will then have an opportunity to determine how to define the equipment subject to the rule in an appropriate manner so that the unreasonable outcomes these refineries fear will be avoided. If it is truly not possible to avoid significant unreasonable outcomes with the current "Process Unit" approach, it will always remain possible to propose further amendments to address any problems that become evident as the rule is implemented, while avoiding the pitfalls associated with the refineries' narrower approach that are outlined above.

Comment 10: One commenter noted that the current rule contains an exception to the requirement to implement at least three redundant Prevention Measures for each PRD that allows facilities to implement fewer than three prevention measures for a particular PRD on the condition that the control requirements are triggered after a single release rather than after two releases. The proposed amendments delete the option of having fewer than three prevention measures, but do not provide a future compliance date. The commenter stated that the lack of a future compliance date means that in some cases facilities may be out of compliance immediately upon adoption. (Shell e-mail comment.)

Response: Staff has made a change to the proposed amendments to correct this oversight, which would provide a six month period to allow facilities to implement three prevention measures for each PRD. This revision is not a substantive change to the proposed amendments, and does not require a new public notice and comment period or continuation of the public hearing in order to be adopted.

Comment 11: Although no public commenter raised this issue, District staff have discovered that one release event that occurred since the current rule took effect was inadvertently left out of the baseline emissions inventory Staff used to calculate the emissions reductions expected from the rule (and related calculations) in the original version of the Staff Report.

Response: Staff have corrected the oversight and have calculated the correct numbers. These numbers are set forth in the revised version that is being made available in connection with this Response to Public Comments. None of these

changes affects the conclusions reached in the Staff Report or the proposed amendments to the rule.

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[3] Testimony of Mr. Jim Karas, BAAQMD Air Quality Engineering Manager, Meeting of BAAQMD Ad Hoc Committee on Accidental Releases, October 26, 1995.

[4] Final Staff Report, Control of Episodic Releases Of VOCs From Pressure Relief Devices at Petroleum Refineries, Dec. 9, 1997, p. 30.

[5] Testimony of Mr. Barry Young, Principal Air Quality Engineer, Public Meeting of the BAAQMD Board of Directors, Dec. 9, 1997.

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SOCIOECONOMIC
ANALYSIS
PROPOSED RULE

REGULATION 8, RULE 28: EPISODIC RELEASES FROM PRESSURE RELIEF DEVICES AT PETROLEUM REFINERIES AND CHEMICAL PLANTS

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1. EXECUTIVE SUMMARY

INTRODUCTION

This report describes the socioeconomic impacts of proposed amendments to Regulation 8, Rule 28 in order achieve and maintain state ambient air quality standards for ozone, and reduce episodic releases from atmospheric pressure relief devices in petroleum refineries. Following this summary, the report summarizes the proposed rule requirements and describes the methodology for the socioeconomic analysis. The report also describes the economic characteristics of sites affected by the proposed rule amendments along with the socioeconomic impacts of the proposed amendments. The proposed amendments will assist the BAAQMD in meeting its commitments to improving air quality in the region by improving the clarity and enforceability of Regulation 8, Rule 28.

SUMMARY

The proposed rule affects Pressure Relief Devices (PRD) at the five oil refineries in the San Francisco Bay Area region. It is estimated that the refineries employ about 1,935 workers and provide a total payroll of $557 million per year. The refineries are estimated to generate sales of $9.8 billion per year and to realize net income of about 7 percent of sales, or $689 million per year.

Compliance with the proposed rule amendments would require refineries to submit reports identifying all of their affected equipment and demonstrating that they have the capability to detect and record a Release Event from any of their PRDs. Compliance is expected to cost approximately $65,300 District-wide.

The socioeconomic analysis evaluates the compliance costs in relation to the financial characteristics of the affected facilities to determine the significance of the economic impact of the proposed rule amendments. The compliance cost represents approximately 0.01 percent of profits for the affected

facilities, well below the 10 percent threshold of significance for such impacts. The analysis concludes that the affected refineries should be able to absorb these costs without significant economic dislocation or job losses. The analysis also addresses the issue of potential impacts to small businesses but concludes that the affected refineries do not meet the criteria to be considered small business operations.

2. DESCRIPTION OF PROPOSED RULE

CURRENT STATUS OF THE RULE

Regulation 8, Rule 28, which addresses episodic emissions of both organic and inorganic compounds from Pressure Relief Devices (PRD) located at petroleum refineries and chemical plants, was last amended in 1998. For petroleum refineries, the rule requires that facilities report to the District any releases over 10 pounds from a PRD and that certain substantive measures be taken to reduce the likelihood of releases. For chemical plants, the rule requires only release reporting (releases of 10 pounds or more). The existing rule requirements are summarized below:

1) **New and Modified Sources**: PRDs at new and modified sources at petroleum refineries must vent to a fuel gas recovery system, furnace, or flare with a control efficiency of at least 98 percent

2) **Existing Sources**: Any PRD in organic compound service at an existing source at a petroleum refinery must implement specified prevention procedures to minimize releases.[1]

3) **Releases from PRDs**: Within 90 days of a reportable Release Event a facility must:

    a. Conduct a process hazard analysis including an evaluation of the cost effectiveness and technological feasibility of controls
    b. Implement prevention measures (to the extent they have not already been implemented)
    c. Conduct a failure analysis to discover the cause of the release and prevent recurrences

[1] The prevention measure procedures include: 1) establishing training, equipment, inspection, maintenance and monitoring requirements; and 2) implementing prevention measures such as process flow, temperature, level, and pressure indicators with interlocks; documented and verified routine inspection and maintenance programs; inherently safer design; and deluge systems.

All PRDs on the source that experienced the Release Event must be equipped with a telltale indicator and evaluated for control within 120 days of the Release Event. All PRDs on any source that experiences two or more Release Events within five years must be vented to a control device.

4) **Reporting Requirements for Refineries and Chemical Plants**: Following all Release Events: 1) the Event must be reported by the next working day; 2) the associated PRDs must be inspected within five days; and, 3) a report must be submitted to the District within 30 days.[2]

   The requirement to report this information implies that facilities must monitor PRDs to determine whether a Release Event has occurred and if so, the duration, cause, type and amount of material released. There is no explicit monitoring requirement in the rule, however.

PROPOSED RULE AMENDMENTS

In 2005, building upon the District's 2002 audit of PRDs located at the five refineries located in the San Francisco Bay Area (Bay Area), District staff evaluated the rule and developed a set of recommendations to improve its effectiveness. Based upon those recommendations, staff is proposing the following amendments to the Rule:

1. Require facilities to ensure that they have the capability to detect and quantify all release events, including small releases of 10 pounds (the reporting threshold), and require facilities to demonstrate this capability to the District;
2. Require data recording and recordkeeping for venting and emissions verification;

[2] The report must include: 1) date, time, and duration of Release Event; 2) device that experienced the Event; 3) District-assigned release number; 4) type and size of device; 5) type and amount of material released; 6) information used to estimate duration and amount released; 7) cause of release; 8) schedule prevention of re-occurrence action; and, 9) results of fugitive emission inspection.

3. Clearly define the equipment subject to the rule as the process unit to ensure that the original intent of the rule – to regulate all PRDs on an individual source (i.e., process unit) in the same manner – is clarified;
4. Require facilities to report to the District their analysis of the root causes and potential corrective actions after each PRD release event;
5. Make minor, non-substantive changes to the rule such as deleting obsolete references to "turnarounds," moving requirements where appropriate, and clarifying various sections of the rule.

EMISSIONS REDUCTIONS

Since the 1998 amendments took effect, there have been 42 Release Events reported by the five Bay Area refineries according to Release Event Reports submitted to the District. These 42 Release Events vented 125 tons of VOC emissions, according to the refineries' calculations. The 125 tons of reported VOC emissions translates to average emissions of approximately 17.9 tons per year.

Ensuring that facilities are using comprehensive monitoring systems will ensure that facilities are fully aware of release events, which will allow operators to better target their release prevention and mitigation efforts and will ensure that repeat-release "bad actors" and identified and subjected to additional control requirements. These effects, in turn, are expected to lead to fewer release events and reduced emissions.

US EPA has estimated from time to time in various rulemakings that enhanced monitoring can result in a ten to twenty percent emissions reduction. Here, staff believes that the proposal to add an explicit monitoring requirement should more appropriately to use a five percent emissions reduction factor, because many PRDs are already subject some form of monitoring and it appears that most releases – and especially the larger ones – are being detected.

Using the 17.9 tons-per-year average emissions figures from the period 1998-2005, a 5% reduction would result in approximately 0.9 fewer tons of emissions per year.

3. IMPACT OF PROPOSED RULE AMENDMENTS

This section of the socioeconomic analysis describes demographic and economic trends in the San Francisco Bay Area (Bay Area) region. Following an overview of the methodology for the socioeconomic analysis, the first part of this section compares the Bay Area against California and provides a context for understanding demographic and economic changes that have occurred within the Bay Area between 1994 and 2004. After an overview of Bay Area industries, we focus on SIC 2911, Petroleum Refining (NAICS 32411) and how the proposed changes to Rule 8-28 concerning episodic releases from pressure relief devices (PRDs) would impact the refineries in the Bay Area. For the purposes of this report, the Bay Area region is defined as Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties.

3.1 METHODOLOGY

The socioeconomic analysis of the proposed rule amendments concerning episodic releases of PRDs involves the use of information provided directly by BAAQMD, as well as secondary data used to describe the industries affected by the proposed rule amendments.

Based on conversations with BAAQMD staff, ADE determined that the impacts would affect the oil refineries in the BAAQMD region: Chevron, Shell, Conoco Phillips, Valero, and Tesoro.

With this information we began to prepare an economic description of the industry groups of which the affected sites are part, as well as to analyze data on the number of jobs, sales levels, the typical profit ratios and other economic indicators for Bay Area oil refineries. ADE also reviewed and summarized documents available to the public such as annual reports for publicly traded companies.

With the annual reports and data from the US Economic Census, ADE was able to estimate revenues and profit ratios for many of the sites affected by the proposed PRD rule

amendments. In calculating aggregate revenues generated by Bay Area refineries, ADE first estimated an average revenue figure for a refinery based on revenues generated over the four-year period between 2000 and 2003. Using annual reports and publicly available data, ADE calculated ratios of profit per dollar of sales for the refineries. To estimate employment, ADE used employment data from Dun & Bradstreet.

The result of the socioeconomic analysis shows what proportion of profit the compliance costs represent. Based on a given threshold of significance, ADE discusses in the report whether the affected sites are likely to reduce jobs as a means of recouping the cost of compliance or as a result of reducing business operations. To the extent that such job losses appear likely, the indirect multiplier effects of the job losses area estimated using a regional IMPLAN input-output model.

3.2 REGIONAL DEMOGRAPHIC TRENDS

The Bay Area experienced moderate population growth from 1994 to 2004. Between 1994 and 1999, the nine-county region increased by 7 percent, from 6.2 million in 1994 to 6.6 million in 1999. From 1994 to 2004, the population increase was from 6.2 million to 6.8 million for an increase of 11 percent. At the same time, California had population growth of 14 percent.

Within the Bay Area, the greatest percentage increase occurred in Contra Costa County. From 1994 to 2004 Contra Costa increased its population by 18 percent. All other Bay Area counties had population increases equal to, or slower than, the State. The smallest percentage increase occurred in Marin and San Mateo Counties where population grew 5 percent from 1994 to 2004. Table 1 shows the population changes that have occurred in the Bay Area and California from 1994 to 2004.

TABLE 1
Population Growth: San Francisco Bay Area

	Population			Percent Change		
	1994	1999	2004	94 – 99	99 – 04	94 – 04
California	30,889,182	32,971,834	35,300,654	7%	7%	14%
Bay Area	6,189,000	6,646,167	6,865,370	7%	3%	11%
Alameda County	1,302,462	1,406,046	1,470,456	8%	5%	13%
Contra Costa County	844,076	914,645	992,608	8%	9%	18%
Marin County	228,718	236,955	239,209	4%	1%	5%
Napa County	111,083	118,088	126,283	6%	7%	14%
San Francisco County	729,024	771,122	772,985	6%	0%	6%
San Mateo County	667,218	712,376	702,017	7%	-1%	5%
Santa Clara County	1,544,523	1,672,977	1,701,831	8%	2%	10%
Solano County	356,652	377,601	399,826	6%	6%	12%
Sonoma County	405,244	436,357	460,155	8%	5%	14%

Source: Applied Development Economics, based on household population estimates from The California Department of Finance

3.3 REGIONAL ECONOMIC TRENDS

The Bay Area is one of the world's greatest regional economies. It benefits from pre-eminent knowledge-based industries, with competitive strength flowing from an unmatched culture of entrepreneurship, world-leading research institutions, and some of the nation's best educated and most highly skilled workforce. With these remarkable advantages, it has led through innovation in a wide range of research and industrial fields.

Many of the Bay Area's most prominent industries are manufacturing related. Bay Area manufacturers are often high profile companies with world-renowned recognition. From small to large, Bay Area industry has been dynamic, creating wealth and jobs in both the export sector and local serving industries.

The economic base is typically comprised of export industries within the manufacturing, minerals-resource extraction, and agricultural sectors. There are also the "local support industries" such as retail or service sectors, the progress of which is a function of the economic base and demographic changes, and more so the latter than the former. As population increases in a given area, demand for services –

such as realtors, teachers, healthcare – increases, as does demand for basic retail items like groceries, gas for commuting, or clothing at the local apparel shops.

The industries affected by the proposed PRD rule amendments are a prominent part of the region's economic base. Mainly engaged in export related business, the oil refineries are classified as manufacturers. In the Bay Area, manufacturing jobs have decreased over the last decade. In 1994, manufacturing accounted for 14 percent of all Bay Area employment. By 2004, manufacturing declined 11 percent to account for 11 percent of all Bay Area employment.

As of 2004, the professional and business services sector was the largest employer in the region, at 520,200 jobs or 16 percent of all private and public sector jobs. This is a change from 1994 when professional and business services accounted for 15 percent of all Bay Area employment. During the same period, professional and business services increased 17 percent. The next largest industry in the Bay Area is public service, or government, with 460,300 jobs. In 2004, government accounted for 14 percent of all Bay Area employment. From 1994 to 2004, government had one of the lowest growth rates of all industries at 4 percent. Two other industries came close to manufacturing in total employment. Retail trade and education & health care both made up 11 percent of total employment and had only a few hundred or few thousand jobs less than manufacturing. Unlike manufacturing, both retail trade and education & health care had significant job gains from 1994 to 2004. All other industries made up less than manufacturing in total employment in 2004. Table 2 shows Bay Area industry sectors and their trends from 1994 to 2004.

Table 2
Employment Profile of the San Francisco Bay Area, 1994 - 2004

Industry	1994	1999	2004	% of Total Employment in 2004
Farm	25,800	28,600	21,300	1%
Natural Resources & Mining	4,300	3,600	2,300	0%
Construction	109,300	171,400	181,000	6%
Manufacturing	405,400	459,400	359,700	11%
Wholesale Trade	118,500	107,100	121,900	4%
Retail Trade	300,200	339,000	337,900	11%
Transportation & Warehousing & Utilities	115,500	124,700	102,900	3%
Information	89,200	122,100	111,600	3%
Financial Activities	193,300	197,400	209,800	7%
Professional and Business Services	445,400	626,100	520,200	16%
Education & Health Care	293,800	335,000	359,200	11%
Leisure and Hospitality	250,000	289,500	304,400	10%
Other Services	100,100	108,800	109,700	3%
Government	444,500	449,800	460,300	14%
Total	**2,895,300**	**3,362,500**	**3,202,200**	**100%**

Source: Applied Development Economics from data supplied by the Labor Market Information Division of the California Employment Development Department

3.4 DESCRIPTION OF AFFECTED INDUSTRIES

The proposed PRD rule amendments affect industries in SIC 2911, Oil Refining (NAICS 32411 – oil refineries). What follows is a description of this industry, along with economic trends for oil refineries in the Bay Area, and it provides a comparison between 2001 and 2004. Data in Table 3 are for all sources, not just the five major oil refineries in the Bay Area. As shown in Table 3, employment in oil refineries increased by 2 percent in the four years from 2001 to 2004. This is at the same time that Bay Area manufacturing jobs decreased 22 percent. In California, oil refineries declined 5 percent during the same period and manufacturing jobs declined 14 percent.

