BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

ADVISORY COUNCIL
PUBLIC HEALTH COMMITTEE

COMMITTEE MEMBERS

LINDA WEINER, CHAIRPERSON
SANJIV BHANDARI
JEFFREY BRAMLETT
BRIAN ZAMORA

DIANE BAILEY
ELINOR BLAKE
VICTOR TORREANO

MONDAY
OCTOBER 25, 2004
1:30 P.M.

ROOM 716

AGENDA

1. **Call to Order – Roll Call**

2. **Public Comment Period**

   Public Comment on Non-Agenda Items, Pursuant to Government Code Section 54954.3. *The public has the opportunity to speak on any agenda item. All agendas for Advisory Council Committee meetings are posted at the District, 939 Ellis Street, San Francisco, at least 72 hours before a meeting. At the beginning of the meeting, an opportunity is also provided for the public to speak on any subject within the Committee's purview. Speakers are limited to five minutes each.*

3. **Approval of Minutes of August 9, 2004**

4. **Optical Fence Line Monitoring at Bay Area Refineries and Chemical Plants**

   The Committee will consider recommendations on whether the optical fence line monitoring technology in operation at the Conoco Phillips Refinery in Rodeo should be applied to other Bay Area refineries and chemical plants.

5. **Discussion of Advisory Council Activities**

   The Committee will review the Council's activities this year with particular attention to evaluating the Council's role and effectiveness, Council procedures and Councilmember development.

6. Committee Member Comments/Other Business

Committee or staff members on their own initiative, or in response to questions posed by the public, may: ask a question for clarification, make a brief announcement or report on their own activities, provide a reference to staff about 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.

7. Time and Place of Next Meeting

At the call of the Chair.

8. Adjournment

LW:jc

CONTACT CLERK OF THE BOARDS - 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 in a timely manner so that arrangements can be made accordingly.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
939 ELLIS STREET, SAN FRANCISCO, CALIFORNIA 94109
(415) 771-6000

CLERK OF THE BOARDS OFFICE:
MONTHLY CALENDAR OF DISTRICT MEETINGS

OCTOBER 2004

TYPE OF MEETING	DAY	DATE	TIME	ROOM
Board of Directors Regular Meeting *(Meets 1st & 3rd Wednesday of each Month)* **- CANCELLED**	**Wednesday**	**6**	**9:45 a.m.**	**Board Room**
Advisory Council Joint Air Quality Planning & Technical Committees	**Tuesday**	**12**	**9:00 a.m.**	**Board Room**
Board of Directors Legislative Committee *(Meets on an as needed basis)*	**Wednesday**	**13**	**9:30 a.m.**	**Board Room**
Board of Directors Mobile Source Committee *(Meets 2nd Thursday each Month)*	**Thursday**	**14**	**9:30 a.m.**	**4th Floor Conf. Room**
Board of Directors Regular Meeting *(Meets 1st & 3rd Wednesday of each Month)*	**Wednesday**	**20**	**9:45 a.m.**	**Board Room**
Advisory Council Public Health Committee	**Monday**	**25**	**1:30 p.m.**	**Room 716**
Board of Directors Budget & Finance Committee *(Meets 4th Wednesday each Month)*	**Wednesday**	**27**	**9:45 a.m.**	**4th Floor Conf. Room**

NOVEMBER 2004

TYPE OF MEETING	DAY	DATE	TIME	ROOM
Board of Directors Regular Meeting *(Meets 1st & 3rd Wednesday of each Month)*	**Wednesday**	**3**	**9:45 a.m.**	**Board Room**
Board of Directors Public Outreach Committee *(Meets 2nd Monday every other Month)*	**Monday**	**8**	**9:45 a.m.**	**4th Floor Conf. Room**
Advisory Council Executive Committee	**Wednesday**	**10**	**9:00 a.m.**	**Room 716**
Advisory Council Regular Meeting	**Wednesday**	**10**	**10:00 a.m.**	**Board Room**
Board of Directors Regular Meeting *(Meets 1st & 3rd Wednesday of each Month)*	**Wednesday**	**17**	**9:45 a.m.**	**Board Room**

November 2004 Calendar continued on next page

NOVEMBER 2004 (Continued)

TYPE OF MEETING	DAY	DATE	TIME	ROOM
Board of Directors Stationary Source Committee *(Meets 4th Monday every other Month)*	**Monday**	**22**	**9:30 a.m.**	**Board Room**
Board of Directors Budget & Finance Committee *(Meets 4th Wednesday each Month)*	**Wednesday**	**24**	**9:45 a.m.**	**4th Floor Conf. Room**

DECEMBER 2004

TYPE OF MEETING	DAY	DATE	TIME	ROOM
Board of Directors Regular Meeting *(Meets 1st & 3rd Wednesday of each Month)*	**Wednesday**	**1**	**9:45 a.m.**	**Board Room**
Advisory Council Air Quality Planning Committee	**Tuesday**	**7**	**9:30 a.m.**	**Room 716**
Board of Directors Mobile Source Committee *(Meets 2nd Thursday each Month)*	**Thursday**	**9**	**9:30 a.m.**	**4th Floor Conf. Room**
Board of Directors Regular Meeting *(Meets 1st & 3rd Wednesday of each Month)*	**Wednesday**	**15**	**9:45 a.m.**	**Board Room**
Board of Directors Budget & Finance Committee *(Meets 4th Wednesday each Month)*	**Wednesday**	**22**	**9:45 a.m.**	**4th Floor Conf. Room**
Board of Directors Executive Committee *(Meets 5th Wednesday of Months that have 5 Wednesdays)*	**Wednesday**	**29**	**9:30 a.m.**	**4th Floor Conf. Room**

MR:hl
10/4/04 (3:15 p.m.)
P/Library/Calendar/Moncal

AGENDA NO. 3

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., Wednesday, August 9, 2004

1. **Call to Order – Roll Call.** 1:38 p.m. Quorum Present: Linda Weiner, Chairperson; Diane Bailey, Elinor Blake, Victor Torreano. Absent: Sanjiv Bhandari, Jeffrey Bramlett, Brian Zamora.

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

3. **Approval of Minutes of May 12, 2004.** Mr. Torreano moved approval of the minutes; seconded by Ms. Bailey: carried.

4. **Indoor Air Quality.** Chairperson Weiner reviewed the two documents in the agenda packet entitled, *Report to the California Legislature: Indoor Air Pollution in California, California Air Resources Board (CARB), June 2004*, and *Indoor Air Technical & Policy Issues: An Update for the BAAQMD Advisory Council, by Jed Waldman, Ph.D., Chief, Indoor Air Quality Section, California Department of Health Services, May 12, 2004.* She stated that at this time there is no comprehensive and coordinated strategy on indoor air quality. Regulatory jurisdiction is spread throughout a variety of agencies.

   Ms. Blake distributed her August 9, 2004 memorandum to the Committee entitled *Rough draft idea for a recommendation to the Council concerning the District's role in indoor air quality*. She observed that the CARB report was issued at the request of the Legislature and attests to the widespread health effects associated with indoor air pollution. Noting that the Air District has a rare opportunity to explore its potential role in this field, she offered two suggestions:

   1) that the District convene a workshop or series of workshops in which researchers, organizations and regulatory agencies associated with indoor air quality could discuss the District's role. The workshops could be convened within the Bay Area with either a broad statewide invitation or as Bay Area-only but with representation from appropriate State agencies.. Key features of the discourse would include identifying current agency roles in indoor air quality and recommendations for future research, education and regulation.

   2) That the District annually sponsor a graduate student scholarship for research in indoor air quality. This would provide both visibility and a connection with local academic institutions.

   Mr. Torreano observed that building materials are a major source of the indoor air pollutants, particularly formaldehyde in pressboard and insulation. In commissioning buildings, contractors heat the interior to treat caulking and epoxies. However, any deficiencies in the

commissioning process require review. If the proper installation and maintenance of building materials could be incorporated into building codes, this would reduce indoor air pollution. Ms. Bailey suggested that the Committee review the study of the toxicity of formaldehyde in the recent rulemaking by the Environmental Protection Agenda (EPA) on wood products. Peter Hess, Deputy APCO, added that formaldehyde is used in plywood resin as a material binder, and is also found in the resin in caulking materials. The latter are regulated as consumer products by CARB, which is currently evaluating an air toxic control measure in this field.

Mr. Hess referred to an advertisement in today's San Francisco Chronicle for an indoor ozone generator, which asserts that ozone has a good effect on health. Chairperson Weiner suggested that the District consider issuing a letter to the editor correcting that misconception. Mr. Torreano observed that the CARB report on indoor air quality addresses this type of equipment.

Mr. Hess noted that the District regulates volatile organic compounds (VOCs) in paints and has adopted stringent rules in this field. The District's perchlorethylene (perc) rule, which is based on toxic air contaminant regulation, far exceeds the stringency of the CARB rule for perc dry cleaners. The District's authority to regulate perc derives from the California Health & Safety Code and is based on ambient air quality management. There may be indoor air quality benefits that derive from the rule but these cannot form the basis for its adoption.

Ms. Bailey opined that any District action on indoor air quality should not supplant its concern with or work on ambient air quality. However, other fields of indoor exposure, such as inside vehicles, and in occupational settings like an excavator or a highway tollbooth, should also be considered. Jack Broadbent, Executive Officer/APCO stated that the South Coast AQMD conducted an in-vehicle study in the 1980's that showed elevated levels of most of the compounds for which the agency monitored. The National Resources Defense Council has also conducted a study on air in buses. Chairperson Weiner noted that the American Lung Association is presently studying indoor air quality in the context of school buses.

Ms. Hess suggested that the Council consider working with staff in contacting and working with planning departments in Bay Area cities and counties. Council member Hayes has previously participated with District executive management in speaking to local governments about urban heat island mitigation. Such Council/staff outreach could be extended to the effort to influence building codes. The Council, in concert with staff, would develop the presentation, which would concern guidelines, recommendations and identify key issues. Ms. Blake suggested that local government staff be included on the invitation list to the above-mentioned workshops. Noting that the District was successful years ago in getting local entities to adopt air quality elements in their general plans, she suggested that a comparable general plan amendment for building codes could be studied. This may be a topic for next year's Advisory Council Retreat.

Mr. Torreano noted that the apprentice sheet metal workers in his union are trained in various ventilation processes. It would be ideal for a union training department to incorporate indoor air quality certification processes into an apprenticeship program. However, at the present time there are neither guidelines nor certification processes associated with the installation or maintenance of industrial air duct cleaners for hospitals and municipalities. Mr. Broadbent observed that there are building heating and ventilation guidelines on airflow, but these do not address indoor air quality concentrations. That is why the field of indoor air quality is ripe for review with regard to potential courses of regulatory action.

Jack Colburn, Senior Policy Advisor, stated that EPA has produced a packet on the "Tools for Schools" program, one of which will be provided to each Committee member. It provides a number of key sources of information. Guidance can be gleaned from the packet materials and reviewed for possible application to other indoor situations. A considerable amount of information on indoor air quality is generally available but there is no clearinghouse for it. Molds in buildings and homes are the major indoor air issue in the state. Ms. Blake noted that the State Health Department has active programs on mold in indoor building environments.

Mr. Broadbent suggested that at an off-site location next year the Board and Council hold a Retreat on indoor air quality. Prior to the Retreat, the Council could adopt recommendations for the Board to consider. In addition to the state of the science on indoor air quality, the discussion could include establishing standards for smaller sources comparable to the regulation of back-up diesel generators that are found in many buildings. It could involve a component in which owners of back-up generators, as well as building maintenance staff, could also be educated about ventilation systems and integrate ambient and indoor air quality management awareness.

Mr. Broadbent added that in the Bayview Hunters Point area, where there are higher incidences of asthma, there is no program to deal with indoor air quality. Mr. Hess suggested that perhaps indoor air could be included in the forthcoming public meetings on the Ozone Control Strategy. Mr. Broadbent added that the Community Air Risk Evaluation (CARE) program would be addressed in these community meetings. Ms. Roggenkamp indicated that the meetings would begin in late September and continue through mid-October.

Chairperson Weiner opined that the review of indoor air quality in Bayview Hunters Point, as it relates to the incidence of asthma, should not supplant the District's careful review of permitting an electrical generating power plant since the emissions may also influence the incidence of asthma in that area. Ms. Bailey added that care must be taken in framing the categories of discourse on indoor air quality and asthma.

Ms. Blake inquired if there could be an immediate augmentation of programs in which the District encourages the development of educational and advisory materials for distribution in residential neighborhoods. Mr. Colburn replied that checklists for home inspections are available and there are scientifically proven building materials that meet both environmental and energy conservation ratings.

Mr. Broadbent added that such material may not be widely distributed, and this issue could be discussed in the workshop. Chairperson Weiner stated that from the perspective of social marketing, tailoring the principles of the meeting and the materials to be presented to a given audience is always to be recommended.

Ms. Blake suggested the following additions to the proposed recommendation, based on today's discussion:

- In No. 3, prior to "we recommend that" add "to augment—but in no case to supplant—the District's activities to improve ambient air quality" and before "in which" in the first line add "within the next year".

- In the first bullet under No. 3, add a second sentence to read: "Included among the issues to be addressed should be their building materials and their appropriate installation and maintenance."
- After "or workshops" in No. 3 in the first line add "or summit."
- Delete "state policy" from the last line in No. 3 and insert "and programs" in its place.

Mr. Torreano moved adoption of the text as amended for forwarding on September 8 to the Council; seconded by Ms. Bailey; carried unanimously. The Committee directed that the members absent from today's meeting receive the revised document via e-mail and be invited to separately submit comments to the Clerk for inclusion in the Council meeting agenda packet.

In reply to Chairperson Weiner, Emily Hopkins, Public Information Officer, stated that to date 30 cities and 6 counties have adopted the District's wood smoke ordinance. There are approximately 100 incorporated cities and nine counties in the District's jurisdiction, two counties of which are partial counties with some jurisdiction from another air district.

5. **Committee Member Comments/Other Business.** Ms. Blake inquired as to the District's view of a proposal by the Governor's California Performance Review commission to eliminate CARB. Mr. Broadbent stated the District would respond with a letter of support for CARB. Ms. Blake suggested the Council might consider endorsing such an action by the District.

6. **Time and Place of Next Meeting.** Monday, October 25, 2004, 1:30 p.m. 939 Ellis Street, San Francisco, California 94109. The September 8, 2004 Committee meeting is canceled.

7. **Adjournment.** 3:01 p.m.

James N. Corazza
Deputy Clerk of the Boards

:jc

AGENDA NO. 4

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

To: Public Health Committee Members

From: Linda Weiner, Chairperson

Re: Public Health Committee Review of Optical Fenceline Monitoring at Refineries

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Sets forth below are excerpts from the minutes of the Public Health Committee meetings at which the subject of optical fenceline monitoring and refineries has been discussed.

FEBRUARY 10, 2003

Understanding Optical Remote Sensing and How It Relates To Fence Line Monitoring. Alton Arnett, Business Manager of TerraAir Services in Houston, Texas, stated that optical remote sensing (ORS) technology is currently being used to monitor ambient air at the fencelines of refineries and chemical plants. Emitting separate beams of infrared (IR) and ultraviolet (UV) light, ORS detects toxic compounds in the atmosphere and distinguishes them by how they absorb light radiation. The compounds measured can be quantified and speciated in real-time. TerraAir Services operates and provides service to the ORS systems at the ConocoPhillips refinery in Rodeo, California and the Westlake Petrochemical facility in Lake Charles, Louisiana. It also processes the data they generate. The ConocoPhillips system contains 16 separate pieces of equipment monitoring 38 compounds at the 930-meter north fence and the 855-meter south fence. It was installed in 1996 as a result of a Catacarb release in 1994 and cost approximately $2 million.

Mr. Arnett displayed slides of ORS equipment in monitoring shelters, as well as the system's computer screen that includes data for the compounds monitored, a map of the facility and the surrounding area and meteorological conditions. Compound detection levels are identified by color-coding with green, yellow and red lights. If there is a red flash for 60 seconds, a high level alarm flashes on the screen. If the system operator does not acknowledge the computer alarm after another 60 seconds, a refinery alarm sounds. This has occurred once in the last seven years.

Dial-in access to the screen is permitted to four community members and the staff of the Air District. Ms. Blake added Contra Costa County also has access to this data in real-time. The screen display will soon be posted on the County's website, although the specific features are not yet determined. Of the meteorological indicators, the windrose are of greatest interest to the community for sampling purposes. There was brief discussion of whether the screen display is user-friendly to the layman and if a primer would help to introduce the screen features.

Mr. Arnett added that fenceline monitoring provides for "turf protection" in cases in which a release occurs in one of several adjacent facilities. ORS provides for early detection of a release that can lead to the prevention of a subsequently catastrophic release. It has been utilized to activate a water cannon system around an industrial facility. It has also increased employee safety by identifying compounds at the fenceline of a Houston plant that lead facility staff to discover previously undetected in-house equipment malfunctions.