Table 3
Employment Trends: Industries Affected by Proposed Amendments, 2001 - 2004

	2001	2002	2003	2004	Change from 2001 to 2004	% Change from 2001 to 2004
San Francisco Bay Area						
Manufacturing	460,992	402,895	362,089	357,385	-103,607	-22%
Petroleum refineries	7,086	7,271	7,248	7,196	110	2%
California						
Manufacturing	1,780,544	1,633,958	1,532,287	1,536,787	-243,757	-14%
Petroleum refineries	13,447	12,878	13,149	12,776	-671	-5%

Source: Applied Development Economics from data supplied by the Labor Market Information Division of the California Employment Development Department

Table 4 identifies the economic characteristics of the refineries affected by the proposed PRD rule amendments. This table shows that the refineries are estimated to employ 1,935 workers. These sites have an estimated aggregate payroll of $172 million, and estimated revenues of $9.8 billion. In calculating aggregate revenues generated by Bay Area refineries, the consultant estimated an average revenue figure per refinery based on revenues generated by that refinery in 2004 using annual reports. Then, the consultant summed the refineries' estimated revenue to arrive at the aggregate amount of $9.8 billion.

Table 4
Economic Characteristics of Impacted Oil Refineries in the San Francisco Bay Area

No. of Oil Refineries	Estimated Sales	Estimated Employment	Estimated Payroll
5	$9,837,599,000	1,935	$172,194,000

Source: U.S. Economic Census 2002; California Employment Development Department Quarterly Census of Employment and Wages

As Table 5 shows, the affected sources represent 27 percent of all employment within their respective industry in the Bay Area. Overall, there are an estimated 7,196 petroleum refining employees in the Bay Area. Of the 7,196 workers, 1,935 work in the affected refineries, or 27 percent. In all of California, there were 12,776 workers in SIC 2911 (NAICS

32411), meaning that the affected Bay Area refineries equal 15 percent of the state oil refinery workforce.

Table 5
Employment at Impacted Sites Relative to the Bay Area as a Whole

No. of Oil Refineries	Estimated Employment	Affected Oil Refineries as a % of Bay Area Total	Affected Oil Refineries as a % of California Total
5	1,935	27%	15%

Source: Calculations by Applied Development Economics

3.5 COMPLIANCE COSTS

The proposed rule amendments require that each affected refinery prepare and submit to the District a "Monitoring System Demonstration Report." This report would provide information that would demonstrate that the refineries have adequate monitoring systems in place for all of their atmospheric PRDs subject to the rule. Section 8-28-407 is proposed to require facilities to submit a monitoring demonstration report that will enable staff to enforce the monitoring requirements. The report will require descriptions of the monitoring equipment, operating parameters and engineering calculations used to quantify emissions releases. District Staff have estimated that preparing the needed information for inclusion in the report for each PRD would take about two man-hours per PRD. (Most of this information if already available and must be utilized in the event of a release event and the subsequent report to the District.) The hour labor cost is estimated to be approximately $100 per hour. Because there are 324 PRDs in total at the five Bay Area refineries, the District estimates that the total one time cost of this provision to be about $64,800.

The proposed amendments also require each affected refinery to provide a listing of each process unit equipped with atmospheric PRDs and the associated PRDs. This information is already generally available and would not require any additional man-hours to generate. Preparation of the report for submission should take no longer than an hour for each refinery. District Staff have therefore estimated the

cost associated with this provision to be approximately $100 per refinery; this translates to $500 District-wide.

District staff have also recognized that some facilities may have to install additional monitoring equipment to be able to demonstrate that they can detect releases as required by the rule, which could cost approximately $1,500 per PRD. The requirement to have such equipment is already an implied requirement of the existing rule, however. The current proposal simply makes the requirement explicit and establishes minimum standards for such equipment. As such, any costs facilities will incur for new equipment are not attributable to the proposed amendments. Moreover, District staff expect these costs to be relatively small, as few PRDs will need additional equipment.

Therefore, the total one time compliance cost that would result from the proposed amendments would be approximately $65,300.

3.6 BUSINESS RESPONSE TO COMPLIANCE COSTS

Sites impacted by the proposed PRD rule amendments may respond in a variety of ways when faced with new regulatory costs. These responses may range from simply absorbing the costs and accepting a lower rate of return to shutting down the business operation all together. Businesses may also seek to pass the costs on to their customers in the form of higher prices, although, in general, throughout the oil industry prices are set in global markets and individual producers or refineries are not in a position to affect prices. More likely, they may renew efforts to increase productivity and reduce costs elsewhere in their operation in order to recoup the regulatory costs and maintain profit levels.

3.7 IMPACT ANALYSIS

The businesses' responses to increased compliance costs hinge on the effect of the costs on the profits generated at the affected sites. An impact on estimated profits greater than 10 percent implies that the source would experience serious economic effects because of the compliance cost. When

compliance costs are greater than 10 percent of estimated profits, companies typically respond to the impact by laying off some workers, closing parts of manufacturing facilities or, in the most drastic case, possibly closing the manufacturing facility.

Using the cost estimates developed for the proposed PRD rule amendments, ADE calculated the socioeconomic impacts of the proposed actions. In calculating impacts on profits, ADE used return on sales ratios identified by media reports and in annual reports of companies directly affected by the proposal. Based on this information, we estimate that the affected refineries generated a combined profit of $688 million on $9.8 billion in revenues.

Table 7 compares the estimated costs of the proposed PRD rule amendments and their impact on profits. Affected refineries will incur an initial cost of approximately $**65,300.** This cost represents an estimated **0.01** percent of profits for the oil refineries affected by the proposed PRD rule amendments. This cost impact is far below the 10% of profits above which facilities would experience serious economic effects.

Table 6
Impact of Proposed Changes on Estimated Profits at Bay Area Oil Refineries

Impacted Refineries	Estimated Profits Generated	Cost of Compliance	Cost as a % of profits
5	$688,632,000	$65,300	0.01

Source: Calculations by ADE, based on a 7 percent profit margin for oil refiners

Furthermore, even if facilities had to incur costs for installing additional monitoring equipment of 5 times this cost, and these costs were considered to be required by the proposed amendments rather than required under the current rule, the cost of compliance would still be only **0.05** percent of profits. Even under this conservative assumption, the impact would still be far below the 10% significant impact threshold.

3.8 IMPACT ON SMALL BUSINESSES

In addition to analyzing the employment impacts the proposed PRD rule amendments, state legislation requires

that the socioeconomic analysis assess whether small businesses are disproportionately affected by air quality rules.

For purposes of qualifying small businesses for bid preferences on state contracts and other benefits, the State of California defines small businesses in the following manner:

- Must be independently owned and operated;
- Cannot be dominant in its field of operation;
- Must have its principal office located in California
- Must have its owners (or officers in the case of a corporation) domiciled in California; and,
- Together with its affiliates, be either:
    - A business with 100 or fewer employees, and an average gross receipts of $10 million or less over the previous tax years, or
    - A manufacturer with 100 or fewer employees

The refineries that are affected by the proposed PRD rule amendments are not independently-owned and operated businesses. These refineries are owned by publicly-traded global corporations whose headquarters are generally outside of California. In addition, each of the refineries that are affected by the proposed PRD rule amendments employ, on average, 387 workers (and far more when affiliates are included), and their average revenue is approximately $1.9 billion. Thus, by the standards established by the State of California, these sources are not small businesses. Based on this discussion, it is determined that the proposed PRD rule amendments do not disproportionately affect small businesses because the sources impacted by the proposed changes do not meet California's definition of small business.

Initial Study/Negative Declaration for the Amendments to Bay Area Air Quality Management District Regulation 8, Rule 28

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November 2005

Chapter 1

Chapter 2

Chapter 3

TABLES:

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Chapter 1

Introduction

Purpose of this Document

This Initial Study/Negative Declaration (IS/ND) assesses the environmental impacts of the proposed adoption of amendments to Regulation 8, Rule 28, by the Bay Area Air Quality Management District (BAAQMD or District) as required by the California Environmental Quality Act (CEQA) and in compliance with the state CEQA Guidelines (Title 14 California Code of Regulations §1400 et seq.). An IS/ND serves as an informational document to be used in the decision-making process for a public agency that intends to carry out a project; it does not recommend approval or denial of the project analyzed in the document. The BAAQMD is the lead agency under CEQA and must consider the impacts of the proposed rule amendments when determining whether to adopt them. The BAAQMD has prepared this IS/ND because no significant adverse impacts would result from the proposed rule amendments.

Scope of this Document

This document evaluates the potential impacts of the proposed amendments on the following resource areas:

- aesthetics,
- agricultural resources,
- air quality,
- biological resources,
- cultural resources,
- geology and soils,
- hazards and hazardous materials
- hydrology and water quality,
- land use planning,
- mineral resources,
- noise,

- population and housing,
- public services,
- recreation,
- transportation and traffic, and
- utilities and service systems.

Impact Terminology

The following terminology is used in this IS/ND to describe the levels of significance of impacts that would result from the proposed rule amendments:

- An impact is considered *beneficial* when the analysis concludes that the project would have a positive effect on a particular resource.
- A conclusion of *no impact* is appropriate when the analysis concludes that there would be no impact on a particular resource from the proposed project.
- An impact is considered *less than significant* if the analysis concludes that an impact on a particular resource topic would not be significant (i.e., would not exceed certain criteria or guidelines established by BAAQMD). Impacts are frequently considered less than significant when the changes are minor relative to the size of the available resource base or would not change an existing resource.
- An impact is considered *less than significant with mitigation incorporated* if the analysis concludes that an impact on a particular resource topic would be significant (i.e., would exceed certain criteria or guidelines established by BAAQMD), but would be reduced to a less than significant level through the implementation of mitigation measures.

Organization of This Document

The content and format of this document, described below, are designed to meet the requirements of CEQA.

- Chapter 1, "Introduction," identifies the purpose, scope, and terminology of the document.
- Chapter 2, "Description of the Proposed Rule," provides background information of Regulation 8, Rule 28, describes the proposed rule amendments, and describes the area and facilities that would be affected by the amendments.

- Chapter 3, "Environmental Checklist," presents the checklist responses for each resource topic. This chapter includes a brief setting description for each resource area and identifies the impact of the proposed rule amendments on the resources topics listed in the checklist.

- Chapter 4, "References Cited," identifies all printed references and personal communications cited in this report.

Chapter 2

Description of the Proposed Rule

Background

Pressure relief devices are a means to safely relieve excessive pressures to protect process equipment, piping and other components to prevent the rupture of equipment or other safety hazards. PRDs are designed to vent, or "lift", at a prescribed "set pressure" to relieve excess pressure before it can exceed safe operating and/or equipment design levels. In most new refinery construction, PRDs in VOC service relieve to a control system such as a safety flare or thermal oxidizer. However, many older installations still have PRDs that vent directly to the atmosphere, resulting in the emission of VOCs and/or other material when the PRDs lift or if the valve leaks at pressures below the set point. These PRDs are called "atmospheric" PRDs.

Bay Area 2001 Ozone Plan Further Study Measure FS-8 committed the Bay Area Air Quality Management District to examining whether there is the potential for reducing emissions of ozone precursors from PRDs at petroleum refineries. PRDs are currently regulated under District Regulation 8, Rule 28: Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants. For chemical plants, the rule requires only that facilities report any releases of over 10 pounds from a PRD to the District. For petroleum refineries, the rule requires release reporting and also requires certain substantive measures to reduce the likelihood of releases.

In accordance with FS-8, District staff conducted an audit of refinery PRDs and drafted a technical assessment document, both in 2002. District staff also reviewed release event reports submitted to the District by the affected facilities since the implementation of the 1997 amendments to Regulation 8, Rule 28, visited refineries and chemical plants, interviewed refinery staff, and discussed concerns with District staff to get a complete understanding of how the rule is being implemented. Based on these investigations, Staff are proposing the following amendments to Regulation 8, Rule 28:

1. Require facilities to ensure that they have the capability to detect and quantify all release events, including small releases of 10 pounds (the reporting threshold), and require facilities to demonstrate this capability to the District;
2. Require data recording and recordkeeping for venting and emissions verification;
3. Clearly define the equipment subject to the rule as the process unit to ensure that the original intent of the rule – to regulate all PRDs on an individual source (i.e., process unit) in the same manner – is clarified;
4. Require facilities to report to the District their analysis of the root causes and potential corrective actions after each PRD release event;

5. Make minor, non-substantive changes to the rule such as deleting obsolete references to "turnarounds," moving requirements where appropriate, and clarifying various sections of the rule.

Objectives

The objectives of the proposed rule amendments are to help reduce emissions of ozone forming compounds (e.g., VOCs) by making Regulation 8, Rule 28 clearer and more easily enforceable.

The U.S. Environmental Protection Agency (U.S. EPA) has set primary national ambient air quality standards for ozone and other air pollutants to define the levels considered safe for human health. CARB has also set a California ozone standard. The BAAQMD is seeking re-designation to attainment for the federal 1-hour standard for ozone and is a non-attainment area for the state 1-hour standard and federal 8-hour standard. Under the requirements of the federal Clean Air Act (CAA), non-attainment areas must prepare ozone attainment demonstrations showing how they will attain the federal standard. The most recent federal attainment demonstration is the Bay Area 2001 Ozone Attainment Plan. Similarly, the California Clean Air Act of 1988 requires areas that do not comply with the standard to prepare ozone attainment plans. The most recent state plan is the Bay Area 2000 Clean Air Plan.

Both federal and state plans include measures to reduce emissions of the pollutants that form ozone, i.e., nitrogen oxides and volatile organic compounds. These measures may be already adopted rules or proposal to adopt new regulations or amendments to existing regulations. As noted, Regulation 8, Rule 28 would improve enforcement of pressure relief devices.

Affected Area

The proposed rule amendments would apply to refineries and chemical plants under BAAQMD jurisdiction, which includes all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma counties (approximately 5,600 square miles). The San Francisco Bay Area is characterized by a large, shallow basin surrounded by coastal mountain ranges tapering into sheltered inland valleys. The combined climatic and topographic factors result in increased potential for the accumulation of air pollutants in the inland valleys and reduced potential for buildup of air pollutants along the coast. The Basin is bounded by the Pacific Ocean to the west and includes complex terrain consisting of coastal mountain ranges, inland valleys, and bays.

The majority of the facilities affected by the proposed rule amendments are located within Contra Costa County and Solano County (see Figure 1) adjacent to the San Francisco Bay.

Chapter 3

Environmental Checklist

ENVIRONMENTAL CHECKLIST FORM

1. Project Title:	Bay Area Air Quality Management District (BAAQMD) Proposed Amendments to Regulation 8, Rule 28.
2. Lead Agency Name and Address:	Bay Area Air Quality Management District 939 Ellis Street San Francisco, California 94109
3. Contact Person and Phone Number:	Victor Douglas, Planning and Research Division 415/749-4752 or vdouglas@baaqmd.gov
4. Project Location:	This rule amendment applies to the area within the jurisdiction of the Bay Area Air Quality Management District, which encompasses all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The refineries affected by the rule are located in Contra Costa and Solano Counties.
5. Project Sponsor's Name and Address:	Bay Area Air Quality Management District 939 Ellis Street San Francisco, California 94109
6. General Plan Designation:	The rule amendments apply to refineries and chemical plants which are usually located in heavy manufacturing or industrial areas.
7. Zoning	The rule amendments apply to refineries and chemical plants that are usually located in heavy manufacturing or industrial areas.
8. Description of Project	See "Background" in Chapter 2.
9. Surrounding Land Uses and Setting	See "Affected Area" in Chapter 2.
10. Other Public Agencies Whose Approval Is Required	None

Environmental Factors Potentially Affected:

The environmental factors checked below would potentially be affected by this Project (i.e., the project would involve one impact that is a "Potentially Significant Impact"), as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology/Soils
☐ Hazards & Hazardous Materials	☐ Hydrology/Water Quality	☐ Land Use/Planning
☐ Mineral Resources	☐ Noise	☐ Population/Housing
☐ Public Services	☐ Recreation	☐ Transportation/Traffic
☐ Utilities/Service Systems	☐ Mandatory Findings of Significance	

Determination:

On the basis of this initial evaluation:

☑ I find the proposed project COULD NOT have a significant effect on the environment, and that a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be significant effects in this case because revisions to the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have an impact on the environment that is "potentially significant" or "potentially significant unless mitigated" but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION, pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

_____ _____

Signature Date

_____ _____

Printed Name For

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less-than-Significant Impact	No Impact
I.	**AESTHETICS.**				
	Would the project:				
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☑
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings along a scenic highway?	☐	☐	☐	☑
c)	Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☑
d)	Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles), so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses.

The refineries and chemical plants affected by the proposed rule amendments are generally located in industrial areas, with the majority in industrial portions of Contra Costa and Solano Counties. Scenic highways or corridors are generally not located in the vicinity of industrial areas.

Regulatory Background

Visual resources are generally protected by the City and/or County General Plans through land use and zoning requirements.

Discussion of Impacts

I a-d: The proposed amendments to Regulation 8, Rule 28 would enhance existing requirements for pressure relief devices (PRDs) at existing petroleum refineries and chemical plants in the Bay Area. PRDs are small devices within refinery or plant units and not visible to areas outside of

the facilities. The proposed amendments are not expected to require new structures that would be visible to areas outside of the refinery or plant.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
II. AGRICULTURE RESOURCES.				
In determining whether impacts on agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☑
b) Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract?	☐	☐	☐	☑
c) Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses. Some of these agricultural lands are under Williamson Act contracts.

The refineries and chemical plants affected by the proposed rule amendments are generally located in heavy industrial areas, with the majority in industrial portions of Contra Costa and Solano Counties. Agricultural resources are generally not located in the vicinity of heavy industrial areas.

Regulatory Background

Agricultural resources are generally protected by the City and/or County General Plans, Community Plans through land use and zoning requirements, as well as any applicable specific plans, ordinances, local coastal plans, and redevelopment plans.

Discussion of Impacts

II a-c: The proposed amendments to Regulation 8, Rule 28 would enhance existing requirements for PRDs at existing petroleum refineries and chemical plants in the Bay Area. The amendments would not require construction or any other activities with impacts outside of the boundaries of existing industrial facilities. The refineries and chemical plants are located within heavy industrial areas. Therefore, no significant adverse impacts on agricultural resources are expected.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
III. AIR QUALITY				
When available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☑
b) Violate any air quality standard or contribute to an existing or projected air quality violation?	☐	☐	☐	☑
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	☐	☐	☐	☑
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☑
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☑
f) Diminish an existing air quality rule or future compliance requirement resulting in a significant increase in air pollutant(s)?	☐	☐	☐	☑

Setting

Meteorological Conditions

The summer climate of the West Coast is dominated by a semipermanent high centered over the northeastern Pacific Ocean. Because this high pressure cell is quite persistent, storms rarely affect the California coast during the summer. Thus the conditions that persist along the coast of California during summer are a northwest air flow and negligible precipitation. A thermal low pressure area from the Sonoran-Mojave Desert also causes air to flow onshore over the San Francisco Bay Area much of the summer.

In winter, the Pacific High weakens and shifts southward, upwelling ceases, and winter storms become frequent. Almost all of the Bay Area's annual precipitation takes place in the November through April period. During the winter rainy periods, inversions are weak or nonexistent, winds are often moderate and air pollution potential is low. During winter periods when the Pacific high becomes dominant, inversions become strong and often are surface based; winds are light and pollution potential is high. These periods are characterized by winds that flow out of the Central Valley into the Bay Area and often include tule fog.

Topography

The San Francisco Bay Area is characterized by complex terrain consisting of coastal mountain ranges, inland valleys and bays. Elevations of 1,500 feet are common in the higher terrain of this area. Normal wind flow over the area becomes distorted in the lower elevations, especially when the wind velocity is not strong. This distortion is reduced when stronger winds and unstable air masses move over the areas. The distortion is greatest when low level inversions are present with the surface air, beneath the inversion, flowing independently of the air above the inversion.

Winds

In summer, the northwest winds to the west of the Pacific coastline are drawn into the interior through the Golden Gate and over the lower portions of the San Francisco Peninsula. Immediately to the south of Mount Tamalpais, the northwesterly winds accelerate considerably and come more nearly from the west as they stream through the Golden Gate. This channeling of the flow through the Golden Gate produces a jet that sweeps eastward but widens downstream producing southwest winds at Berkeley and northwest winds at San Jose; a branch curves eastward through the Carquinez Straits and into the Central Valley. Wind speeds may be locally strong in regions where air is channeled through a narrow opening such as the Carquinez Strait, the Golden Gate, or San Bruno Gap.

In winter, the Bay Area experiences periods of storminess and moderate-to-strong winds and periods of stagnation with very light winds. Winter stagnation episodes are characterized by outflow from the Central Valley, nighttime drainage flows in coastal valleys, week onshore flows in the afternoon and otherwise light and variable winds.

Temperature

In summer, the distribution of temperature near the surface over the Bay Area is determined in large part by the effect of the differential heating between land and water surfaces. This process produces a large-scale gradient between the coast and the Central Valley as well as small-scale local gradients along the shorelines of the ocean and bays. The winter mean temperature high and lows reverse the summer relationship in that daytime variations are small while mean minimum nighttime temperatures show large differences and strong gradients. The moderating effect of the ocean influences warmer minimums along the coast and penetrating the Bay. The coldest temperatures are in the sheltered valleys, implying strong radiation inversions and very limited vertical diffusion.

Inversions

A primary factor in air quality is the mixing depth, i.e., the vertical dimension available for dilution of contaminant sources near the ground. Over the Bay Area the frequent occurrence of temperature inversions limits this mixing depth and consequently limits the availability of air for dilution. A temperature inversion may be described as a layer or layers of warmer air over cooler air.

Precipitation

The San Francisco Bay Area climate is characterized by moderately wet winters and dry summers. Winter rains (December through March) account for about 75 percent of the average annual rainfall; about 90 percent of the annual total rainfall is received in November to April period; and between June and September, normal rainfall is typically less than 0.10 inches. Annual precipitation amounts show greater differences in short distances. Annual totals exceed 40 inches in the mountains and are less than 15 inches in the sheltered valleys.

Pollution Potential

The Bay Area is subject to a combination of physiographic and climatic factors which result in a low potential for pollutant buildups near the coast and a high potential in sheltered inland valleys. In summer, areas with high average maximum temperatures tend to be sheltered inland valleys with abundant sunshine and light winds. Areas with low average maximum temperatures are exposed to the prevailing ocean breeze and experience frequent fog or stratus. Locations with warm summer days have a higher pollution potential than the cooler locations along the coast and bays.

In winter, pollution potential is related to the nighttime minimum temperature. Low minimum temperatures are associated with strong radiation inversions in inland valleys that are protected from the moderating influences of the ocean and bays. Conversely, coastal locations experience higher average nighttime temperatures, weaker inversions, stronger breezes and consequently less air pollution potential.

Air Quality

Criteria Pollutants

It is the responsibility of the BAAQMD to ensure that state and federal ambient air quality standards are achieved and maintained in its geographical jurisdiction. Health-based air quality standards have been established by California and the federal government for the following criteria air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter less than 10 microns (PM10), sulfur dioxide (SO_2) and lead. These standards were established to protect sensitive receptors with a margin of safety from adverse health impacts due to exposure to air pollution. The California standards are more stringent than the federal standards and in the case of PM10 and SO_2, far more stringent. California has also established standards for sulfate, visibility, hydrogen sulfide, and vinyl chloride.

The state and national ambient air quality standards for each of these pollutants and their effects on health are summarized in Table 3-1. The BAAQMD monitors levels of various criteria pollutants at 26 monitoring stations. The 2002 air quality data from the BAAQMD's monitoring stations are presented in Table 3-2.

Air quality conditions in the San Francisco Bay Area have improved since the Air District was created in 1955. Ambient concentrations of air pollutants and the number of days on which the region exceeds air quality standards have fallen dramatically (see Table 3-3). The Air District is in attainment of the State and federal ambient air quality standards for CO, nitrogen oxides (NOx), and sulfur oxides (SOx). The Air District is unclassified for the federal 24-hour PM10 standard. Unclassified means that the monitoring data are incomplete and do not support a designation of attainment or non-attainment. However, the Air District does not comply with the State 24-hour PM10 standard.

The 2004 air quality data from the BAAQMD monitoring stations are presented in Table 3-2. All monitoring stations were below the standard and federal ambient air quality standards for CO, NO_2, and SO_2. The federal 1-hour ozone standard was not exceeded in 2004. Based on the Bay Area ozone record for 2001-2003, the U.S. EPA has determined that the Bay Area has attained the federal 1-hour ozone standard. The federal 8-hour standard was not exceeded in the District in 2004. The Bay Area is designated as a non-attainment area for the California 1-hour ozone standard. The state 1-hour ozone standard was exceeded on 7 days in 2004 in the District, most frequently in the Eastern District (Livermore) (see Table 3-2).

All monitoring stations were in compliance with the federal PM10 standards. The California PM10 standards were exceeded on seven days in 2004, most frequently in San Jose. The Air District exceeded the federal PM2.5 standard on one day (at Concord) in 2004 (see Table 3-4).

TABLE 3-1

FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS

	STATE STANDARD	FEDERAL PRIMARY STANDARD	MOST RELEVANT EFFECTS
AIR POLLUTANT	CONCENTRATION/ AVERAGING TIME	CONCENTRATION/ AVERAGING TIME	
Ozone	0.09 ppm, 1-hr. avg. > 0.070 ppm, 8-hr	0.12 ppm, 1-hr avg.> 0.08 ppm, 8-hr avg. >	(a) Short-term exposures: (1) Pulmonary function decrements and localized lung edema in humans and animals (2) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (b) Long-term exposures: Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (c) Vegetation damage; (d) Property damage
Carbon Monoxide	9.0 ppm, 8-hr avg. > 20 ppm, 1-hr avg. >	9 ppm, 8-hr avg.> 35 ppm, 1-hr avg.>	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; (d) Possible increased risk to fetuses
Nitrogen Dioxide	0.25 ppm, 1-hr avg. >	0.053 ppm, ann. avg.>	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; (c) Contribution to atmospheric discoloration
Sulfur Dioxide	0.04 ppm, 24-hr avg.> 0.25 ppm, 1-hr. avg. >	0.03 ppm, ann. avg.> 0.14 ppm, 24-hr avg.>	(a) Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma
Suspended Particulate Matter (PM10)	20 $\mu g/m^3$, annarithmetic mean > 50 $\mu g/m^3$, 24-hr average>	50 $\mu g/m^3$, annual arithmetic mean > 65 $\mu g/m^3$, 24-hr avg.>	(a) Excess deaths from short-term exposures and exacerbation of symptoms in sensitive patients with respiratory disease; (b) Excess seasonal declines in pulmonary function, especially in children
Suspended Particulate Matter (PM2.5)		15 $\mu g/m^3$, annual arithmetic mean> 150 $\mu g/m^3$, 24-hour average>	Decreased lung function from exposures and exacerbation of symptoms in sensitive patients with respiratory disease; elderly; children.
Sulfates	25 $\mu g/m^3$, 24-hr avg. >=		(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; (f) Property damage
Lead	1.5 $\mu g/m^3$, 30-day avg. >=	1.5 $\mu g/m^3$, calendar quarter>	(a) Increased body burden; (b) Impairment of blood formation and nerve conduction
Visibility-Reducing Particles	In sufficient amount to give an extinction coefficient >0.23 inverse kilometers (visual range to less than 10 miles) with relative humidity less than 70%, 8-hour average (10am – 6pm PST)		Nephelometry and AISI Tape Sampler; instrumental measurement on days when relative humidity is less than 70 percent

TABLE 3-2
BAY AREA AIR POLLUTION SUMMARY 2004

MONITORING STATIONS	Ozone							CARBON MONOXIDE			NITROGEN DIOXIDE			SULFUR DIOXIDE			PM10				PM2.5				
	Max 1-Hr	Nat Days	Cal Days	3-Yr Avg	Max 8-Hr	Nat Days	3-Yr Avg	Max 1-Hr	Max 8-Hr	Nat/ Cal Days	Max 1-Hr	Ann Avg	Nat/ Cal Days	Max 24-Hr	Ann Avg	Nat/ Cal Days	Ann Avg	Max 24-Hr	Nat Day	Cal Days	Max 24-Hr	Nat Days	3-Yr Avg	Ann Avg	3-Yr Avg
NORTH COUNTIES	(pphm)							(ppm)			(pphm)			(ppb)			($\mu g/m^3$)				($\mu g/m^3$)			($\mu g/m^3$)	
Napa	9	0	0	0.0	7	0	6.6	3.7	2.0	0	6	1.1	0	--	--	--	20.7	60	0	1	--	--	--	--	--
San Rafael	9	0	0	0.0	6	0	4.9	3.2	2.0	0	6	1.5	0	--	--	--	17.9	52	0	1	--	--	--	--	--
Santa Rosa	8	0	0	0.0	6	0	5.1	2.7	1.6	0	5	1.1	0	--	--	--	18.0	48	0	0	27	0	32	8.3	9
Vallejo	10	0	1	0.0	7	0	6.5	4.0	3.4	0	5	1.2	0	5	1.3	0	19.6	51	0	1	40	0	39	11.1	11
COAST & CENTRAL BAY																									
Oakland	8	0	0	0.0	6	0	4.0	3.5	2.6	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Richmond	--	--	--	--	--	--	--	--	--	--	--	--	--	5	1.6	0	--	--	--	--	--	--	--	--	--
San Francisco	9	0	0	0.0	6	0	4.7	2.9	2.2	0	6	1.7	0	8	1.4	0	22.5	52	0	1	46	0	41	9.9	11
San Pablo	11	0	1	0.0	7	0	5.2	3.2	1.8	0	6	1.3	0	5	1.6	0	21.2	64	0	1	--	--	--	--	--
EASTERN DISTRICT																									
Bethel Island	10	0	1	0.0	8	0	7.5	1.2	0.9	0	3	0.8	0	6	1.6	0	19.5	42	0	0	--	--	--	--	--
Concord	10	0	1	0.0	8	0	7.9	2.7	2.0	0	7	1.2	0	10	1.0	0	18.6	51	0	1	74	1	40*	10.7*	11*
Crockett	--	--	--	--	--	--	--	--	--	--	--	--	--	7	1.7	0	--	--	--	--	--	--	--	--	--
Fairfield	10	0	1	0.0	8	0	7.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Livermore	11	0	5	1.0	8	0	8.3	3.5	1.8	0	6	1.4	0	--	--	--	20.0	49	0	0	41	0	37	10.3	11
Martinez	--	--	--	--	--	--	--	--	--	--	--	--	--	7	1.5	0	--	--	--	--	--	--	--	--	--
Pittsburg	9	0	0	0.0	8	0	7.3	4.1	1.9	0	5	1.1	0	7	2.0	0	21.7	64	0	1	--	--	--	--	--
SOUTH CENTRAL BAY																									
Fremont	9	0	0	0.0	7	0	6.4	3.0	1.7	0	6	1.5	0	--	--	--	18.6	49	0	0	40	0	32	9.4	10
Hayward	9	0	0	0.0	7	0	6.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood City	10	0	1	0.0	7	0	6.0	4.8	2.1	0	6	1.5	0	--	--	--	20.5	65	0	1	36	0	32	9.3	9
San Leandro	10	0	1	0.0	7	0	5.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SANTA CLARA VALLEY																									
Gilroy	9	0	0	0.0	8	0	7.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Los Gatos	9	0	0	0.0	8	0	7.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
San Jose Central*	9	0	0	*	7	0	*	4.4	3.0	0	7	1.9	0	--	--	--	23.1	58	0	4	52	0	*	11.6	*
San Jose East	9	0	0	0.0	7	0	6.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
San Jose, Tully Road	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	26.0	65	0	3	45	0	35	10.4	10
San Martin	9	0	0	0.0	8	0	8.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sunnyvale	10	0	1	0.0	8	0	6.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Bay Area Days over Standard		**0**	**7**			**0**				**0**			**0**			**0**			**0**	**7**		**1**			

(ppm) = parts per million, (pphm) = parts per hundred million, (ppb) = parts per billion

*

TABLE 3-3

TEN-YEAR BAY AREA AIR QUALITY SUMMARY

Days over standards

YEAR	OZONE			CARBON MONOXIDE				NO_X	SULFUR DIOXIDE		PM10		PM2.5
	1-Hr		8-Hr	1-Hr		8-Hr		1-Hr	24-Hr		24-Hr*		24-Hr**
	Nat	Cal	Nat	Nat	Cal	Nat	Cal	Cal	Nat	Cal	Nat	Cal	Nat
1995	11	28	-	0	0	0	0	0	0	0	0	7	-
1996	8	34	-	0	0	0	0	0	0	0	0	3	-
1997	0	8	-	0	0	0	0	0	0	0	0	4	-
1998	8	29	16	0	0	0	0	0	0	0	0	5	-
1999	3	2	9	0	0	0	0	0	0	0	0	12	-
2000	3	12	4	0	0	0	0	0	0	0	0	7	1
2001	1	15	7	0	0	0	0	0	0	0	0	10	5
2002	2	16	7	0	0	0	0	0	0	0	0	6	5
2003	1	19	7	0	0	0	0	0	0	0	0	6	0
2004	0	7	0	0	0	0	0	0	0	0	0	7	1

* PM10 is sampled every sixth day – actual days over standard can be estimated to be six times the numbers listed.
** 2000 is the first full year for which the Air District measured PM2.5 levels.