In response to Committee member questions, Mr. Arnett provided the following comments:

a) the ability of ORS equipment to operate under diverse or adverse atmospheric conditions, such as subjugation to prolonged, heavy rains or a thick dust cloud, depends upon the density of the water or particulate matter that would block the projected beams of light. This has happened once in heavy precipitation and only for a few minutes. While there is no back-up to the optical equipment, the system has electrical back-up power.

b) ORS technology is being applied to ambient air monitoring in a field at a considerable distance from a large chemical complex in Seabrook, Texas and also to monitoring for ozone precursors in downtown air in one municipality in the State of Maine.

c) a portion of the scientific community still regards UV readings with some skepticism due to problems associated with developing a commonly accepted UV data baseline.

d) a TerraAir Services Project Manager visits the ConocoPhillips refinery every two months to perform general maintenance on the optics, fiber optic cables and the meteorological stations.

e) TerraAir Services turns over its data to community groups but does not follow their use of it and he was not aware of any community uses of it.

f) the number of contaminants that can be speciated depends on the type of monitor that is used.

g) the use of ORS in evaluating the composition of refinery flare emissions or as an opacity evaluation tool is difficult because the flares are very high. Peter Hess, Deputy Air Pollution Control Officer, stated that portable Lidars could be calibrated to evaluate specific compounds in refinery flares. Mr. Arnett added that ORS applies primarily to ground level, fugitive emissions from pump seals, valves, flanges and floating roof tanks. Measurements of flare emissions at ground level would have to be conducted several miles downwind of the flares.

h) data are inputted every five minutes from the system and are downloaded at the end of a monitoring period over the telephone line. Three weeks are usually required to process such data, and a total of 28 days is allowed to complete quality assurance.

i) cost estimates for the ORS system vary, but the Westlake facility in Lake Charles, Louisiana allocated $400,000 for equipment, monitoring shelters and training. TerraAir Services charges an annual fee of $350,000 to operate the system.

j) in the event of a loss of power or a high-level alarm, the system initiates an autopage that notifies all clients via e-mail. With regard to round-the-clock notification, this is largely dependent on the refinery staff that have pager numbers of health department staff.

k) since the system was installed at the ConocoPhillips refinery in 1996 there have been no exceedances of the safety levels that have been set by the ORS system.

l) the ORS system has detected emissions on the refinery's south end that did not originate in the refinery.

m) the infrared beam projected at the fenceline leaves the scope at 10 inches in diameter and measures three feet in diameter at a distance of 1,000 feet.

n) the following websites provide additional information concerning ORS technology: Boreal Laser at www.boreal-laser.com, IMACC at www.imacc.com and Opsis at www.opsis.se.

Mr. Hess stated that the issue before the Committee is whether ORS technology should be recommended for fenceline emissions monitoring at the other four Bay Area refineries. This technology enables the community to know more about emissions crossing the fenceline in real-time. By contrast, static canister samples are a technology of the 1960's. They measure only a few compounds and cannot be located in every community. The processing and analysis of samples from fixed monitors is also two months behind their collection.

Ms. Blake observed that the real-time fenceline monitoring data takes a month to quality assure. She added that the District does not post data from its fixed monitors on its website, although such information would be useful over time to provide a picture of emissions. Mr. Hess replied that the District plans to post its fixed monitor data on its website when it is upgraded, although it will not be in speciated real-time.

MARCH 10, 2003

Open Path Gas Monitors at the ConocoPhillips Rodeo Refinery Fenceline. Randall L. Sawyer, Accidental Release Prevention Program Supervisor, Hazardous Materials Program, Contra Costa County Health Services department (CCCHS) stated that after an accidental release of Catacarb at what is now the ConocoPhillips Refinery in Rodeo, California in 1994, Optical Open Path Monitors were installed as part of a "Good Neighbor Agreement" in July of 1997. Three different types of monitors were placed along the refinery's north and south fencelines: Fouier Transform Infrared, Ultraviolet and Tunable Diode Laser. About one kilometer separates the monitors from the reflectors.

Data from the monitoring system was shared with Communities for a Better Environment (CBE), the Shoreline Environmental Association (SEA) and the Rodeo Citizen's Association (RCA). However, due to resource limitations, the abundant real-time data were not being fully evaluated. Therefore, these groups requested the assistance of regulatory agencies. In the latter part of 1998, the CCCHS, SEA and CBE applied for an Environmental Protection Agency (EPA) Environmental Monitoring for Public Access and Community Tracking (EMPACT) grant. Its purpose was to analyze and evaluate the optical remote sensing data through the formation of a working group, develop recommendations on real-time monitoring data by the industry, community and government, and educate and involve community members in the understanding and use of the data.

A working group was formed which included technical advisors from the California Department of Health Services, Occupational Health Branch and Environmental Health Laboratory Branch, EPA Region IX's Quality Assurance Section, Air Enforcement Section and Laboratory, as well as the refinery and the Air District. It evaluated the monitoring system technology, the types of compounds to be measured, the data produced, instrumentation oversight by the refinery, as well as data from the Air District's point monitors in the refinery. It recommended that the monitoring data be placed on a website and monthly reports on the data issued. The CCCHS subsequently worked with the SEA, ConocoPhillips, Petris (ConocoPhillips contractor responsible for the different monitors), the EPA, and an EPA contractor to develop the website that collects and posts the monitoring data. The data is quality assured and is approximately six weeks old.

Mr. Sawyer displayed pages from the website that provide background and introductory information, as well as the basis on which compounds have been selected to be monitored. The website also allows the user to research data for one or both fencelines, at varying time intervals and for maximum or average concentrations. Summary reports are also provided identifying different chemicals, their number of detection and type of detection alarm levels, and the maximum, average and minimum concentrations for detections. Acute exposure levels of concern for each substance were obtained from the Office of Occupational and Environmental Health Hazard Assessment (OEHHA). In some cases the federal government uses these same thresholds for acute emergency guideline levels. Lower detection levels are used only for evaluating refinery operations. The website also provides information on the definition of a dose, what is considered toxic, alarm levels and odor thresholds. It has sections for feedback, equipment technical support, health information and county accident records. It posts links to such other agencies as the California Air Resources Board (CARB), the Air District's accident history and incident reports, OEHHA, CBE and SEA. The site also allows for archival research of historical monitoring data from the refinery.

While the goal of the system is to capture real-time data, the continuous evaluation of constant data streams into the website is cost-prohibitive. However, the working group agreed that jpg files would be created of the computer screen that will provide real-time information. It is updated every five minutes and contains data for optical measurements of 30 chemicals, along with meteorological data and hydrocarbon data from six point source monitors. The website posts a disclaimer that states the data readouts on the jpg's have not been quality assured. The data takes six weeks to verify. The jpeg files are stored for 4-6 weeks during which it can be recalled. Telephone numbers and an email address are provided for those seeking either further information or wishing to report an emergency and contact the Hazardous Materials Incident Response Team. The website for the historical should be operational in April 2003 and for real-time data information in May 2003. Thereafter the real-time data will be used in a six-month pilot program.

Fenceline monitoring data can be used for public information, emergency response, historical research, analysis of fugitive emissions from seals, valves and pumps, and identifying emissions-related problems at the refinery. No correlation has so far been found between fenceline data and the occurrence of an accidental release and no alarm has been triggered since 1997, though a number of incidents have occurred since then. A plume could have gone above the fenceline monitor after having been emitted from a high stack or been blown in another direction by the

wind. In an accidental release of hydrogen and methane, both are lighter than air and immediately ascend and go over the fenceline monitors. Also, the monitoring system was down for maintenance during one previous accidental release.

In reply to questions, Mr. Sawyer noted that optical open path monitors are being used with an accepted quality assurance protocol elsewhere in the United States. EPA staff can provide information on where this is taking place. There is a protocol in place at the ConocoPhillips refinery. However, all the signatories to the Good Neighbor Agreement have not yet formally endorsed it.

With regard to what the public derives from the monitoring system, it is provided with an additional way to obtain monitoring data for routine operations and critical events. However, only a few individuals have looked further into what insights the data provides into refinery operations or to conduct further studies. A member of SEA has worked extensively on the quality assurance issue.

The refinery uses quality assured real-time data chiefly for evaluating accidental releases rather than for regulatory work or planning. The placement of the optical monitors based on modeling comparable with hazardous materials modeling was the subject of a separate EMPACT grant. This study took meteorology and terrain into account, but the results proved inconclusive.

As to whether it would be useful for the District to post on its upgraded website the data from its stationary source monitors, Mr. Sawyer observed this would provide an historical perspective even though the data were not in real-time. The District works cooperatively with CCCHS in assisting with sample analysis and in sharing diverse air quality information. The coordination on the District's website of all of the region's monitoring data, including data from the California Air Resources Board air quality study currently underway in Crockett, would be very worthwhile.