Toxic Air Pollutants

The BAAQMD also regulates toxic air contaminants (TACs). The BAAQMD maintains a network of monitoring stations to monitor certain TACs in ambient air. In addition, the California Air Resources Board (CARB) maintains several monitoring stations in the Bay Area as part of a statewide toxics monitoring effort. The mean ambient concentrations of monitored TACs are listed in Table 3-4 based on monitoring conducted during 2000 for the monitoring stations closest to the refineries. The Richmond station is located at 7th Street downwind from the ChevronTexaco refinery and the Richmond parkway. The Crockett station is located at the end of Kendall Avenue generally downwind of the ConocoPhillips refinery. There are two Concord stations.

TABLE 3-4

CONCENTRATIONS OF TOXIC AIR CONTAMINANTS IN THE BAY AREA[(1)]

CHEMICAL	MONITORING STATION (mean ppb)				
	Crockett	Concord (Treat Blvd)	Richmond	Bethel Island	Concord (Arnold)
Vinyl Chloride	<0.30	<0.30	<0.30	<0.30	<0.30
Methylene Chloride (DCM)	0.30	0.26	0.26	0.30	<0.50
Chloroform (CHCl3)	<0.30	<0.30	0.01	<0.30	<0.30
Ethylene Dichloride	<0.10	<0.10	<0.10	<0.10	<0.10
1,1,1-Trichloroethane (TCA)	0.12	0.06	0.06	0.05	0.20
Carbon Tetrachloride (CCl4)	0.11	0.11	0.10	0.11	0.10
Trichloroethylene (TCE)	<0.08	0.04	0.05	<0.08	<0.08
Benzene	0.20	0.54	0.41	0.26	0.43
Ethylene Dibromide	<0.02	<0.02	<0.02	<0.02	<0.02
Perchloroethylene	0.02	0.04	0.06	0.03	0.05
Toluene	0.35	2.32	1.92	0.49	0.94
MTBE	0.67	0.54	0.69	0.46	0.59

(1) BAAQMD, Toxic Air Contaminant, 2000 Annual Report, December 2001.

The concentrations of TACs at these monitoring stations are similar to concentrations of TACs in the rest of the Bay Area.

Regulatory Background

Criteria Pollutants

At the federal level, the Clean Air Act (CAA) Amendments of 1990 give the U.S. EPA additional authority to require states to reduce emissions of ozone precursors and PM10 in non-attainment areas. The amendments set new attainment deadlines based on the severity of problems. At the state level, CARB has traditionally established state ambient air quality standards, maintained oversight authority in

air quality planning, developed programs for reducing emissions from motor vehicles, developed air emission inventories, collected air quality and meteorological data, and approved state implementation plans. At a local level, California's air districts, including the BAAQMD, are responsible for overseeing stationary source emissions, approving permits, maintaining emission inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality-related sections of environmental documents required by CEQA.

The BAAQMD regulates air contaminants from stationary sources. The BAAQMD is governed by a 22-member Board of Directors composed of publicly-elected officials apportioned according to the population of the represented counties. The BAAQMD has the authority to develop and enforce regulations for the control of air pollution within its jurisdiction. The BAAQMD is responsible for implementing emissions standards and other requirements of federal and state laws. It is also responsible for developing air quality planning documents required by both federal and state laws.

Toxic Air Contaminants

TACs are regulated in the District through federal, state, and local programs. At the federal level, TACs are regulated primarily under the authority of the CAA. Prior to the amendment of the CAA in 1990, source-specific National Emission Standards for Hazardous Air Pollutants (NESHAPs) were promulgated under Section 112 of the CAA for certain sources of radionuclides and Hazardous Air Pollutants (HAPs).

Title III of the 1990 CAA amendments requires U.S. EPA to promulgate NESHAPs on a specified schedule for certain categories of sources identified by U.S. EPA as emitting one or more of the 189 listed HAPs. Emission standards for major sources must require the maximum achievable control technology (MACT). MACT is defined as the maximum degree of emission reduction achievable considering cost and non-air quality health and environmental impacts and energy requirements. EPA has promulgated NESHAPs for many of the 189 listed HAPs, although not all have been completed yet.

Many of the sources of TACs that have been identified under the CAA are also subject to the California TAC regulatory programs. CARB developed three regulatory programs for the control of TACs. Each of the programs is discussed in the following subsections.

Control of TACs Under the TAC Identification and Control Program: California's TAC identification and control program, adopted in 1983 as Assembly Bill 1807 (AB 1807) (California Health and Safety Code §39662), is a two-step program in which substances are identified as TACs, and airborne toxic control measures (ATCMs) are adopted to control emissions from specific sources. Since adoption of the program, CARB has identified 18 TACs, and CARB adopted a regulation designating all 189 federal HAPs as TACs.

Control of TACs Under the Air Toxics "Hot Spots" Act: The Air Toxics Hot Spot Information and Assessment Act of 1987 (AB 2588) (California Health and Safety Code §39656) establishes a state-wide program to inventory and assess the risks from facilities that emit TACs and to notify the public about significant health risks associated with those emissions. Inventory reports must be updated every four years under current state law. The BAAQMD uses a maximum individual cancer risk of 10 in one

million, or an ambient concentration above a non-cancer reference exposure level, as the threshold for notification.

Senate Bill (SB) 1731, enacted in 1992 (California Health and Safety Code §44390 et seq.), amended AB 2588 to include a requirement for facilities with significant risks to prepare and implement a risk reduction plan which will reduce the risk below a defined significant risk level within specified time limits. At a minimum, such facilities must, as quickly as feasible, reduce cancer risk levels that exceed 100 per one million. The BAAQMD adopted risk reduction requirements for perchloroethylene dry cleaners to fulfill the requirements of SB 1731.

Discussion of Impacts

III a. The objective of the proposed rule amendments is to help make Regulation 8, Rule 28 clearer and more easily enforceable. The proposed amendments are part of the District's efforts to implement its local air quality plans. The proposed amendments will therefore not conflict with or obstruct implementation of an applicable air quality plan.

III b, c, d, and f. The proposed amendments will make the rule clearer and more enforceable, which will help further the rule's goal of reducing emissions from PRDs. The rule as it currently exists has been successful in reducing emissions. When the current rule was adopted in 1997, emissions from PRDs were found to be approximately 27 to 150 tons per year. Since the current rule has been in place, emissions have averaged 18 tons per year. Furthermore, since the rule's requirement to implement Prevention Measures took effect, emissions have averaged only 8.6 tons per year. The proposed amendments will ensure that facilities are monitoring their PRDs properly and are maintaining and reporting PRD emissions data so that District enforcement staff can ensure compliance with the rule. By enhancing the current rule in this way, the proposed amendments will help the rule achieve emissions reductions. U.S. EPA has estimated from time to time in various rulemakings that enhanced monitoring can result in a ten to twenty percent emissions reduction. Here, staff believes that the proposal to add an explicit monitoring requirement should more appropriately use a five percent emissions reduction factor, because many PRDs are already subject to some form of monitoring and it appears that most releases – and especially the larger ones – are being detected. Using the 18 tons-per-year average emissions figure from the period 1998-2005, a five percent reduction would result in emissions reductions of approximately 0.9 tons per year. Using the 8.6 tons-per-year average from the period after the Prevention Measures requirement came into effect, a five percent reduction would result in emissions reductions of 0.4 tons per year. Based on the above analysis, the proposed amendments to Regulation 8, Rule 28 are expected to result in reductions in emissions and, thus, provide air quality benefits. No significant adverse impacts to air quality are expected.

III e. The proposed amendments are expected to enhance the District's ability to enforce the rule. The rule amendments are not expected to generate any additional odors at refineries or chemical plants, and could actually reduce the potential for odor impacts by reducing emissions from PRDs.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
IV.	**BIOLOGICAL RESOURCES.** Would the project:				
a)	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☑
b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☑
c)	Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☑
d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☑
e)	Conflicting with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☑
f)	Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses. A wide variety of biological resources are located within the Bay Area.

The refineries and chemical plants covered by the proposed amendments are generally located industrial areas. The sites have been graded to develop the various industrial structures and are typically surrounded by other commercial and industrial facilities. Native vegetation, other than landscape vegetation, has been removed from operating portions of the industrial facilities to minimize fire hazards.

Regulatory Background

Biological resources are generally protected by the City and/or County General Plans through land use and zoning requirements which minimize or prohibit development in biologically sensitive areas. Biological resources are also protected by the California Department of Fish and Game, and the U.S. Fish and Wildlife Service. The U.S Fish and Wildlife Service and National Marine Fisheries Service oversee the federal Endangered Species Act. Development permits may be required from one or both of these agencies if development would impact rare or endangered species. The California Department of Fish and Game administers the California Endangered Species Act which prohibits impacting endangered and threatened species. The U.S. Army Corps of Engineers and the U.S. EPA regulate the discharge of dredge or fill material into waters of the United States, including wetlands.

Discussion of Impacts

IV a – f. No impacts on biological resources are anticipated from the proposed rule amendments. The PRDs and the equipment they serve are located within the confines of existing industrial facilities. The proposed rule amendments neither require, nor are likely to result in, activities, e.g., construction activities, that would affect sensitive biological resources. Activities related to the proposed rule amendment would be limited to the confines of the existing facilities. No significant construction activities are expected to be required within or outside of the confines of the existing facilities. Therefore, no significant adverse impacts on biological resources are expected.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
V.	**CULTURAL RESOURCES.** Would the project:				
a)	Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	☐	☐	☐	☑
b)	Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☐	☐	☐	☑
c)	Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☑
d)	Disturb any human remains, including those interred outside a formal cemeteries?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses vary greatly and include commercial, industrial, residential, agricultural and open space uses. Cultural resources are defined as buildings, sites, structures, or objects that might have historical architectural, archaeological, cultural, or scientific importance.

The refineries and chemical plants affected by the proposed rule amendments are located in industrial areas. The sites have been graded to develop the various refinery structures and are typically surrounded by other commercial and industrial facilities. Cultural resources are generally not located within the operating portions of the refineries.

Regulatory Background

The State CEQA Guidelines define a significant cultural resources as a "resource listed or eligible for listing on the California Register of Historical Resources" (Public Resources Code Section 5024.1). A project would have a significant impact if it would cause a substantial adverse change in the significance of a historical resource (State CEQA Guidelines Section 15064.5(b)). A substantial adverse change in the significance of a historical resource would result from an action that would demolish or adversely alter the physical characteristics of the historical resource that convey its historical significance and that qualify the resource for inclusion in the California Register of Historical Resources or a local register or survey that meets the requirements of Public Resources Code Sections 50020.1(k) and 5024.1(g).

Discussion of Impacts

V a – d. No impacts on cultural resources are anticipated from the proposed rule amendments that would apply to existing refinery and chemical plant operations. The PRDs already exist and are located within the confines of existing refineries. The proposed rule amendments neither require nor are likely to result in activities that would affect sensitive cultural resources. No major construction activities are expected from the proposed rule amendments. Therefore, no significant adverse impacts on cultural resources are expected.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
VI. GEOLOGY AND SOILS.				
Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☐	☑
• Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☑
• Strong seismic groundshaking?	☐	☐	☐	☑
• Seismic–related ground failure, including liquefaction?	☐	☐	☐	☑
• Landslides?	☐	☐	☐	☑
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☑

c)	Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☑
d)	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☑
e)	Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses. The facilities affected by the proposed rule amendments are located in industrial areas.

The refineries and chemical plants are located in the natural region of California known as the Coast Ranges geomorphic province. The province is characterized by a series of northwest trending ridges and valleys controlled by tectonic folding and faulting, examples of which include the Suisun Bay, East Bay Hills, Briones Hills, Vaca Mountains, Napa Valley, and Diablo Ranges. Regional basement rocks consist of the highly deformed Great Valley Sequence, which include massive beds of sandstone interfingered with siltstone and shale.

The San Francisco Bay Area is a seismically active region, which is situated on a plate boundary marked by the San Andreas Fault System. Several northwest trending active and potentially active faults are included with this fault system. Under the Alquist-Priolo Earthquake Fault Zoning Act, Earthquake Fault Zones were established by the California Division of Mines and Geology along “active” faults, or faults along which surface rupture occurred in Holocene time (the last 11,000 years). In the Bay area, these faults include the San Andreas, Hayward, Rodgers Creek-Healdsburg, Concord-Green Valley, Greenville-Marsh Creek, Seal Cove/San Gregorio and West Napa faults. Other smaller faults in the region classified as potentially active include the Southampton and Franklin faults.

Ground movement intensity during an earthquake can vary depending on the overall magnitude, distance to the fault, focus of earthquake energy, and type of geological material. Areas that are underlain by bedrock tend to experience less ground shaking than those underlain by unconsolidated sediments such as artificial fill. Earthquake ground shaking may have secondary effects on certain foundation materials, including liquefaction, seismically induced settlement, and lateral spreading.

Regulatory Background

Construction is regulated by the local City or County building codes that provide requirements for construction, grading, excavations, use of fill, and foundation work including type of materials, design, procedures, etc. which are intended to limit the probability of occurrence and the severity of consequences from geological hazards. Necessary permits, plan checks, and inspections are generally required.

The City or County General Plan includes the Seismic Safety Element. The Element serves primarily to identify seismic hazards and their location in order that they may be taken into account in the planning of future development. The Uniform Building Code is the principal mechanism for protection against and relief from the danger of earthquakes and related events.

In addition, the Seismic Hazard Zone Mapping Act (Public Resources Code §§2690 – 2699.6) was passed by the California legislature in 1990 following the Loma Prieta earthquake. The Act required that the California Division of Mines and Geology (DMG) develop maps that identify the areas of the state that require site specific investigation for earthquake-triggered landslides and/or potential liquefaction prior to permitting most urban developments. The act directs cities, counties and state agencies to use the maps in their land use planning and permitting processes.

Local governments are responsible for implementing the requirements of the Seismic Hazards Mapping Act. The maps and guidelines are tools for local governments to use in establishing their land use management policies and in developing ordinances and review procedures that will reduce losses from ground failure during future earthquakes.

Discussion of Impacts

VI a – e. No impacts on geology and soils are anticipated from the proposed rule amendments. No major construction activities are expected from the proposed rule amendments and no new structures would be required. Therefore, no significant adverse impacts on geology and soils are expected.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
VII.	**HAZARDS AND HAZARDOUS MATERIALS.** Would the project:				
a)	Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☑
b)	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☑
c)	Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☑
d)	Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☑
e)	Be located within an airport land use plan or, where such a plan has not been adopted, be within two miles of a public airport or public use airport, and result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☑
f)	Be located within the vicinity of a private airstrip and result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☑
g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☑
h)	Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☑

Setting

Petroleum refineries and chemical plants handle and process large quantities of flammable, hazardous, and acutely hazardous materials. Accidents involving these substances can result in worker or public exposure to fire, heat, blast from an explosion, or airborne exposure to hazardous substances.

The potential hazards associated with industrial activities are a function of the materials being processed, processing systems, and procedures used to operate and maintain the facility. The hazards that are likely to exist are identified by the physical and chemical properties of the materials being handled and their process conditions, including the following events.

- **Toxic gas clouds:** Toxic gas clouds are releases of volatile chemicals (e.g., anhydrous ammonia, chlorine, and hydrogen sulfide) that could form a cloud and migrate off-site, thus exposing individuals. "Worst-case" conditions tend to arise when very low wind speeds coincide with an accidental release, which can allow the chemicals to accumulate rather than disperse.

- **Torch fires (gas and liquefied gas releases), flash fires (liquefied gas releases), pool fires, and vapor cloud explosions (gas and liquefied gas releases):** The rupture of a storage tank containing a flammable gaseous material (like propane), without immediate ignition, can result in a vapor cloud explosion. The "worst-case" upset would be a release that produces a large aerosol cloud with flammable properties. If the flammable cloud does not ignite after dispersion, the cloud would simply dissipate. If the flammable cloud were to ignite during the release, a flash fire or vapor cloud explosion could occur. If the flammable cloud were to ignite immediately upon release, a torch fire would ensue.

- **Thermal Radiation:** Thermal radiation is the heat generated by a fire. Exposure to thermal radiation would result in burns, the severity of which would depend on the intensity of the fire, the duration of exposure, and the distance of an individual to the fire.

- **Explosion/Overpressure:** Process vessels containing flammable and/or explosive vapors and potential ignition sources are present at refineries and chemical plants. Explosions may occur if the flammable/explosive vapors came into contact with an ignition source. An explosion could cause impacts to individuals and structures in the area.

For all refineries and chemical plants, risks to the public are reduced if there is a buffer zone between industrial processes and residences or other sensitive land uses, or the prevailing wind blows away from residential areas and other sensitive land uses. The risks posed by refinery and chemical plant operations are unique and determined by a variety of factors.

Regulatory Background

There are many federal and state rules and regulations that refineries and chemical plants must comply with which serve to minimize the potential impacts associated with hazards at these facilities.

Under the Occupational Safety and Health Administration (OSHA) regulations [29 Code of Federal Regulations (CFR) Part 1910], facilities which use, store, manufacture, handle, process, or move highly hazardous materials must prepare a fire prevention plan. In addition, 29 CFR Part 1910.119, Process Safety Management (PSM) of Highly Hazardous Chemicals, and Title 8 of the California Code of Regulations, General Industry Safety Order §5189, specify required prevention program elements to protect workers at facilities that handle toxic, flammable, reactive, or explosive materials. Prevention program elements are aimed at preventing or minimizing the consequences of catastrophic releases of the chemicals and include process hazard analyses, formal training programs for employees and contractors, investigation of equipment mechanical integrity, and an emergency response plan.

Section 112 (r) of the Clean Air Act Amendments of 1990 [42 U.S.C. 7401 et. Seq.] and Article 2, Chapter 6.95 of the California Health and Safety Code require facilities that handle listed regulated substances to develop Risk Management Programs (RMPs) to prevent accidental releases of these substances, U.S. EPA regulations are set forth in 40 CFR Part 68. In California, the California Accidental Release Prevention (CalARP) Program regulation (CCR Title 19, Division 2, Chapter 4.5) was issued by the Governor's Office of Emergency Services (OES). RMPs consist of three main elements: a hazard assessment that includes off-site consequences analyses and a five-year accident history, a prevention program, and an emergency response program. Refineries are also required to comply with the U.S. EPA's Emergency Planning and Community Right-to-Know Act (EPCRA).

The refineries and most chemical plants that store materials are required to have a Spill Prevention Control and Countermeasures (SPCC) Plan per the requirements of 40 Code of Federal Regulations, Section 112. The SPCC is designed to prevent spills from on-site facilities and includes requirements for secondary containment, provides emergency response procedures, establishes training requirements, and so forth.

The Hazardous Materials Transportation (HMT) Act is the federal legislation that regulates transportation of hazardous materials. The primary regulatory authorities are the U.S. Department of Transportation, the Federal Highway Administration, and the Federal Railroad Administration. The HMT Act requires that carriers report accidental releases of hazardous materials to the Department of Transportation at the earliest practical moment (49 CFR Subchapter C). The California Department of Transportation (Caltrans) sets standards for trucks in California. The regulations are enforced by the California Highway Patrol.

California Assembly Bill 2185 requires local agencies to regulate the storage and handling of hazardous materials and requires development of a plan to mitigate the release of hazardous materials. Businesses that handle any of the specified hazardous materials must submit to government agencies (i.e., fire departments), an inventory of the hazardous materials, an emergency response plan, and an employee training program. The business plans must provide a description of the types of hazardous materials/waste on-site and the location of these materials. The information in the business plan can then be used in the event of an emergency to determine the appropriate response action, the need for public notification, and the need for evacuation.

Contra Costa County has adopted an industrial safety ordinance that addresses the human factors that lead to accidents. The ordinance requires stationary sources to develop a written human factors program that includes the following:

- Consideration of human factors in the process hazards analysis process;
- Consideration of human systems as causal factors in the incident investigation process for major accidents or releases or for incidents that could have led to a major accident or release;
- Training of employees in the human factors program;
- Operating procedures;
- Management of changes in staffing, staffing levels, or organization in operations or emergency response;
- Participation of employees and their representatives in the development of the written human factors program;
- Development of a program that includes issues such as staffing, shiftwork, and overtime; and
- Incorporation of the human factors program description in the facility safety plan.

Discussion of Impacts

VII a. The proposed rule amendments will not require or change the transportation, use, storage, or disposal of any hazardous material. The proposed amendments will enhance the current rule, which applies to PRDs that may serve equipment handling hazardous materials, but they will not alter the way those materials are transported, used, stored, or disposed of. By enhancing the current rule, the proposed amendments may actually reduce the hazards associated with exposure to released material. Therefore, no significant hazards to the public or the environment are expected.

VII b – c. The proposed rule amendments will not change the way affected facilities engage in operations that may involve hazardous materials (including the transportation, use, storage, or disposal of such materials). The proposed amendments will therefore not affect the likelihood of or risk from upset or accident conditions that may result in the release of hazardous materials into the environment. By enhancing the current rule, the proposed amendments may even reduce the likelihood or risk from such conditions. Therefore, no significant adverse impacts from accidental releases of hazardous materials into the environment are expected from the proposed amendments. The absence of any such significant impacts applies to all areas throughout the District, regardless of proximity to existing or proposed schools.

VII d. No impacts on hazardous material sites are anticipated from the proposed rule amendments that would apply to existing refinery operations. Some of the refineries and chemical plants may be located on the hazardous materials sites list pursuant to Government Code Section 65962.5. However, the proposed

rule amendments would have no affect on hazardous materials nor would the amendment create a significant hazard to the public or environment. The proposed rule amendments neither require, nor are likely to result in, activities that would affect hazardous materials or existing site contamination. Therefore, no significant adverse impacts on hazards are expected.

VII e – f. No impacts on airports or airport land use plans are anticipated from the proposed rule amendments. The proposed rule amendments neither require nor are likely to result in activities that could affect anything outside of the refinery boundaries. No major construction activities are expected from the proposed rule amendments. Therefore, no safety hazards are expected as a result of proximity to airports.

VII g. No impacts on emergency response plans are anticipated from the proposed rule amendments. The proposed rule amendments neither require, nor are likely to result in, activities that would impact the emergency response plan. No major construction activities are expected from the proposed rule amendments. Therefore, no significant adverse impacts on emergency response plans is expected.

VII h. No increase in hazards related to wildfires are anticipated from the proposed rule amendments that would apply to existing refinery and chemical plant operations. No major construction activities are expected from the proposed rule amendments and no activities would occur outside the confines of the existing refineries or chemical plants. Vegetation surrounding the operating portions of industrial facilities is has generally been removed to reduce the potential fire hazards. Therefore, no significant adverse impacts on fire hazards are expected.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
VIII. HYDROLOGY AND WATER QUALITY.				
Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☐	☑
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g. the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☑

c)	Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite?	☐	☐	☐	☑
d)	Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite?	☐	☐	☐	☑
e)	Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☑
f)	Otherwise substantially degrade water quality?	☐	☐	☐	☑
g)	Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☑
h)	Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	☐	☐	☐	☑
i)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☑
j)	Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses and affected environment vary substantially throughout the area and include commercial, industrial, residential, agricultural, and open space uses.

The refineries and chemical plants are located within the San Francisco Bay Area Hydrologic Basin. The primary regional groundwater water-bearing formations include the recent and Pleistocene (up to two million years old) alluvial deposits and the Pleistocene Huichica formation. Salinity within the unconfined alluvium appears to increase with depth to at least 300 feet. Water of the Huichica formation tends to be soft and relatively high in bicarbonate, although usable for domestic and irrigation needs.

Regulatory Background

The Federal Clean Water Act of 1972 primarily establishes regulations for pollutant discharges into surface waters in order to protect and maintain the quality and integrity of the nation's waters. This Act requires industries that discharge wastewater to municipal sewer systems to meet pretreatment standards. The regulations authorize the U.S. EPA to set the pretreatment standards. The regulations also allow the local treatment plants to set more stringent wastewater discharge requirements, if necessary, to meet local conditions.

The 1987 amendments to the Clean Water Act enabled the U.S. EPA to regulate, under the National Pollutant Discharge Elimination System (NPDES) program, discharges from industries and large municipal sewer systems. The U.S. EPA set initial permit application requirements in 1990. The State of California, through the State Water Resources Control Board, has authority to issue NPDES permits, which meet U.S. EPA requirements, to specified industries.

The Porter-Cologne Water Quality Act is California's primary water quality control law. It implements the state's responsibilities under the Federal Clean Water Act but also establishes state wastewater discharge requirements. The RWQCB administers the state requirements as specified under the Porter-Cologne Water Quality Act, which include storm water discharge permits. The water quality in the Bay Area is under the jurisdiction of the San Francisco Bay Regional Water Quality Control Board.

In response to the Federal Act, the State Water Resources Control Board prepared two state-wide plans in 1991 and 1995 that address storm water runoff: the California Inland Surface Waters Plan and the California Enclosed Bays and Estuaries Plan. Enclosed bays are indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. San Francisco Bay, and its constituents parts, including Carquinez Strait and Suisun Bay, fall under this category.

Discussion of Impacts

VIII a – j. No significant adverse impacts on hydrology/water quality resources are anticipated from the proposed rule amendments. The refineries and chemical plants affected by the proposed rule amendments are required to treat and monitor wastewater discharges from their facilities, and the proposed amendments would not affect those requirements. The proposed amendments are not expected to require new construction, create additional water runoff, place any additional structures within 100-year flood zones or other areas subject to flooding, or contribute to inundation by seiche, tsunami or mudflow. No major construction activities are expected from the proposed rule amendments and no new structures are required. Therefore, no significant adverse impacts on hydrology/water quality are expected.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
IX. LAND USE AND PLANNING. Would the project:				

a)	Physically divide an established community?	☐	☐	☐	☑
b)	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to a general plan, specific plan, local coastal program or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☑
c)	Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses.

The refineries and chemical plants affected by the proposed rule amendments are located in industrial areas and are generally adjacent to industrial and commercial land uses.

Regulatory Background

Land uses are generally protected and regulated by the City and/or County General Plans through land use and zoning requirements.

Discussion of Impacts

IX a-c. PRDs are located within the confines of existing refineries within heavy industrial areas. The proposed rule amendments neither require, nor are likely to result in, any significant construction inside or outside of those facilities. Therefore, no land use impacts are expected.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
X. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the	☐	☐	☐	☑

residents of the state?

b)	Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses and the affected environment vary greatly throughout the area. The facilities affected by the proposed rule amendments are generally located in industrial areas.

Regulatory Background

Mineral resources are generally protected and regulated by the City and/or County General Plans through land use and zoning requirements.

Discussion of Impacts

X a-b. PRDs are located within the confines of refineries and chemical plants within industrial areas. The proposed rule amendments neither require, nor are likely to result in, any significant construction inside or outside of those facilities. The proposed rule amendments are not associated with any action that would result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state, or of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. Therefore, no impacts on mineral resources are expected.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XI.	**NOISE.** Would the project:				
a)	Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☑
b)	Expose persons to or generate of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☑
c)	Result in a substantial permanent increase in	☐	☐	☐	☑

	ambient noise levels in the project vicinity above levels existing without the project?				
d)	Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☑
e)	Be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑
f)	Be located within the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses and the affected environment vary greatly throughout the area. The refineries and chemical plants affected by the proposed rule amendments are located in industrial areas and are typically surrounded by other commercial and industrial facilities.

Regulatory Background

Noise issues related to construction and operation activities are addressed in local General Plan policies and local noise ordinance standards. The General Plan and noise ordinances generally establish allowable noise limits within different land uses including residential areas, other sensitive use areas (e.g., schools, churches, hospitals, and libraries), commercial areas, and industrial areas.

Discussion of Impacts

XI a-f. PRDs are located within the confines of existing refineries and chemical plants within industrial areas. PRDs can be noise sources when they release. The proposed amendments to the rule will not require the installation of PRDs or generate any additional noise. The proposed amendments may help reduce the number of releases from PRDs, which would also mean a reduction in the noise related to PRD releases. No new equipment that would generate any significant noise is required as part of the proposed rule amendments. Therefore, no noise impacts are expected.

		Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
XII.	**POPULATION AND HOUSING.** Would the project:				
a)	Induce substantial population growth in an area either directly (e.g., by proposing new homes and businesses) or indirectly (e.g. through extension of roads or other infrastructure)?	☐	☐	☐	☑
b)	Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☑
c)	Displace a substantial number of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses and the affected environment vary greatly throughout the area. The refineries and chemical plants affected by the proposed rule amendments are located in industrial areas.

Regulatory Background

Population and housing growth and resources are generally protected and regulated by the City and/or County General Plans through land use and zoning requirements.

Discussion of Impacts

XII a. PRDs are located within the confines of refineries and chemical plants within industrial areas. The proposed rule amendments neither require nor are likely to result in, any significant construction inside or outside of those facilities. No additional workers will be required at the refineries; therefore, no increase in population is expected.

XII b-c. PRDs are located within the confines of existing refineries and chemical plants within industrial areas. No housing would be impacted or removed by the proposed rule amendments and no displacement of housing would occur. Therefore, no significant adverse impacts on population/housing are expected.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIII. PUBLIC SERVICES. Would the project:				
a. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:				
Fire protection?	☐	☐	☐	☑
Police protection?	☐	☐	☐	☑
Schools?	☐	☐	☐	☑
Parks?	☐	☐	☐	☑
Other public facilities?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses and the affected environment vary greatly throughout the area. The facilities affected by the proposed rule amendments are located in industrial areas.