With respect to whether the optical monitoring system should be installed at the remaining Bay Area refineries, it has some advantages and potentially new uses but its benefit has not yet been demonstrated. The equipment cost the refineries nearly $1 million, excluding programming, installation and maintenance. Considerable further study would need to be conducted on the benefits derived from the system in assessing fugitive emissions.

In reply to a question on whether an early warning mechanism exists for the detection of a flaring incident, Gary Kendall, Director of Technical Services, replied that flare visibility is one means of detection, although this occurs during rather than before the flaring itself. The flaring event of July 10, 2002 is the kind of release that community members are most concerned about. Flaring results in the emission of large quantities of hydrocarbons at an altitude of 240 feet. The resulting buoyant plume rises are difficult to capture at the refinery fenceline. The District does have the ability to take canister field samples from its mobile monitoring van in areas downwind from the plume.

The Committee agreed that at the next meeting it would invite District staff and representatives from environmental and community groups near the ConocoPhillips Refinery and other Bay Area refineries to discuss their interests in, and impressions of, the optical monitoring system.

MAY 19, 2003

Receipt of Community Input on Optical Sensing Emissions Monitoring and Data. Chairperson Zamora stated the Committee has met twice to discuss the optical open path monitoring system at the ConocoPhillips refinery fence line. It has received presentations from the equipment vendor and the staff of the Contra Costa County Health Services (CCCHS) department. Today community input will be received on the utility of the data generated by the monitoring system.

Several individuals came forward and offered their comments as follows:

Howard Adams
Shoreline Environmental Alliance
Crockett, California

- At a Crockett high school two miles east of the refinery, the California Air Resources Board (CARB) installed a monitor that provides real-time data within three to four hours of initial measurement. Fenceline data from an April 5, 2002 flare event showed an increase in nitric oxide (NOx) from 300 parts per billion (ppb) to 400 ppb. The CARB monitor showed an increase in NOx from 0 to 4 ppb and in hydrocarbons (HC) from 200 ppb to 260 ppb. After the July 10, 2002 flaring event no data was recorded at the CARB monitor due to westerly winds, but the north fenceline monitors recorded a sharp increase of butane emissions.
- Monitoring system data can be cumulatively reviewed on a daily, monthly or annual basis. This is helpful in trend analysis. The data is generated independently of community member complaints and can be of additional use in Air District enforcement actions. MTBE has been measured at the refinery fenceline, but it was traced to the adjacent Shoreline Terminal facility. Thus, the data optical monitoring data can assist in locating other sources of air pollution.
- This monitoring data could be used in anticipating a release by being integrated with the local Community Warning System. This type of arrangement would require County authorization.
- The fence line and CARB monitors indicate low levels of emissions from a wide variety of chemicals. Both the community members and the refinery should find such data reassuring.

Andy Mechling
Selma, Oregon

- While he was a Crockett resident in the 1990's, he negotiated with the refinery on the selection and siting of the monitoring equipment. He gained expertise in both the technology and evalu-ating the data that it generates. Every page of data is in response to community concerns.
- There is no quality assurance plan governing the optical monitors at the refinery.

- Within the last four years monitoring data reports have been issued monthly. The posting of real-time data on a Contra Costa County website is anticipated in the near future. The Environmental Protection Agency (EPA) has inexplicably set aside its rules regarding data quality assurance even though it will be posted on-line. This matter requires resolution.
- The type of UV monitor at the refinery fence line is no longer manufactured or technically supported. The scientist who developed it now questions its accuracy.
- There are some problems with where the monitors are sited. The optical pathways are too long to be practical. If they were somewhat shortened they would be more dependable.
- The list of chemicals measured by the monitors is too extensive and should be shortened. Regulatory agency scientists could provide criteria for truncating them. Over the seven years that the monitors have operated, as many as 15-20 chemicals have never registered even
  a single measurement. Also, a tunable diode laser on each fenceline always reads zero.
- An incident on March 17, 2000 in which a junior high school principal smelled a noxious odor and called a shelter-in-place was confirmed by fence line data reviewed two months later show-ing the single highest release of butane in two years. Had this principal had access to a computer screen to read the data, this shelter-in-place might have been initiated even earlier.
- Since the monitors were installed in 1997, none of the fenceline monitors have registered a high alarm. However, no major release incident has occurred either. The monitors may constitute a deterrent against major releases since they provide useful emissions data that can be tracked.
- The utility of the optical monitoring system data is not at issue. The central concern is the lack of attention given to the data by professional scientists. In the initial phase (1997-99) of this project, regulatory agency attention was largely absent. Although agency participation has somewhat increased since then, the question remains whether regulatory agencies are willing to increase their dedication to gathering, interpreting and disseminating this optical monitoring data. It contains significant chemistry. Moreover, in the absence of a mandate from regulatory agencies, there is little market incentive for developing and installing technologically improved equipment that detects pressure relief valve leaks or monitors stack emissions.

Jay Gunkleman
Crockett, California

- The agreement between the refinery and the community allowed a community member with a computer screen connected to the system to "generally characterize" the data for three days after its initial posting. This was in response to community member requests. This data will soon be available on the County's website and no longer confined to a few computer screens.

- The computer screen at the Bay Area AQMD that reads the optical monitoring data is not connected to the refinery. It should become operational and read by trained District staff.
- The UV monitors are unreliable and should be replaced with the most up-to-date equipment.
- The community believes that the monitoring system provides useful information regarding events independently of the refinery as the sole source of information. This is important given some past difficulties with the refinery failing to fully inform the community of a release.
- Regulatory agencies should use optical monitoring, as it is superior to point source monitoring.
- Carbon disulfide is a neurotoxin that, like lead, cumulatively leads to damage to the nervous system. It should be monitored during refinery releases, particularly in nearby communities.

Bill Concannon
Crockett, California

- The optical monitoring system provides the community with useful on-going data. Community member contact with the refinery in connection with the observance of high readings, or the lack thereof, can help in tracking down the source of an odor incident. This occurred when foul-smelling emissions were traced to a sewage treatment plant rather than to the refinery. Screen shots are taken of the computer screen every five minutes and will soon be uploaded to the County website. In addition to chemical measurements, the screen provides data on wind direction which is also critical to tracking releases through a given period of time.
- A school principal in Crockett has expressed interest in accessing the real-time data. From the outset, a Rodeo resident should have had a computer screen with access to the monitoring data.
- The true gauge of refinery activity is the level of butane emissions.
- The system needs to be refined and upgraded where possible and applied to other refineries.

Julia May
Communities for a Better Environment
Oakland, California

- She participated with the community and refinery in the process of selecting monitoring equipment. At the time of its purchase the original UV equipment was innovative. However, it has since been discovered that it is unable to handle the cross-sensitivities of certain gas concentrations that must be measured at low levels and within good detection limits.
- The refinery will soon produce low sulfur diesel fuel. This will increase sulfur emissions at the refinery. The UV monitors measure sulfur compounds and must therefore be

reliable. The refinery is willing to discuss this matter. The Advisory Council could also review this issue and make recommendations as appropriate regarding the upgrading of the UV monitors.

- Most refineries have hydrogen sulfide, sulfur dioxide, carbon monoxide and NOx point source monitors. However, optical monitors measure many other chemicals in real-time and have a better chance to capture emissions than point source monitors. Optical monitors should be installed along the fencelines of the other refineries in the Bay Area.
- While the optical monitoring system data has not yet been used to refute refinery statements about facility emissions, fenceline measurement data combined with wind direction indicators has helped to guide the deployment of the community's bucket brigade during a refinery release. The information gathered by the brigade was provided to the refinery.
- The system provides data relevant to odor complaints well in advance of inspector arrival.
- Bayo Vista residents in Rodeo, who are primarily from minority and low-income groups, were not provided with a computer screen to read the data. This environmental justice (EJ) problem will be solved when the optical monitoring system data is posted on the County's website. The Committee should keep the District's EJ policies in mind as it reviews these issues.

Chairperson Zamora inquired as to whether studies of long-term health effects were conducted on those exposed to refinery releases in the Crockett and Rodeo area. Ms. May replied that a survey was recently conducted by CBE in the Bayo Vista community which revealed that 60% of the children in the project have asthma. A non-random study of households conducted by a CBE youth organization reported one person in each Bayo Vista household has asthma. A UCLA study compared the health of citizens downwind of refineries with other residents not exposed to refinery emissions but with higher exposure to smog. It found that those downwind of refineries showed a greater decrease in lung capacity. Contra Costa County also conducted a study of complainants near the former Pacific Refinery in Hercules, and found that Air District data supported the finding of a correlation between refinery releases and complaints and health problems.