Given the large area covered by the BAAQMD, public services are provided by a wide variety of local agencies. Fire protection and police protection/law enforcement services within the BAAQMD are provided by various districts, organizations, and agencies. There are several school districts, private schools, and park departments within the BAAQMD. Public facilities within the BAAQMD are managed by different county, city, and special-use districts.

Regulatory Background

City and/or County General Plans usually contain goals and policies to assure adequate public services are maintained within the local jurisdiction.

Discussion of Impacts

XIII a. PRDs are located within the confines of refineries and chemical plants within industrial areas. The proposed rule amendments do not require new public services. A reduction in the releases from PRDs would

result in a reduction in hazards associated with those releases. No impacts on the need for fire or police protection are expected. The proposed rule amendments are not expected to require additional workers at the refinery or result in population growth so no impacts on schools or parks are expected. Therefore, no significant adverse impacts on public services are expected.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIV. RECREATION. Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.?	☐	☐	☐	☑
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that there are numerous areas for recreational activities. The facilities affected by the proposed rule amendments are located in industrial areas. Public recreational land uses are not located within the operating areas of these facilities.

Regulatory Background

Recreational areas are generally protected and regulated by the City and/or County General Plans at the local level through land use and zoning requirements. Some parks and recreation areas are designated and protected by state and federal regulations.

Discussion of Impacts

XIV a-b. PRDs are located within the confines of existing refineries and chemical plants within industrial areas. The proposed rule amendments neither require, nor are likely to result in, any significant construction inside or outside of those facilities. No additional workers will be required at the refineries, no increase in population is expected and, therefore, no significant adverse impacts on recreation are expected.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XV. TRANSPORTATION/TRAFFIC. Would the project:					
a)	Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections)?	☐	☐	☐	☑
b)	Cause, either individually or cumulatively, exceedance of a level-of-service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☑
c)	Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☑
d)	Substantially increase hazards because of a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?	☐	☐	☐	☑
e)	Result in inadequate emergency access?	☐	☐	☐	☑
f)	Result in inadequate parking capacity?	☐	☐	☐	☑
g)	Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g. bus turnouts, bicycle racks)?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles). Transportation systems located within the Bay Area include railroads, airports, waterways, and highways. The transportation infrastructure for vehicles and trucks in the Bay Area ranges from single lane roadways to multilane interstate highways. The refineries and chemical plants affected by the proposed rule amendments are located in the industrial portions of Contra Costa and Solano Counties and are accessed via highways and local roadway systems.

Regulatory Background

Transportation planning is usually conducted at the county level.

Discussion of Impacts

XV a-b. PRDs are located within the confines of existing refineries and chemical plants within industrial areas. The proposed rule amendments are not expected to require any significant construction activities. No significant transport of additional materials or workers will be required. No changes to traffic patterns or levels of service at local intersections are expected. Therefore, no adverse significant impacts to traffic are expected.

XV c. The proposed rule amendments include minor modifications to the operation of existing facilities. The project will not involve the delivery of any significant materials via air so no increase and no adverse impacts in air traffic are expected.

XV d - e. The proposed rule amendments are not expected to increase traffic hazards or create incompatible uses at or adjacent to the site. Emergency access is provided at the refinery and most chemical plant sites, will continue to be maintained at the refinery and chemical plant sites, and will not be impacted by the proposed rule amendments.

XV f. No significant construction activities are expected, so no parking is required for construction workers. No increase in permanent workers is expected. Therefore, the proposed rule amendments will not result in significant adverse impacts on parking.

XV g. The proposed rule amendments are not expected to conflict with adopted policies, plans, or programs supporting alternative transportation modes (e.g., bus turnouts, bicycle racks).

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less-than-Significant Impact	No Impact
XVI. UTILITIES AND SERVICE SYSTEMS. Would the project:					
a)	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☑
b)	Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☑
c)	Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☑
d)	Have sufficient water supplies available to serve the project from existing entitlements and resources, or would new or expanded entitlements needed?	☐	☐	☐	☑
e)	Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☑
f)	Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☑
g)	Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☑

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses and the affected environment vary greatly throughout the area. The refineries and chemical plant affected by the proposed rule amendments are located in industrial areas.

Given the large area covered by the BAAQMD, public utilities are provided by a wide variety of local agencies. The affected facilities have wastewater and storm water treatment facilities and discharge treated wastewater under the requirements of NPDES permits.

Water is supplied to the refineries and chemical plants by several water purveyors in the Bay Area. Solid waste is handled through a variety of municipalities, through recycling activities and at disposal sites.

There are no hazardous waste disposal sites within the jurisdiction of the BAAQMD. Hazardous waste generated at area facilities, which is not reused on-site, or recycled off-site, is disposed of at a licensed in-state hazardous waste disposal facility. Two such facilities are the Chemical Waste Management Inc. (CWMI) Kettleman Hills facility in King's County, and the Safety-Kleen facility in Buttonwillow (Kern County). Hazardous waste can also be transported to permitted facilities outside of California. The nearest out-of-state landfills are U.S. Ecology, Inc., located in Beatty, Nevada; USPCI, Inc., in Murray, Utah; and Envirosafe Services of Idaho, Inc., in Mountain Home, Idaho. Incineration is provided at the following out-of-state facilities: Aptus, located in Aragonite, Utah and Coffeyville, Kansas; Rollins Environmental Services, Inc., located in Deer Park, Texas and Baton Rouge, Louisiana; Chemical Waste Management, Inc., in Port Arthur, Texas; and Waste Research & Reclamation Co., Eau Claire, Wisconsin.

Regulatory Background

City and/or County General Plans usually contain goals and policies to assure adequate utilities and service systems are maintain within the local jurisdiction.

Discussion of Impacts

XVI a – g. No significant adverse impacts on utilities and service systems are anticipated from the proposed rule amendments. The proposed rule amendments are not expected to generate or affect wastewater or solid or hazardous waste, will not affect storm water, or storm water drainage, and will not require water, or affect water supplies. PRDs that serve equipment that handles material that could contaminate soil or water could be a pathway for such material to reach the environment in the event of an upset and release. But the proposed amendments would not alter the way that facilities operate the equipment handling such materials, and so there would be no increase in the potential for such releases. Indeed, by enhancing the current rule, the proposed amendments may even lessen the potential. No increases in demand for public utilities are expected as a result of the proposed rule amendments, therefore, no adverse significant impacts are expected.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVII.	**MANDATORY FINDINGS OF SIGNIFICANCE.**				
a)	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☐	☑
b)	Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)	☐	☐	☐	☑
c)	Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☑

Discussion of Impacts

XVII a. The proposed rule amendments do not have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory, as discussed in the previous sections of the CEQA checklist. The proposed rule amendments will enhance the District's current PRD rule, which is designed reduce emission from refineries and chemical plants, thus providing a beneficial air quality impact and improvement in air quality. No significant adverse impacts are expected from the proposed amendments.

XVII b. The proposed amendments are expected to enhance the District's ability to enforce the Regulation 8, Rule 28. The proposal also clarifies the rule so that it can be more easily understood and enforced. By improving the rule, the proposed amendments will help reduce emissions from refineries and chemical plants, thus providing a beneficial air quality impact and improvement in air quality. The proposed rule amendments are part of a long-term plan to bring the Bay Area into compliance with the state ambient air quality standards for ozone and to maintain compliance with the federal standards. The proposed rule

amendments do not have adverse environmental impacts that are limited individually, but cumulatively considerable when considered in conjunction with other regulatory control projects. The proposed rule amendments do not have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly. No significant adverse impacts are expected.

XVII c. The proposed rule amendments are expected to result in emission reductions from refineries and chemical plants, thus providing a beneficial air quality impact and improvement in air quality. The proposed rule amendments are part of a long-term plan to bring the Bay Area into compliance with the state ambient air quality standards for ozone and to maintain compliance with the federal standards, thus reducing the potential health impacts due to ozone exposure. The proposed rule amendments will not have significant adverse effects (either directly or indirectly) to human beings.

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Chapter 4

References

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BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairman Townsend and Members of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 30, 2005

Re: Public Hearing to Consider Approval of Report on 2001 Ozone Attainment Plan Further Study Measure 8: Atmospheric Blowdown Systems

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RECOMMENDED ACTION:

Approve staff recommendation that no regulatory amendments regarding atmospheric blowdown systems are necessary or appropriate at this time.

BACKGROUND

In the 2001 Ozone Attainment Plan the District discussed the need to study emissions from atmospheric blowdown systems and to undertake rulemaking to address the emissions if warranted. Blowdown systems at petroleum refineries provide for the safe disposal of hydrocarbons, liquids and gases that are either automatically vented from a process component through pressure relief devices (PRDs) or manually drawn from units using control valves or block valves. The blowdown systems separate liquids from vapors and recover any condensable oil and water. Gases in the typical blowdown systems are then sent to fuel gas recovery, or to a flare. In *atmospheric* blowdown systems, the hydrocarbon vapors are treated with steam and emitted to the atmosphere without any controls. Along with hydrocarbons from PRDs, blowdown systems handle other material such as industrial water, steam, gasoline and diesel fuel used for cleaning and maintenance during shutdowns and prior to startups. Although all Bay Area refineries have blowdown systems in their process, atmospheric blowdown systems are only found at the Tesoro Refinery in Avon, CA near Martinez. The most significant source of emissions from atmospheric blowdown systems is the PRDs that vent to these systems.

Staff has discussed the issues related to atmospheric blowdown systems with the stakeholders in various forums. In addition to the workgroup meetings on Regulation 8, Rule 28 concerning PRDs, staff held a separate workgroup meeting specifically to discuss atmospheric blowdown systems on September 15. The workgroup meeting was attended by representatives from Western States Petroleum Association, Tesoro refinery,

Communities for a Better Environment and the California Air Resources Board. A public workshop was held in Martinez on October 27, 2005.

DISCUSSION:

There are two types of emissions from atmospheric blowdown systems. The most significant are episodic emissions that occur when a PRD vents. The other type are periodic emissions, which are from processes that occur intentionally but are not part of the normal refinery operation, such as depressurization of process vessels and from cleaning of vessels during maintenance operations.

Staff has identified 167 unique input streams that are plumbed into the four atmospheric blowdown systems at Tesoro; 42 of these are PRDs. The remaining streams originate from a large variety of sources including heat exchangers, pumps and compressors, process vessels, distillation columns, and steam lines. During normal refinery operations, there is no flow to the blowdown systems. However, during process upsets that may cause a PRD to vent, or during periodic cleaning and maintenance operations, emissions to the atmosphere may occur.

Because the Tesoro blowdown systems are open to the atmosphere, any episodic emissions from PRDs are subject to Regulation 8, Rule 28: Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants.

Periodic emissions from the atmospheric blowdown systems are subject to a variety of Regulation 8 rules: Rule 8-10, Process Vessel Depressurization; Rule 8-18, Equipment Leaks; and Rule 8-2, Miscellaneous Operations. The emissions from periodic operations such as depressurization or cleaning and maintenance activities can be calculated from the concentration of gases or the vapor pressure and quantities of liquids introduced to the blowdown system before being drained from the blowdown system. Consequently, compliance with the applicable standards in the Regulation 8 rules can be determined.

Theoretically, the episodic and periodic emissions from the atmospheric blowdown systems could be controlled by venting the blowdown systems to some control device such as a flare. For a number of reasons, including the difficulties presented by the need to control low and high pressure streams that vent to these blowdown systems, it would be inordinately expensive to control these systems as a whole, which, during normal operation, have no emissions. Because the existing regulatory controls in Regulation 8 are sufficient to limit emissions from all input streams (and in fact would require control of pressure relief devices if they have two releases from the same source), staff does not recommend development of further regulations for atmospheric blowdown systems at this time.

ISSUES

Issues raised during the public workshop, comment period and at the technical workgroup session centered on 1) the need to control all emissions from atmospheric blowdown systems to avoid the potential for catastrophic emissions that could lead to an

incident such as the one that occurred at the BP refinery in Texas City, Texas; and 2) concerns that atmospheric blowdown systems are insufficiently regulated and monitored.

Staff has reviewed the investigation into the incident at the Texas City BP refinery. The Chemical Safety Board found multiple causes that contributed to the Texas City incident, including operator errors, malfunctioning alarms, and disregard of safety practices. Venting blowdown systems to a flare would not, in itself, ensure that an accident of this sort could not happen. In Contra Costa County where the Tesoro Refinery is located, the county's Industrial Safety Ordinance is designed to insure that the atmospheric blowdown systems at Tesoro are operated in a safe manner.

The existence of the atmospheric blowdown systems at Tesoro does make monitoring for compliance with Regulation 8 rules more difficult. District staff is working closely with Tesoro to address the monitoring issues and to enforce existing regulations applicable to the atmospheric blowdown systems. Tesoro has installed flow monitoring equipment on all four blowdown systems. These monitors will indicate whether there are any unexpected flows. Further, the facility is required to report any venting from any PRD plumbed to a blowdown system. The proposed amendments to Rule 8-28 would require that each PRD is monitored with a system that is capable of detecting a release of as little as ten pounds.

CONCLUSION

Based on staff analysis and consideration of public comments, no further regulatory amendments are warranted at this time.

BUDGET CONSIDERATION / FINANCIAL IMPACT

None

Respectfully submitted,

Jack P. Broadbent
Executive Officer / Air Pollution Control Officer

Prepared by: Victor Douglas
Reviewed by: Henry Hilken

Attachment:

Staff Report for Further Study Measure 8: Atmospheric Blowdown Systems

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
Memorandum

To: Chairman Townsend and Members of the Board of Directors

From: Jack P. Broadbent
Executive Officer/APCO

Date: November 30, 2005

Re: Public Hearing to Consider Approval of Report on 2001 Ozone Attainment Plan Further Study Measure 8: Atmospheric Blowdown Systems

---

RECOMMENDED ACTION:

Approve staff recommendation that no regulatory amendments regarding atmospheric blowdown systems are necessary or appropriate at this time.

BACKGROUND

In the 2001 Ozone Attainment Plan the District discussed the need to study emissions from atmospheric blowdown systems and to undertake rulemaking to address the emissions if warranted. Blowdown systems at petroleum refineries provide for the safe disposal of hydrocarbons, liquids and gases that are either automatically vented from a process component through pressure relief devices (PRDs) or manually drawn from units using control valves or block valves. The blowdown systems separate liquids from vapors and recover any condensable oil and water. Gases in the typical blowdown systems are then sent to fuel gas recovery, or to a flare. In *atmospheric* blowdown systems, the hydrocarbon vapors are treated with steam and emitted to the atmosphere without any controls. Along with hydrocarbons from PRDs, blowdown systems handle other material such as industrial water, steam, gasoline and diesel fuel used for cleaning and maintenance during shutdowns and prior to startups. Although all Bay Area refineries have blowdown systems in their process, atmospheric blowdown systems are only found at the Tesoro Refinery in Avon, CA near Martinez. The most significant source of emissions from atmospheric blowdown systems is the PRDs that vent to these systems.

Staff has discussed the issues related to atmospheric blowdown systems with the stakeholders in various forums. In addition to the workgroup meetings on Regulation 8, Rule 28 concerning PRDs, staff held a separate workgroup meeting specifically to discuss atmospheric blowdown systems on September 15. The workgroup meeting was attended by representatives from Western States Petroleum Association, Tesoro refinery,

Communities for a Better Environment and the California Air Resources Board. A public workshop was held in Martinez on October 27, 2005.

DISCUSSION:

There are two types of emissions from atmospheric blowdown systems. The most significant are episodic emissions that occur when a PRD vents. The other type are periodic emissions, which are from processes that occur intentionally but are not part of the normal refinery operation, such as depressurization of process vessels and from cleaning of vessels during maintenance operations.

Staff has identified 167 unique input streams that are plumbed into the four atmospheric blowdown systems at Tesoro; 42 of these are PRDs. The remaining streams originate from a large variety of sources including heat exchangers, pumps and compressors, process vessels, distillation columns, and steam lines. During normal refinery operations, there is no flow to the blowdown systems. However, during process upsets that may cause a PRD to vent, or during periodic cleaning and maintenance operations, emissions to the atmosphere may occur.

Because the Tesoro blowdown systems are open to the atmosphere, any episodic emissions from PRDs are subject to Regulation 8, Rule 28: Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants.

Periodic emissions from the atmospheric blowdown systems are subject to a variety of Regulation 8 rules: Rule 8-10, Process Vessel Depressurization; Rule 8-18, Equipment Leaks; and Rule 8-2, Miscellaneous Operations. The emissions from periodic operations such as depressurization or cleaning and maintenance activities can be calculated from the concentration of gases or the vapor pressure and quantities of liquids introduced to the blowdown system before being drained from the blowdown system. Consequently, compliance with the applicable standards in the Regulation 8 rules can be determined.

Theoretically, the episodic and periodic emissions from the atmospheric blowdown systems could be controlled by venting the blowdown systems to some control device such as a flare. For a number of reasons, including the difficulties presented by the need to control low and high pressure streams that vent to these blowdown systems, it would be inordinately expensive to control these systems as a whole, which, during normal operation, have no emissions. Because the existing regulatory controls in Regulation 8 are sufficient to limit emissions from all input streams (and in fact would require control of pressure relief devices if they have two releases from the same source), staff does not recommend development of further regulations for atmospheric blowdown systems at this time.

ISSUES

Issues raised during the public workshop, comment period and at the technical workgroup session centered on 1) the need to control all emissions from atmospheric blowdown systems to avoid the potential for catastrophic emissions that could lead to an

incident such as the one that occurred at the BP refinery in Texas City, Texas; and 2) concerns that atmospheric blowdown systems are insufficiently regulated and monitored.

Staff has reviewed the investigation into the incident at the Texas City BP refinery. The Chemical Safety Board found multiple causes that contributed to the Texas City incident, including operator errors, malfunctioning alarms, and disregard of safety practices. Venting blowdown systems to a flare would not, in itself, ensure that an accident of this sort could not happen. In Contra Costa County where the Tesoro Refinery is located, the county's Industrial Safety Ordinance is designed to insure that the atmospheric blowdown systems at Tesoro are operated in a safe manner.

The existence of the atmospheric blowdown systems at Tesoro does make monitoring for compliance with Regulation 8 rules more difficult. District staff is working closely with Tesoro to address the monitoring issues and to enforce existing regulations applicable to the atmospheric blowdown systems. Tesoro has installed flow monitoring equipment on all four blowdown systems. These monitors will indicate whether there are any unexpected flows. Further, the facility is required to report any venting from any PRD plumbed to a blowdown system. The proposed amendments to Rule 8-28 would require that each PRD is monitored with a system that is capable of detecting a release of as little as ten pounds.

CONCLUSION

Based on staff analysis and consideration of public comments, no further regulatory amendments are warranted at this time.

BUDGET CONSIDERATION / FINANCIAL IMPACT

None

Respectfully submitted,

Jack P. Broadbent
Executive Officer / Air Pollution Control Officer

Prepared by: Victor Douglas
Reviewed by: Henry Hilken

Attachment:

Staff Report for Further Study Measure 8: Atmospheric Blowdown Systems

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109

Staff Report

FURTHER STUDY MEASURE 8

Atmospheric Blowdown Systems

November 28, 2005

Prepared by:

Victor Douglas
Senior Air Quality Engineer

I. INTRODUCTION

A. Summary of Proposal

District staff has determined that it is not necessary to initiate rulemaking to control emissions from refinery blowdown systems (BDS) because the inputs to those systems are already regulated. Blowdown systems at all but one refinery in the Bay Area Air Quality Management District are currently vented to a flare or fuel gas recovery system. The one refinery with uncontrolled, or atmospheric, blowdown systems is the Tesoro Refinery in Contra Costa County. Staff has analyzed the four atmospheric blowdown systems at the Tesoro Refinery and has determined that the inputs to those systems are subject to existing District rules and that additional controls on the blowdown systems themselves would be redundant.

Blowdown systems have two types of inputs: *episodic emissions* from pressure relief devices (PRDs) that vent into the blowdown systems and *periodic emissions* from cleaning and maintenance operations during shutdowns. Episodic emissions from PRDs are subject to the requirements of Regulation 8, Rule 28: Episodic Releases from Pressure Relief Devices in Petroleum Refineries and Chemical Plants. Periodic emissions from shutdowns, startups, cleaning and maintenance operations are subject to the requirements of various rules, most notably Regulation 8, Rule 10: Process Vessel Depressurization, or Regulation 8, Rule 2: Miscellaneous Operations. Because inputs to atmospheric BDSs are already fully regulated, staff does not recommend new rulemaking to further control emissions from these systems.

II. BACKGROUND

A. Description of Blowdown Systems

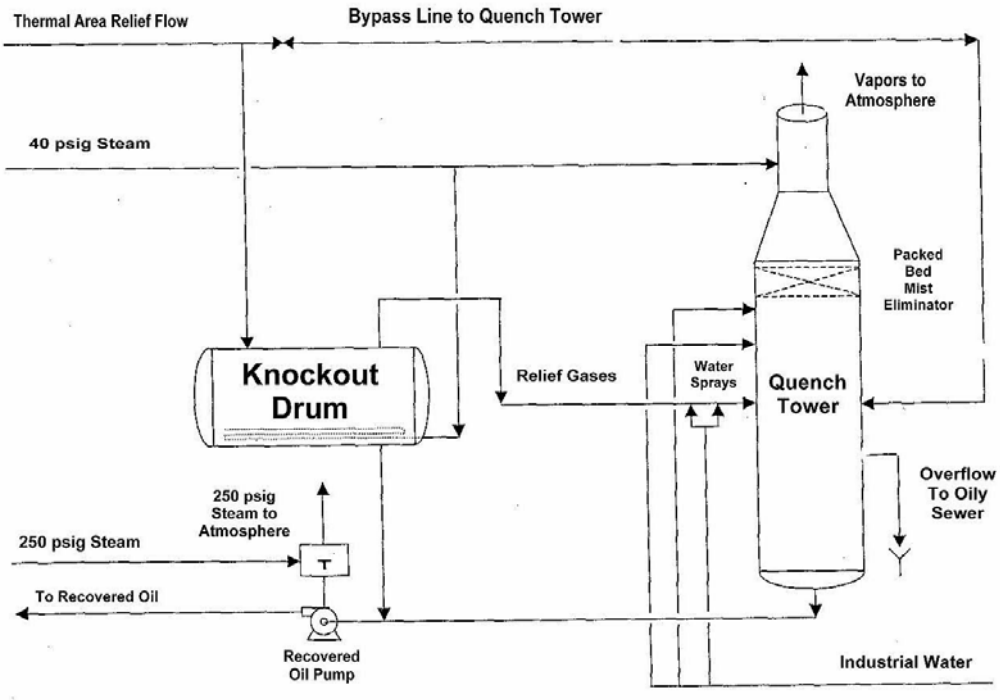
All process units in refineries can be expected to experience operational upsets that must be handled in a safe and effective manner. Upsets include instrument failures, loss of cooling water, loss of steam, loss of power and a number of atypical operating conditions. In order to protect process vessels from over-pressurization and rupture during upsets, vessels are equipped with pressure relief devices (PRDs) so that gases and fluids can be released safely. PRDs may vent directly to the atmosphere or to a blowdown system. BDSs provide for the safe disposal of hydrocarbons, liquids and gases that are either automatically vented from the process component through PRDs or manually drawn from units using control valves or block valves. The BDSs separate liquids from vapors and recover any condensable oil and water. Gases in the typical blowdown system are then sent to fuel gas recovery, or to a flare.

There are many BDSs at refineries operating in the District. Only four of the BDSs are vented to the atmosphere; all four of these atmospheric blowdown systems are located at the Tesoro Refinery in Avon, California near Martinez. Relief flows from PRDs and process vents, including high pressure steam, are

plumbed to atmospheric BDSs. Other materials that can enter a BDS include industrial water, steam, gasoline and diesel fuel used to clean out process vessels during maintenance. Process units are typically purged to the BDS during shutdown and prior to startup. The separated vapors are usually combined with high pressure steam to prevent the potential for explosive or combustible concentrations of hydrocarbons, and then released to the atmosphere. This provides for some reduction in emissions.

Figure 1 is a simplified flow diagram of one of the four atmospheric BDSs. Each of the four BDSs is unique.

Figure 1
Atmospheric Blowdown System



Each atmospheric BDS services a different section of the Tesoro Refinery: Crude Unit 50, Crude Unit 3, the Fluid Catalytic Cracking Area, and the Coker Area. The Crude Unit 3 blowdown system is shown in Figure 2. In each of the four areas, relief gases are transported to the top of a knockout drum. Typically, there should be no flow to the drum. Flow should only be present during startup, shutdown, or upset conditions. The purpose of the knockout drum is to separate gases from liquids. Liquids fall to the bottom and are manually pumped to tanks for reprocessing. There are a number of ways an operator determines that flow is present, including communication with refinery staff, high temperature, high pressure, spray flow alarm, or high level alarm.

Knockout drums on two of Tesoro's atmospheric BDSs have a steam coil. The steam coil keeps heavy hydrocarbons fluid. Vapors and mist exit the top of the

drum and proceed to the side of the quench tower. Water sprays are used to remove condensable hydrocarbons, which fall to the bottom of the quench tower. The liquid hydrocarbons overflow to the oily sewer, where they are separated for reprocessing and wastewater treatment. The remaining vapors exit through the top of the tower. Steam flows into the stack to prevent air from entering and creating an explosive mixture.

Figure 2: Crude Unit 3 Blowdown System

III. REGULATORY HISTORY

A. Further Study Measure 8 (2001 Ozone Attainment Plan)

In the 2001 Ozone Attainment Plan the District discussed the need to study whether regulatory controls for blowdown systems should be implemented (Further Study Measure 8; Pressure Vessels, Blowdown Systems, and Flares). With regard to BDSs,[1] the study was intended to evaluate the volume of gases sent to atmospheric BDSs and the contribution of pressure relief devices (PRDs) to these flows. The study was also intended to consider, as appropriate, the feasibility, cost and safety of emissions reductions by reducing flows to BDSs.

[1] The other commitments discussed in the 2001 Ozone Plan FS-8 have been or are being addressed through other control measures. These include adopted Regulation 12, Rule 11: Flare Monitoring at Petroleum Refineries and Regulation 12, Rule 12: Flares at Petroleum Refineries and proposed amendments to Regulation 8, Rule 28: Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants.

B. 2002 Pressure Relief Valve Audit

In 2002, the District audited pressure relief devices at all five Bay Area refineries to determine compliance with Rule 8-28 and to make recommendations for rule improvement. The findings of the audit directly relate to blowdown systems for the pressure relief devices that vent into the blowdown system. The District is currently developing proposed changes to Rule 8-28, accessible at http://www.baaqmd.gov/pln/ruledev/workshops.htm, which apply to all PRDs including those that vent to blowdown systems.

C. 2002 Technical Assessment Document

In 2002, the District released a draft Technical Assessment Document (TAD) to address emissions from blowdown systems. The TAD calculated emissions from an incident in May, 2001 to determine a range of flow rates from the BDS and estimated emissions using an EPA AP-42 emission factor. As explained below, use of this emission factor significantly overstated emissions from these BDSs. The TAD stated that emissions from blowdown systems could be reduced by prevention measures or control measures such as venting emissions sources into an abatement device. The TAD recommended monitoring for each blowdown system. The TAD can be reviewed on the District's website at: http://www.baaqmd.gov/enf/further_study_measures/flares/blowdown_tad_draft2_dec2002.pdf.

IV. SUMMARY OF TECHNICAL REVIEW

A. Emissions

The typical source of emissions from blowdown systems is a pressure relief device. One or more PRDs that feed into the BDS may experience a release to relieve an over-pressure situation, or an improperly reseated PRD may leak emissions into the BDS. These are *episodic* emissions. Other causes of emissions to the BDS are processes that occur intentionally but are not part of the normal refinery operation, such as a shutdown or cleaning or maintenance when valves are manually opened. These are *periodic* emissions. The 2002 Blowdown System TAD estimated that the emissions average seven tons of organic compounds per day from the four Tesoro BDSs, but this value is misleading and should be clarified.

The TAD estimate was based on EPA emission factors and assumed flow rates that are atypical. The emissions calculation assumed that 15 percent of the refinery feed (crude oil) emissions go to the atmospheric blowdown systems. The EPA factor for blowdown systems, 580 pounds of emissions for each 1000 barrels crude oil processed, assumes the blowdown systems are uncontrolled. However, in the EPA emission factor, "uncontrolled" means that not only the blowdown system itself is uncontrolled or atmospheric, as are Tesoro's BDSs, but that the input streams are not controlled by PRDs or manual valves. The EPA factor, therefore, is not applicable to these blowdown systems. The TAD

also estimated flows of 1 to 5 million cubic feet per day, based on a single incident that occurred in 2001. Flow rates are more typically non-existent, unless, as mentioned above, pressure is being relieved or there is some process where valves are intentionally open, such as vessel depressurization or cleaning. In addition, there exists the possibility of a leak into the BDS from a valve left open or where there is some valve failure.

The TAD also relied on District source test data for an incident that occurred over a five day period from June 16 though 21, 2002. During this incident, the #50 Crude Unit was pressurized and de-pressurized three times with nitrogen as part of unit start-up. During that time, it was discovered that a check valve, not normally opened, had failed, resulting in hydrocarbon emissions that were detected during the source test. Use of emissions data from this atypical event provides a inflated picture of normal blowdown system emissions. Neither the forced flow from nitrogen pressurization and de-pressurization nor the check valve leakage is a normal operating condition.

Other source tests conducted at Tesoro during the past three years have been unable to detect any flow coming out of the blowdown systems. The District monitored the blowdown system serving the #50 Crude Unit from February 5 through December 19, 2003. During that time, with the exception of fewer than five hours in total, the monitoring equipment was unable to detect any flow.

B. Characterization of Input Streams

Staff reviewed piping and instrument diagrams for the four atmospheric BDSs located at the Tesoro Refinery. The diagrams indicate that there are 167 uniquely identified streams plumbed into the four BDSs. Forty-two of the streams are dedicated solely to PRDs. The table in Appendix 1 summarizes the types, source, quantities, and characterization of the identified input streams for the four BDSs at Tesoro.

The table provides an estimate of emissions from blowdown systems for each type of event. As previously described, there are not normally flows to (or, therefore, emissions from) the blowdown systems. There have been eight PRD releases into the blowdown towers since July, 1998 (when reporting of PRD releases became mandatory under Regulation 8, Rule 28). The emissions from these episodic releases are subject to the provisions of Regulation 8, Rule 28 and totaled 26.3 tons.[2] Periodic emissions from cleaning and maintenance activites, or from depressurization when manual valves are opened into the BDSs, can be calculated from the concentration of gases or the vapor pressure and quantities of liquids in the BDS before being drained into slop oil vessels. For example, the VOC emissions from 20 barrels of gasoline in a BDS totaled

[2] 50 Crude Unit, seven releases, 377 lbs; Coker, one pre-turnaround release, 16 tons; three post-turnaround releases, 20,212 lbs; #3 Crude Unit and Cat. Cracker, no releases. Regulation 8, Rule 28 required the implementation of measures to prevent PRD releases at the first refinery turnaround after July 1, 1998.

2.81 pounds. The emissions from 20 barrels of diesel totaled 0.014 pounds VOC.[3] These amounts might be used to clean process vessels as described in the Appendix table. The table also lists materials, amounts and frequency of use for various maintenance operations. These emissions are likely overstated, as they do not account for any cooling effect from the quench towers or packed bed mist eliminators in the blowdown systems. The episodic and periodic natures of emissions from blowdown systems do not lend themselves to an annual average calculation expressed in terms of tons or pounds per day.