Mr. Mechling added that in the wake of the 1996 Catacarb incident a Good Neighbor Clinic was also created. About 66% of the patients complained of ocular problems and 40% suffered from asthma. A follow-up study of those citizens who moved out of Crockett would likely reveal many health problems, but this cannot take place because all the data from the health clinic was returned to UNOCAL, which operated the refinery at the time. Mr. Adams noted that the members of many families that left Crockett had developed various chemical sensitivities after the Catacarb release. Mr. Gunkelman added that some residents suffered dry eye syndrome due to alkaline burn and required tear duct implants. Immune response and neurological problems were also reported. Ms. May indicated that during flaring events many residents report eye irritation and skin rashes.

The community representatives agreed with the following summary provided by Ms. Weiner: the monitoring system provides the community with a sense of empowerment as well as with useful data but requires refinement and updating. Quality assurance protocols must be developed and the UV monitors upgraded. The Air District should establish a working connection to the fenceline monitoring data. Regulatory agency science should interface appropriately with this system.

JUNE 30, 2003

The Role of Optical Remote Sensing Technology in Flare Emission Evaluation. Ted McKelvey, Terra Air Services Project Coordinator, stated he has been the Project Manager for the ConocoPhillips Refinery project since 1998. He described how Optical Remote Sensing (ORS) equipment projects a beam of infrared (IR) or ultraviolet (UR) light to measure fugitive emissions along fencelines or near process units, emissions from vehicle or ambient air content. Along facility fencelines, ORS is used for source identification/separation, early detection and employee safety. The data generated by the ConocoPhillips refinery fence line monitors can be accessed via dial-in and will soon be posted on the website of the Contra Costa County Health Department.

The application of ORS monitoring systems applied to refinery plume flare evaluation would be limited by several factors: (a) the requirement to have reflectors or transmitters behind the plume, (b) the relatively high elevation of the flare stacks, (c) the distance it takes for the flare plume to reach ground level, (d) the difficulty in intercepting the plume properly. Laser Detection and Ranging (LIDAR) systems have been used to monitor flare plumes. However, these systems are limited to measuring a single compound, and they are highly expensive. Fourier Transform Infrared Spectroscopy (FTIR) is currently being developed by the Environmental Protection Agency (EPA) to produce three-dimensional plots of a near ground level plume, and in Texas efforts are underway to use passive FTIR as a means of measuring the content of a variety of compounds from flare stack emissions.

Robert L. Spellicy, Ph.D., President, Industrial Monitor & Control Corporation (IMACC), Round Rock, Texas, presented "Tomographic Inversion and Flare Efficiency by Passive FTIR." He displayed a diagram of a waste site in which radial plume mapping was conducted to identify emission hot spots. Infrared beams were transmitted to corner reflectors distributed in angular and radial patterns at and above ground level. The reflectors were fixed on grid vertices and the readings from them provided a series of measurements of the source emissions. This type of data allows for inversion of the individual integrated path measurements to produce a three-dimensional mapping of the plume. With the addition of wind field information one can determine total flux. Tomographic inversion can be used to map emissions from an area source or the plume at a refinery fence line.

EPA recently conducted validation tests of this system by distributing corner reflectors throughout a region. This region had controlled point sources as well as a simulated area source (soaker hose fed with cal gas). EPA then used the measured FTIR data in the tomographic inversion software, to see how well the software could replicate the actual measurements. For the point sources, the accuracy of the software in locating the position of the release was within one-half of a pixel (about 2.5 meters), and it recovered 93% of the total emissions. Lawrence

Livermore Laboratory has conducted similar optical measurements for homeland security purposes, using multiple beams in a comprehensive crisscross pattern indoors to map possible releases in public buildings. However, this system is complex and very expensive.

EPA also used optical scanning to measure emissions of methane and ammonia at a Kentucky landfill. The system in this case had a computer-controlled scanner that measured transmission to a wide array of corner cubes on site. A single set of scans to all corner cubes can reproduce the source distribution and hot spots, but several cycles are usually averaged to account for source variabilities. Several hot spots in the landfill were identified. In another test, vertical paths were used to look at downwind plumes from a chicken farm before and after a waste area was covered. After the waste area was covered, ammonia emissions were seen to reduce from 0.33 to 0.07 grams/second with the methane remaining essentially unchanged at 0.62 to 0.67 grams/second. EPA is in the process of purchasing additional optical systems to evaluate landfills and other sources, and developing methodological protocols for this type of optical measurement method.

In terms of practical limitations of open path measurements, optical signal quality decreases as the distance of the measured path increases. Integrated path measurement works best between about 300 - 500 meters one-way and remains adequate up to approximately 700 meters. Measuring at distances greater than this will encounter significant interference by atmospheric constituents, particularly water vapors and carbon dioxide and the analysis of many compounds will suffer. The longer pathways generally require splitting the path up to maintain optimum detectivity. Monostatic systems (corner cube plus transceiver) if converted to bi-static systems (combined transmitter and receiver) will improve the signal-to-noise ratio perhaps 10 to 100 times. The path is cut in half, however, so this can degrade minimum detection levels in shorter path systems.

In reply to Committee questions, Dr. Spellicy noted:

- tomographic inversion works best along unobstructed pathways where there is an unobstructed path allowing for integration along the path. This type of scenario also allows for greater ability to measure total flux. In its vertical path configuration, it is designed primarily to provide maps of emissions leaving a site. Total flux can also be determined but this depends on the frequency of measurements, how often they are averaged, as well as the impact of wind speeds. Data from these systems can provide input to citizen warning systems or it can be used to provide evidence after a release for purposes of source attribution.
- Elevation of corner reflectors depends on the source. It would be difficult to suspend corner reflectors at refinery stack heights of 300 feet. Scissor jacks can elevate up to a maximum of 50-60 feet. Around some refineries, nearby hills allow the siting of a measuring device to within 50-60 feet of the top of the flare. However, this could access a high plume rise.
- tomographic models map emissions and provide concentration estimates at specific points within the course contour. The number of compounds measured does not entail a practical trade-off in routine operational feasibility. Rather, the challenge is to generate

the spectrum at a high enough signal-to-noise ratio to be able to discern a sufficiently low concentration.

For major releases shorter averaging periods could be used to achieve a better temporal resolution and early warning. The speed of response is a function of the threshold of lowest concentration. FTIR gathers one spectrum per second. These scans are averaged to produce a higher signal-to-noise ratio in the spectrum. This allows smaller absorption features to be detected and thus lower concentrations of constituents of concern. Optical measurement systems are now sufficiently capable that they can be set up to discern both routine low-level data and high concentrations from a release. FTIR detection limits for emergency response are governed somewhat by the strength of absorbance of each measured gas. Through variable sequencing, five-minute averages could be used to detect fugitive emissions and low-level ambient concentrations along the fence line; and shorter scanning averages could be used to detect higher concentrations expected during an accidental release. Short averaging periods could be used to identify high emission levels. These high-speed spectra could be averaged together to increase the signal-to-noise ratio allowing for post-process evaluation of low-level emissions. Longer averaging time allows for identification of consistently low-level emissions, although transient emissions would be less detectable.

New algorithms are now available that simultaneously allow for the evaluation of the infrared spectrum automatically correcting and refining the analysis procedure as needed. At a toxic waste site in Texas with relatively low emission levels, the system corrects for changing atmospheric water vapor due to seasonal variation in humidity. This is an important improvement that eliminates residual effects that usually interfere with the analysis.

Monostatic scanning equipment and accompanying software cost about $100,000; pre-fabricated equipment housing from $20,000 - $30,000; and replicated corner cubes from between $6,000 - $10,000 each. Mr. McKelvey added that annual maintenance and data analysis for two monostatic systems with a total of four paths would cost between $100,000 - $200,000.

Dr. Spellicy stated that LIDAR technology is excellent for measuring plumes, but it is limited to a single compound and costs approximately $1 million per unit. The Alberta Research Council has contracted with Spectrolite from the United Kingdom to perform measurements on SO_2 with a multiple-laser LIDAR to assess wildcat flares in Alberta. When new wells are drilled at these Alberta oil fields, the gases are sent to a flare while testing on flow, and pressure is conducted. The Alberta ambient air quality regulations require that emission levels from a plume when they reach ground level must be below the ambient air quality standards. Use of a LIDAR allows for mapping of the plume from the flare measuring concentration as a function of distance from the flare. This should allow LIDAR to assess if the regulations are being met when the plume reaches the ground.