C. Rules Affecting BDS Input Streams

Emissions from PRDs, whether vented directly to atmosphere or to a BDS, are regulated by Regulation 8, Rule 28: Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants. Similarly, any fugitive leakage of hydrocarbons past PRDs would be subject to the requirements in Regulation 8, Rule 18: Equipment Leaks. Input streams to Tesoro's atmospheric BDSs that are not controlled by PRDs are controlled by manual valves. These are used during shutdowns and maintenance. Regulation 8, Rule 10: Process Vessel Depressurization applies during the shutdown of a pressure vessel. Once a valve is opened and a process component is flushed into the BDS with steam and/or diesel, the operation is subject to the provisions of Regulation 8, Rule 2: Miscellaneous Operations. Table 1 summarizes District rules applicable to BDS input streams. It must be noted that more than one rule may apply to a single input stream depending on the nature of the emissions and source. For example, one input may originate from a process vessel that may be depressurized only once every few years. Emissions from the depressurization would be regulated under Rule 8-10: Process Vessel Depressurization. However, if material leaks past the valve that controls the depressurization, then those fugitive emissions would be regulated under Rule 8-18: Equipment Leaks.

Table 1
District Rules Applicable to Blowdown System Input Streams

District Rule	Description
Rule 8-2: Miscellaneous Operations	Limits organic emissions from miscellaneous operations to no more than 300 ppm concentration and 15 lbs per day.
Rule 8-10: Process Vessel Pressurization	Prohibits opening pressurized vessels until pressure is less than 1000 mm Hg pressure (4.6 psig) and organic compound concentration less than 10,000 ppm before being opened.
Rule 8-18: Fugitive Emissions	Applies to fugitive emissions from valves, pumps, compressors, pressure relief devices and other refinery components. The rule sets emission standards for each category and allows a small fraction of leaking components to be placed on a "non-repairable" list provided the leak is less than 10,000 parts per million on a volume basis (ppmv).

[3] Assumes 90^{o}F and that 20 barrels of liquid fully displaces the equivalent volume of vapors.

District Rule	Description
Rule 8-28: Episodic Emissions from PRDs	Regulates emissions from pressure relief devices (PRDs) at refineries and chemical plants. The rule requires that PRDs be equipped with a telltale indicator following one "Release Event" (10 pounds or more of VOC). Control is required for all PRDs on a process unit following the second release event within five years on that process unit. Rule 28 is concurrently being considered for amendment.

D. Controls for Blowdown Systems

Blowdown systems could be further controlled in various ways, although doing so would not be a simple matter. A pressure relief device that vents into a BDS could theoretically be routed to a control system such as a flare or fuel gas recovery system. Tesoro has been able to control a select group of PRDs by venting them into an existing fuel gas recovery system. However, there are significant difficulties to be overcome for either of these control options. Atmospheric blowdown systems are designed to operate at or near atmospheric pressures, as are the input streams that feed into the BDSs. In order to control these systems by routing them to a flare or fuel gas recovery system, the pressures at which this equipment typically operates would have to be adjusted so that back pressure associated with the control system would not over-pressurize and potentially damage the equipment. The components that operate at atmospheric pressure, such as the manual valves serving drains and pumps, could not be routed to a flare or fuel gas system without additional equipment such as pumps or compressors to increase the pressure of these streams. More likely, the blowdown units would have to be completely scrapped and another system designed and constructed.

It may be possible to isolate PRDs and route those to a control device without controlling the atmospheric BDSs. The costs of such an approach would be consistent with the cost estimates for controlling pressure relief devices. This is a control option that was considered as part of the larger PRD regulation. Amendments to Regulation 8, Rule 28: Episodic Pressure Relief Devices at Petroleum Refineries and Chemical Plants are currently being considered. Information concerning the draft amendments can be found on the District's website at http://www.baaqmd.gov/pln/ruledev/workshops.htm.

V. SUMMARY OF PUBLIC CONSULTATION PROCESS

A. Meetings

Blowdown systems, because of their intimate relationship with pressure relief devices, have previously been discussed concurrently with other work on Further Study Measure 8 concerning flares and pressure relief devices. In June, 2003, the District Board adopted new Regulation 12, Rule 11: Flare Monitoring at Petroleum Refineries. A workgroup was initiated in January, 2002 to provide technical assistance in developing that rule. During workgroup meetings to

develop Reg. 12-11, it was decided that splitting FS-8 into separate technical assessments was most efficient, in part because atmospheric BDSs are only found at one refinery.

The Technical Assessment Document was distributed and posted to the District's web site in December, 2002. No comments on the TAD were received.

Following the District's investigation of inputs to the four blowdown systems at Tesoro, a workgroup meeting was held on September 15, 2005. Preliminary results were presented and the question of the need for a separate regulation specifically targeting BDSs was discussed. As mentioned above, the question of regulation of BDSs is inextricably tied to the question whether PRDs should be controlled to a more stringent standard than is required in the current Regulation 8, Rule 28. Much of the discussion at the BDS workgroup meeting focused on that issue. This document and recommendation reflect the input staff received during that workgroup meeting.

A public workshop to receive comment on the proposal was held on Thursday, October 27 in Martinez, near the Tesoro refinery. At that time, the public was given opportunity to comment on the staff's determination that a separate regulation addressing emissions from atmospheric blowdown systems is not necessary or appropriate at this time. Following the public workshop, there was a seven day comment period.

B. Responses to Public Comments

This section presents a summary of the public comments that were received during the workgroup meeting, public workshop, or as part of the public consultation process. The District received written and oral comments from one source: representatives of Communities for a Better Environment (CBE).

Comment: The District did not set the condition for meaningful comments. CBE asserts that staff did not allow CBE adequate time and access to information for CBE to provide meaningful comments on the staff's conclusion that further regulation of BDSs was unnecessary. When CBE requested data to substantiate staff's conclusion, staff directed CBE to gather the information directly from Tesoro, which was never made available.

Staff Response: Except for the confidential information submitted by Tesoro during the investigation undertaken by the District for the BDSs portion of Further Study Measure 8, all data and information relied on by staff was available as part of the public process for consideration of this potential control measure. This included emissions data and summary information that characterizes the input streams all of which was set out in the September 30, 2005 Workshop Staff Report.

Staff did not provide CBE the piping and instrument diagrams of the four BDSs submitted by Tesoro as requested because the company had designated that

information proprietary. Staff did, however, make available as part of the public workshop materials a detailed summary of the confidential information submitted by Tesoro. Additionally, during the workgroup meeting, Tesoro agreed to work directly with CBE to provide additional data to supplement the basic summary distributed at that meeting. Upon receipt of this comment, staff made inquiries of both parties and worked to facilitate the exchange of information.

Comment: CBE asserts that none of the four rules referenced in the BDS Staff Report explicitly or clearly applies to BDS.

Staff Response: All inputs to the BDS are subject to one or more different rules depending on the source of emissions. The rules iterated, 8-2, 8-10, 8-18, and 8-28, apply to different emissions at different times, but together, leave no emission unregulated. Regulation 8-2 is a miscellaneous standard for emissions not covered by other rules. Regulation 8-10 specifically limits emissions from opening of pressure vessels during maintenance operations, Regulation 8-18 limits fugitive emissions from valves and other equipment connections, and Regulation 8-28 addresses emissions from pressure relief devices, including those opening into the blowdown system.

Comment: CBE asserts that staff previously stated that it would address BDSs in a PRD rule, but it does not do so in the currently proposed PRD Rulemaking.

Staff Response: In the 2001 Ozone Attainment Plan, Further Study Measure 8, the District discussed the need to "…examine the blowdown system for each of the Bay Area refineries to determine whether there is potential for significantly reducing emissions by reducing routine flaring and by venting more pressure relief valves (PRVs) to gas recovery systems, with flares used only for emergency events." Thus, originally, FSM 8 covered flares, PRDs and BDSs as sources of episodic emissions that should be considered as a source of further controls. Ultimately separate TADs were prepared for each "system" but they are clearly facets of an interrelated system that is a source of (primarily) episodic emissions. The current PRD rulemaking does not address BDSs directly but it does address the primary input to BDSs and in that context will certainly control a significant portion of the emissions vented through these systems.

Comment: BDSs themselves would not be monitored. Although staff proposes to measure or calculate the emissions for the inputs to the BDS, the Staff Report does not describe even generally how this would be accomplished. The Report neither discusses the significance nor presents data on each stream going into the BDSs.

Staff Response: It is true that at the initiation of this evaluation, BDS were not equipped with permanent monitoring devices. However, all four BDSs are currently equipped with flow meters. Under Regulation 8, Rule 28, the facility is required to quantify emissions from a PRD release event (accurate to two significant figures). Emissions quantification for Rule 8-28 is often based upon engineering estimates of the equipment from which the release occurred, and, in

the proposed Regulation 8-28 amendments, refineries will be required to demonstrate their capability to accurately quantify a release. The flow monitors will assist in quantifying emissions and enforcing the other applicable rules, particularly Regulation 8-2: Miscellaneous Operations. Regulation 8-2 requires compliance with an emission standard of 15 lbs organic compounds a day as well as a concentration limit of 300 ppm. Based on the material emitted and measured flows, these parameters (concentration and pounds) can be determined.

Comment: The Report contains discrepancies that are not fully explained, including emissions estimates from the Blowdown System TAD of seven tons per day. The Staff Report states that this number is overestimated. However, there is no information as to whether the monitoring was based on calculations or measurements, or whether the monitoring was continuous or conducted in a manner that can be expected to represent emissions accurately. Most importantly, the monitoring focused on the regularity with which flow was detected rather than on the significance of the amount emitted. The TAD stated that information was insufficient to draw a conclusion. However, staff now has drawn a conclusion based largely on that same data. More information is needed to draw such a conclusion.

Staff Response: The Report clearly explains why the seven tons of emissions presented in the TAD was overestimated. Further, additional data have been generated since the TAD was published and that data were presented in the Workshop Report. Specifically, that report included information on ten months continuous monitoring in which no flows were detected with the exception of a five-hour period. The report also includes descriptions of specific incidents that occurred at the individual BDSs and the reasons for the emissions. Staff also evaluated each of the input streams to characterize the stream and their potential for emissions. Based on all of this information, staff concluded that additional rulemaking is unnecessary.

Comment: The District has ducked it obligation to evaluate BDSs. In the settlement agreement, the District specifically commits to evaluate controls of uncontrolled BDSs. "For refinery blowdown systems, in addition to the description identified in Further Study Measure 8, the District will evaluate the potential for control of uncontrolled refinery blowdown systems."

Staff Response: Staff did evaluate the potential for control of uncontrolled refinery blowdown systems for purposes of reducing ozone. This is a multi-pronged evaluation that looks at a number of factors. The evaluation performed by the District is described in this Report. The primary conclusion reached by staff in preparing its recommendation not to undertake additional control of the four atmospheric blowdown systems at Tesoro for purposes of controlling ozone precursors was the finding that all of the inputs to these systems are controlled by an existing District rule. The primary input is episodic releases from PRDs. The District is considering amendments to that regulation, which will affect the input to the BDSs. Other inputs are far less significant and they are also subject

to existing District rules. The conclusion dictated by this part of the evaluation that a second level of controls for the sources that vent to an atmospheric BDS, as opposed to simply venting to atmosphere, found additional support when District staff considered that the significant technological challenges attended to controlling the atmospheric BDSs at Tesoro.

VI. EXPLANATION FOR NOT PROCEEDING WITH RULEMAKING AT THIS TIME

The inputs that are responsible for emissions from atmospheric blowdown systems are subject to existing District regulations. Regulation 8, Rule 28, requiring control of all pressure relief devices on any process unit that vents twice is the most stringent rule of its sort in existence, and one of only two to control episodic PRD releases in California. Regulation 8, Rule 10 was amended in January, 2004 to establish more stringent standards to reduce emissions from vessel depressurization, and Regulation 8, Rule 18 is the most stringent rule regulating fugitive emissions in the United States. Finally, Regulation 8, Rule 2 controls emissions from miscellaneous operations such as flushing diesel into the blowdown tower during cleaning and maintenance and also would limit emissions in the event of a valve left open inadvertently. Atmospheric BDSs do complicate enforcement of the requirements for the various inputs to the system. However, proper monitoring of emissions by measurement of flows and measurement or calculation of hydrocarbon concentration provides sufficient means to enforce these rules.

Staff has determined, therefore, that a second level of regulatory control, i.e., controlling emissions from atmospheric BDSs, which receive only regulated inputs, is not warranted under existing circumstances. Therefore, staff does not propose to undertake additional rulemaking related to atmospheric BDSs at this time.

APPENDIX 1
Characterization of the Various Input Streams to Atmospheric Blowdown Systems

Source	No. of Inputs	Material in Stream	Total Amounts	Conditions of Use	Access to Blowdown
PRDs	(42)	Hydrocarbons	Varies	Process Upset	PRD
Heat Exchanger Drains (83)	(29)	Slurry, heating oil, Product Feed, Light gas oil, Gasoline, Steam, LPG, Decant Oil	170 - 11,575 gal	Shutdown	Manual valve
	(33)	Diesel	66 bbls	Clean & repair, once each 6 yrs	Manual valve
	(19)	Gasoline, steam & water	2-42 bbls	Clean & repair, once each 3 yrs	Manual valve
	(1)	Steam / water	10 bbls	Never	Manual valve
Pumps / Compressors (5)	(1)	Glycol / Gasoline	1 gal/min	Flushing following emergencies – inner seal failure	Manual valve
	(2)	Decant Oil / gasoline	5 -25 gal	Flushing during Shutdown	Manual valve
	(1)	Gasoline vapor Gasoline liquid	5 cf 10 gal	Intermittent flushing	Manual valve
	(1)	Slurry HGO	0 gal 0 gal	Shutdown (not used)	Locked closed
PRD Flush	(1)	Diesel	10 bbls	Flushing following episodic PRD lift	Manual valve
BDT level glass flush Line	(2)	Wash oil	0	Used to flush BDT level glass	Manual valve, locked closed
Valve Flush (2)	(1)	Slurry (15 gal) LGO (45 gal)		Shutdown	Manual valve
	(1)	LGO (0 gal)	0	Shutdown – never used	Locked closed
Vessels (3)	(3)	Foul water / LPG	0	Not used	Locked closed
Blowdowns (from PRDs)	(2)	n/a	0	Never used	Double blocked valves -- locked closed
Fractionator	(1)	n/a	0	Never used	Manual valve, locked closed
Vent (8)	(1)	Gasoline / LPG	15 MMSCF	Emergencies – high accumulation & flare pressure	Manual valve
	(1)	Steam	4000 scf	Turnaround, once each 6 yrs	Manual valve
	(3)	Crude, gasoline	20-200 bbls	Clean & repair, once each 3 yrs	Manual valve
	(2)	Gasoline	20 bbls	Shutdown & startup, once each 6 yrs	Manual valve
	(1)	Various Light materials		Normally to flare. Has tie into blowdown – not used	Locked closed
Condensate	(2)	Steam condensate	100 – 200 lbs/hr	Intermittent	Manual valve
Drain (Purge gas)	(2)	Natural Gas	8-10 lbs	1 / 2 days	Manual valve
Drain (steam line)	(1)	Steam condensate	0 -10 Mlb/hr	Startup – 1 / 2 yrs	Manual valve
Drain (PRD)	(2)	Gasoline	80 bbls	Following PRD lift	Manual valve
Drain (valve)	(2)	Water / liquid	4 gals	2/yr	Manual valve
Outlets	(4)	Gasoline	25-90 bbls	Shutdown & startup, twice in 3 yrs	Manual valve
Coil Outlet	(3)	Diesel	60 bbls	Shutdown & startup, twice per year	Manual valve
Flare Header	(1)	HC Gas	0	Never used	Locked closed
40# Steam	(1)	Steam	0.5 – 30 Mlbs/hr	Continuous minimum flow	open
250# Steam	(1)	Steam	0	Never used	Locked closed