Passive FTIR measurement of flare efficiency is underway in Texas to identify ozone precursors near industrial facilities. Houston is an ozone non-attainment area. NASA fly-bys identified hot spots downwind of certain facilities that could not be accounted for by current emission factors. The issue was whether variance in normal flare operations at facilities affected such hot spots. FTIR should allow for the continuous, unmanned measurement of combustion and destruction efficiency of elevated flares in near real-time. The Texas program will demonstrate this and

determine the measurement accuracy of such a system. The State of Texas is working on a protocol for continuous FTIR monitoring for flare measurement. This effort is based on emission spectroscopy. When gases are heated they emit radiation with the same infrared signatures as exhibited in their absorption spectrum. Therefore, hot gases emitted by a flare can be identified and quantified by measuring the flare radiant signature. The FTIR signal derives from measurements of background radiance, flare radiance, atmosphere path radiance and atmospheric transmission. Natural background radiance and atmospheric temperature are negligible. The major measurement is then the radiance of the plume as transmitted through the air.

Dr. Spellicy displayed spectral signal charts of several plumes showing emissions of organics and hydrocarbons, with water content and CO2 content carefully distinguished in each. Comparisons with reference spectra and temperature provide the measurement criteria essential to this process. The measurement of combustion efficiency requires the quantification of carbon monoxide, carbon dioxide and organics. CO, CO_2, and an approximation to total organics is comparatively easy to determine, so combustion efficiency can be measured. Total hydrocarbons can be approximated by calibrating against a mix of heavy organics or using a representative heavy organic. The measurement of destruction efficiency requires analysis of individual organics and this is more difficult. Speciation of non-methane organics is possible for the lighter compounds (< C5).

Atmospheric path transmission between the FTIR and the flare is needed to correct the observations for atmospheric effects. This transmission can be measured by observing an infrared source over a horizontal path from the FTIR to the flare base. This signal is then corrected by measuring radiance with the black body removed which accounts for any atmospheric path radiance (this is usually very small). This path transmission is then used to deduce gas concentrations in the horizontal path, which in turn are used to compute slant-path atmospheric transmission to the flare exhaust. Flare radiance is measured with FTIR directly. An iterative calculation of flare temperature and its opacity is then performed using the intervening atmospheric transmission to correct for the air path. This produces concentrations of all compounds observed in the plume.

The Texas Flare Measurement Program will measure flare combustion efficiencies up to 99.95%, and destruction efficiencies for highly reactive organic compounds of concern in ozone production. Program phases include analytical simulation to assess maximum observable efficiency and minimum detectable concentration levels for organics, and controlled source-emission tests to demonstrate the accuracy of the inversion process. A plume generator spiked with typical gases at accurately known concentrations will be measured from a moderate distance with FTIR. Field tests will follow to scan several industrial flares to assess combustion/destruction efficiencies.

AUGUST 28, 2003

Discussion with District Staff on Optical Remote Sensing at Refinery Fence Lines. Peter Hess, Deputy Air Pollution Control Officer, stated the public's comments on the District's 2001 Ozone Plan revealed an interest to know more about refinery emissions in real-time. This provided the basis for referring to the Council the question as to whether the optical fence line

monitoring technology at the ConocoPhillips refinery should be applied to other refineries.

At the May 19, 2003 meeting of this Committee, Rodeo and Crockett residents commented on the optical monitoring system and the data it generates. Residents of North Richmond, Clyde and Benicia are also becoming increasingly interested in air monitoring data. The November issue of "Environmental Manager" will be devoted entirely to optical sensing technology.

Gary Kendall, Technical Division Director, stated that he had reviewed refinery reports for 13 incidents at the ConocoPhillips refinery since 1996. The District issued 11 odor nuisance Violation Notices (VNs) and two visible emission VNs for these events, which involved:

- the flaring of process gas with hydrogen sulfide (H2S)
- the flaring of sulfur plant feed gas, which is 90% H2S
- the venting of gases to the flare with high sulfur content from product storage tanks
- the venting from tanks that contained "sour" material
- the steam flushing of process vessels that vented oil droplets into the atmosphere
- a fire in a fixed bed coker
- a spill of high strength sulfuric acid, which generated buoyant droplets of acidic mist

Some of the optical data from 1997 to 2000 have been archived and are unavailable. In four of the six events where optical data were available, the monitors registered nothing unusual. During the remaining two events they were shut down for maintenance. During the July 10, 2002 flaring incident the optical monitors did not detect anything unusual. However, the rise of a buoyant plume from a flare stack tip at an elevation of 240 feet would render fence line detection unlikely. The public observed smoke and flames issuing from the flare and smelled foul odors.

One refinery Ground Level Monitor (GLM) detected higher H2S levels. Air monitors in Bethel Island, Martinez and Pittsburg detected elevated sulfur dioxide (SO2) at staggered points in time. This is consistent with a large release of a buoyant plume. An incident occurred on April 16, 1997 involving excess flaring of sulfur plant feed gas. The District issued VNs for odor impacts and public nuisance. While nothing was measured at the fence line, a District monitor at the refinery registered 15 parts per billion (ppb) of H2S; an east refinery GLM measured 170 ppb of SO2, and a monitor at Crockett Park registered 15 ppb SO2. Staff will follow-up on the archived optical data to complete its incident assessment and report back to the Committee.

Ms. Blake noted that major refinery incidents are not reflected in the fence line data, probably due to flare stack height and ultraviolet (UV) monitors that are now widely believed to be faulty. Mr. Kendall observed that emissions from leaks of liquid hydrocarbons (HCs) from the top of 30-foot holding tanks would more likely pass through the fence line monitors. However, on June 11, 2003, the optical monitors did not detect the hydrocarbon (HC) and sulfur compounds released from a tank due to a pressure spike. The District issued a public odor nuisance VN.

Ms. Blake opined that while the citizens near the refinery feel empowered by the optical monitoring system, it appears that these data give a false impression that air quality is safe near a refinery during an incident when, in fact, it is not. This raises public health and cost-benefit issues. Newer and better technology now makes possible the measurement even of refinery flares. A regulation that focuses on installing state-of-the-art optical equipment would provide higher quality data that might lead to the long-term improvement of air quality.

Kelly Wee, Director of Enforcement, replied that the establishment of a monitoring scheme requires specific objectives and an equipment distribution aimed at achieving them. The community near the refinery is concerned with acute exposure to emissions during an incident and chronic health risk from exposure to routine emissions. A single monitoring scheme may not be able to address both concerns. Emergency response requires mobility because meteorology often dictates how monitors are deployed. Fixed monitors of any type are generally less effective in emergencies. A robust, fixed monitoring network using canister samplers that conform to the state's toxics data collection protocols could collect data for the long-term. The District posts an incident report within a day, and often within half a day, of an event. The Contra Costa County Health Department issues an incident report within 72 hours of an event and a second report after 30 days. These reports concern the number of complaints, the time of the incident, what occurred, and the preliminary sampling and monitoring data.

Ms. Blake noted that community members in Rodeo and Crockett have asked the Committee to intervene and make a number of specific recommendations. Additional issues before the Committee concern (a) educating the community about further data requirements beyond what are provided by the optical system, and (b) ascertaining how more data can be provided with the monitoring tools the District already has or could develop through grants. For example, a program to install optical monitors in downtown areas other than Benicia would be influenced by the diversity of terrain in the Bay Area. Mr. Hess responded that Benicia installed optical monitors in the downtown area because almost all of its residences are east of the refinery. The purpose of the monitors is to provide Benicia citizens with real-time, speciated data on what emissions cross the refinery fence line into the downtown area. The City of Portland, Oregon has also installed open path optical monitors in its downtown area.

Chairperson Zamora suggested that the District consider conducting a cost-benefit study that evaluates the relationship between existing and cutting edge monitoring technology, so as to develop a hybrid approach to air monitoring. Mr. Hess responded that while more monitoring data is always desirable, the challenge is how to provide this data to the community on a continuing basis. At present, the District is not allowed to use optical monitoring data for purposes of demonstrating attainment or maintenance of ambient air quality standards.

Ken Kunaniec, Air Quality Engineering Manager, suggested that the refinery GLM requirement be reviewed. Some GLMs are 25 years old, and when they were originally cited, the nearby population was small. Air quality rules must by law be reasonable, necessary and enforceable. However, the interpretation and enforcement of optical data has not yet been formalized, nor has an entity been established to referee disputes on the data. New ambient-extracted VOC monitors can measure non-methane and methane organics in real-time. Xontech samplers start sampling only after an analyzer detects a specific threshold. The Committee might consider holding a discussion with industry on the current state-of-the-art in air monitoring and the costs of

supporting computer software and hardware for data evaluation and posting on the Internet. The extent to which good neighbor obligations would support such an approach might also be discussed. Improvement of the excellent continuous emissions monitoring (CEM) network in the District would provide even greater public protection. The use of predictive software could also be evaluated for improving the current monitoring capability.

Chairperson Zamora inquired if industry uses monitoring techniques more stringent than the District's. Mr. Wee noted that Chevron sends monitoring staff into the community with H2S samplers and Tedlar bags when there is an incident. Mr. Kuneniac added that the District monitors air quality from a van, which tracks current data read-outs to identify areas of impact. Each refinery could be required to equip and operate a state-of-the-art air monitoring van.

Jim Karas, Engineering Manager, stated that, in Europe, optical differential absorption analysis is conducted from mobile monitoring vans. It would cost $30,000 per day to run such a system in this country. Mr. Hess added that Lawrence Livermore Laboratory sought to conduct infrared optical monitoring of refineries from aircraft but requested $2 million in District funds for this purpose. Staff considered the cost for this type of special study to be prohibitive.

Chairperson Zamora inquired if the installation of monitoring technology has been required as a condition in District litigation settlements. Mr. Hess replied affirmatively. Mr. Wee added that the District uses the Supplemental Environmental Program (SEP) approach in which part of a penalty can be designated to community-based projects in either monitoring or additional mobile source controls. Federal policy requires that there be a nexus with the original excess emission. This involves community buy-in, and staff engages in considerable public outreach in this process. Mr. Kuneniac noted that, as a citizen, he expects the District to adopt and enforce reasonable and necessary regulations and to inform him what the air quality is where he lives.

Mr. Karas added that, at present, the main task before the District is to improve its feedback to the community. Mr. Hess added that in connection with such improvement, the first of three update phases to the District's website is scheduled for completion next month. The website will be linked to real-time, continuous monitoring data for criteria pollutants. The posting of toxics data on the District's website will be included in a future update to the website.

OCTOBER 20, 2003

Fenceline Monitoring: A Case Study and Industry Perspective. Phillip Stern, Environmental Superintendent, ConocoPhillips Refinery, Rodeo, stated that the refinery optical monitoring system was installed in 1997 and covers almost 2,000 feet on the north and south fence-lines. It includes infrared monitors for detection of 30 hydrocarbon (HC) compounds, ultra-violet monitors for detection of seven compounds, and a tunable diode laser for detection of hydrogen sulfide (H2S) and ammonia. The community, refinery, and the Contra Costa County Health Services (CCCHS) department negotiated which compounds would be monitored.

A contractor manages the monitoring system, performs daily checks from a remote terminal and several monthly field checks, downloads and validates all the data, and prepares monthly data reports. The refinery Environmental Department submits the monthly data reports to regulatory agencies, such as the District and CCCHS, and replies to letters from the community.

The refinery is committed to continuing to provide the community with these real-time data, which are presented in detection levels that have been averaged over five-minute intervals. Several community members have on-line access to it, and in the near future the data will be posted on the County's website. The stakeholders to the system agreed to the alarm points on the system. The high alarms are based on the short-term exposure levels set by the Occupational Health & Safety Administration (OSHA), and the low-level alarms are based on one-hour, time-weighted averages. These alarms are wired to a control room at the refinery.

Data from 2002 show that of the detections of various hydrocarbons above the detection level, the highest detection level were only a few percentage points of the low-alarm threshold. The sole detection of the toxic compound benzene was only 3% of the low-alarm threshold.

When the refinery knows there is a problem—such as an odor incident—it checks wind direction, ground level monitors (GLMs) and the fenceline monitors. The latter has never provided the refinery with the first-line of emission detection. When there have been major releases at the refinery, no correlation with the fenceline monitoring data could be identified.

Kevin Buchan, Environmental Manager, Western States Petroleum Association (WSPA), noted that WSPA does not represent the ConocoPhillips refinery in this presentation. He stated:

a) It is questionable that the District has statutory authority under California Health & Safety Code Section 40701(g) to require fenceline monitoring.

b) Optical fenceline monitoring technology is not as accurate or reliable as other technologies and cannot be used for purposes of enforcing ambient air quality standards.

c) Much data have been collected from the Rodeo refinery over five years and to date no correlation between events and measurements can be found based on the optical sensing technology. Such data cannot be used for purposes of seeking emission reductions.

d) Optical monitoring data can conflict with, or even undermine, the Community Warning System in Contra Costa County. If the read-outs that residents observe over the Internet do not support a shelter-in-place warning, when in fact there is a real problem not detected by the optical monitors, this puts residents at risk. Conversely, false readings from the optical monitors may give a sense of fear and concern when none may exist.

e) Optical monitors redirect critical environmental resources, requiring extensive research to verify or invalidate readings and staff time for monitoring and controlling emissions.

f) There is a need to fairly evaluate emission levels of toxics from mobile and stationary sources such as dry cleaners, plaiting companies and high tech manufacturers. District monitors have not detected elevated levels of toxics near refineries at or above levels elsewhere in the Bay Area. The application of fenceline monitoring to the broad array of toxic sources would prove costly. Refinery perimeters also differ, and miles of fenceline monitors would be required to apply a monitoring technology with no proven benefit.

Ms. Blake stated that the community wishes to know what comes from refineries and to retrospectively review emissions data from previous incidents. She inquired as to what value newer optical sensing technology could add to existing optical monitors and GLMs. Mr. Stern replied that GLMs register higher than normal levels of SO2 when there are large episodes. Gary Kendall, Technical Services Division Director, added that GLMs focus on SO2 and H2S. In the siting of a GLM, the District provides input based on meteorology and source knowledge.

Mr. Kendall inquired of Mr. Stern as to the refinery's view of the fenceline monitoring data for the 14 refinery release incidents that the District has identified as having had off-property community impacts. Mr. Stern replied that on July 10, 2002 when there was a total steam loss at the refinery and significant flaring, the fenceline data showed only slight variations. Mr. Kendall noted that slight measurement variation occurred at refinery GLMs, and higher than normal levels of SO2 were registered at the District's meteorological stations in Martinez, Pittsburg and Bethel Island. Staff's analysis of half of the release events that had off-property impacts since 1997 reveals that the optical monitors did not detect higher levels of emissions.

Ms. Weiner noted that the Committee is evaluating fenceline monitoring efficacy rather than legal questions on statutory authority. The California Air Resources Board (CARB) has issued regulations for dry cleaners. Refineries are large and have a bigger impact on public health.

Mr. Buchan replied that the Environmental Protection Agency (EPA) is revising health risk assessments, and the initial results suggest that refineries are not that significant. Ms. Weiner replied that there is impact from refinery flares or accidental releases of toxic emissions into the atmosphere and local residents are subsequently admitted to hospital emergency rooms.

Mr. Kendall observed that motor vehicles are the major source of ambient air toxics. However, the community is thinking about large release events in advocating fenceline optical monitors. Ms. Weiner inquired as to staff's opinion of the optical monitors. Mr. Kendall replied that they do not capture every possible emission scenario. With the right wind direction, the fenceline monitors will more likely capture a non-buoyant plume release than a buoyant release from a high stack. A review of long-term data from all the refineries would be necessary to identify the best monitoring technology. Mr. Stern added that when the monitoring system was installed its aim was to provide a warning of a release event rather than precise emissions measurements.

Chairperson Zamora inquired as to what it would cost to replace the system with newer equipment. Mr. Stern replied that the optical monitoring system cost $2,100,000 to install. Annual data processing and validation, along with maintenance, cost $400,000 per year. The cost to replace the system would be comparable to the original cost. The refinery is presently considering replacing the ultraviolet monitor, which is no longer technically supported.

Ms. Blake noted that the monitoring system was installed after a release event that the refinery did not inform the adjacent community about for several days, and Rodeo residents strongly endorse the system. Mr. Stern replied that the system has improved community relations and trust. Mr. Buchan added that most refineries also have a Community Advisory Panel that provides for and facilitates communication with the members of the local community.

Chairperson Zamora inquired as to the total value of the rest of the refinery monitoring equipment and if the community has been apprised of the limitations of the 1997 optical technology. Mr. Stern replied that the seven GLMs cost $20,000 each, excluding installation, and each of the ten stack monitors for nitric oxide (NOx) cost $400,000. As to the efficacy of the technology installed in 1997, he could not comment at this time because the refinery is presently negotiating with the community on certain components of the monitoring system.

Ms. Blake inquired as to whether data could be provided to the community from the District's flare monitoring rule in a manner similar to the real-time data provided by the fenceline optical monitoring system. Mr. Stern noted that the rule will require continuous flow monitoring of hydrocarbon and sulfur content going to the flare prior to combustion, based on samples taken every 15 minutes. Mr. Buchan observed that these data will also be available retrospectively through the monthly reports that refineries will be submitting, and will indicate that major reductions in flaring have occurred. Mr. Kendall added that if there is a major release the District's refinery inspectors will also be on the scene promptly, and the flow data may become available even earlier through the incident reports that the District would issue.

Chairperson Zamora stated that at its next meeting the Committee will discuss recommendations on the staff referral regarding the application of optical remote sensing technology to other Bay Area refineries. Ms. Blake requested that a member of the Technical Committee, as well as other District staff including Mr. Kendall, attend the next Public Health Committee meeting.

DECEMBER 8, 2003

Development of Recommendations on Refinery Fenceline Monitoring. In assessing whether the type of optical monitoring equipment in operation at the ConocoPhillips refinery in Rodeo should be applied to other refineries and chemical plants in the Bay Area, the Committee members identified and discussed the following central issues:

- There has been no correlation between refinery releases and real-time data.
- Optical monitors can provide an additional source of data on refinery fugitive emissions.
- Optical monitoring data have not been standardized for either reading or interpretation.
- More recent technology has improved upon older optical equipment but is quite costly.
- Rodeo and Crocket community members feel positive about the optical monitoring system even though it may not be predictive of release events.
- The District's website has been significantly improved with the addition of monitoring data, but the broader question concerns how to provide the community with useful air quality data and the availability of other District tools that would achieve such a result.

Ms. Blake stated that the Committee could recommend the refinery continue to conduct optical monitoring, work with community groups, and refine and post the data on the Contra Costa County website. Also, the District's website should contain a link to the refinery's optical monitoring data page on the Contra Costa County website. She added that the citizens of Rodeo and Crockett also wanted to see the District put the real-time optical monitoring data to use. However, the Committee has not yet ascertained from staff what that might entail. These types of data may be more useful in the analysis of chronic than in acute health effects.

Ms. Weiner suggested that the Good Neighbor Agreement between the ConocoPhillips refinery and its adjacent communities is a good model for use by other refineries. Chairperson Zamora noted that the Committee would evaluate optical technology primarily from a public health perspective, although associated issues are not excluded from the review. He added that the referral requires more of a contextual rather than a per se evaluation of the optical monitoring technology, based on whether its technical capability justifies a broader application.

Ms. Blake added that staff suggestions regarding additional aspects of this issue include:

- evaluating various monitoring deployments of fixed and canister samplers
- reviewing the ground level monitoring (GLM) requirements for possible update
- further improving the continuous emissions monitoring system
- requiring each refinery equip a van with remote sensing devices, and/or other monitoring and sampling equipment, for use in emergency release situations.

Cost considerations for each monitoring and sampling technology must also factor into the review. Whether data from other monitoring systems could be posted on line, in addition to District monitoring network data, should also be considered. The District's website could be further improved by including explanatory material that clarifies monitoring data symbols and tables of chemical compounds, and explains how these relate to meteorological data. The availability of funding from industry or various foundations should be considered as well.

Chairperson Zamora suggested that as a standard feature of presentations at community meetings, the District should include an introduction to the District's website. Kelly Wee, Compliance & Enforcement Division Director, stated that at the community meetings in which a new or modified rule is being presented, the most typical questions concern monitor siting. However, such an introduction could certainly be provided. Gary Kendall, Technical Division Director, added that under the District's flare monitoring rule gas flow rates to the refinery flares will be measured and monthly reports will be provided to the District. As part of the rule, combustion at the flare tip will be recorded on DVD and then posted on-line.

Noting that the community is concerned over both acute and chronic health effects, Ms. Blake suggested that the District's website include a link to the Crockett health study. In addition, since the District posts incident reports that contain monitoring data after a certain period of time after the incident has elapsed, it would be useful to post such data on the District's website.

Mr. Kendall replied that longer-term studies usually require a minimum of one year's worth of monitoring data that health experts use to assess chronic health risks since annual averages are developed and used in risk assessment. Fenceline monitoring, and mobile monitoring with grab samples, each focus on the acute health effects. In emergency incidents, sharp data variations are reviewed for possible correlation with observed health effects. In the General Chemical release of sulfuric acid mist, adverse health effects were indeed observed. Some incidences concern odor nuisances or visible emissions but do not always pose highly acute health risks.

Ms. Blake observed that health experts will have to recognize and evaluate increasing trends in the diagnosis of asthma among residents of communities near the refineries. Mr. Kendall replied

that sufficient levels of SO2 on a short-term basis can aggravate asthma. Ms. Weiner added that apart from asthma, issues concerning cumulative risk also arise. Ms. Blake offered to develop a list of major findings and recommendations for review at the next Committee meeting.

Chairperson Zamora noted that in evaluating whether asthma and other respiratory illnesses have increased around refineries, other factors such as the age of the community, personal history, and mobility factor into the analysis. Data on the health of refinery employees would be of importance as a barometer since on-site workers are the most likely to show health impacts.

Chairperson Zamora called for public comment and the following individual spoke:

Dennis Bolt
Senior Coordinator, Bay Area
Western States Petroleum Association

stated that some companies have conducted epidemiological work and he will evaluate what data can be publicly reported to the Committee at a future meeting. Dr. Wendell Brunner of the Contra Costa County Health Department has noted that in west Contra Costa County asthma rates have increased, although they are only one third of the levels that are currently found in Alameda County. Former Air District Board member Sunne McPeak has noted that asthma is increasing while emissions of criteria and toxic air pollutants are decreasing in the Bay Area.

Mr. Bolt added that while there are abundant emissions data that could be made available by the refineries, most of the record is in hard copy. Some of the data are also proprietary and contain some process knowledge that cannot be distributed. The District's posting of emissions data on the website is a good first step. Clarification of that data in subsequent iterations can follow. In particular, clarification of the summary flare data would be the most useful to the public.

Ms. Blake replied that the refineries can post emissions data on their respective websites as well. The matter of providing funding to further disseminate data to the public is also worthy of consideration. Mr. Bolt replied that he would relay this discussion to the refinery staff. The refineries can collaborate with the District to get meaningful information on the website.

Peter Hess, Deputy Air Pollution Control Officer, noted that if optical fence line monitors do not fulfill community information needs in emergency situations, perhaps other mechanisms are available. The use of a color-coded screen for presentation of emissions data on the District's website could be considered. If GLMs have focused on hydrogen sulfide (H2S) and sulfur dioxide (SO2) due to their odoriferous qualities, additional pollutants could now be considered.

Ms. Blake urged consideration of the extent to which toxics can be folded into the data posted on the website, in addition to the criteria pollutants that the District monitors. Mr. Kendall noted that data for toxic pollutants are not available in real-time. The District's laboratory analyzes for low concentrations of toxic materials from fixed samples. Accordingly, it may be preferable to present toxics data to the public in terms of the categories of risk assessment.

AGENDA NO. 4

October 18, 2004

To: Chairperson Linda Weiner and Members of the Public Health Committee

From: Advisory Council Chairperson Elinor Blake

RE: Draft Recommendation to the Advisory Council

Below for discussion at our October 25 meeting is a draft of our recommendation to the Council concerning information to the public from fenceline monitoring data at refineries. It is based on information collected at our meetings and some updates, since those were several months ago (e.g., the Contra Costa web site does not yet include real-time data).

Topic: Should the District recommend that all Bay Area petroleum refineries install a fenceline air monitoring system similar to that at the ConocoPhillips Rodeo refinery, in order to provide real-time information to the public?

Background: In 2003, Deputy APCO Peter Hess told the Advisory Council that public comments on the District's 2001 Ozone Plan revealed an interest in knowing more about real-time emissions from petroleum refineries. He asked the Advisory Council to consider whether the District should recommend that all Bay Area petroleum refineries install a fenceline monitoring system, as had been done at the ConcocoPhillips Rodeo refinery. That system was installed in 1997 as part of a Good Neighbor Agreement after a major incident at the refinery, then owned by Unocal. The system uses optical remote sensing monitors that report in real time raw data which can be posted on the Internet.

Information considered by the Council: The Council heard presentations and reviewed documents concerning monitoring technology; the specific system at ConocoPhillips; comparisons of data from that system with other monitoring and refinery incident data; monitoring conducted by the District and CARB; and community concerns. Presentors included:

- Alton Arnett and Ted McKelvey, Terra Air Services (operator of the system at the ConocoPhillips refinery)
- Randall Sawyer, Hazardous Materials Program, Contra Costa County Health Services Department
- Howard Adams, Shoreline Environmental Alliance, Crockett
- Jay Gunklemean, Crockett resident
- Bill Concannon, Crockett resident
- Julia May, Communities for a Better Environment
- Robert L. Spellicy, Industrial Monitor and Control Corporation
- Kevin Buchan, Western States Petroleum Association
- Phillip Stern, Conoco Phillips

- Gary Kendall, Technical Division Director, BAAQMD
- Kelly Wee, Director of Enforcement, BAAQMD
- Ken Kunaniec, Engineering Manager, BAAQMD
- Jim Karas, Engineering Manager, BAAQMD.

The Council's Public Health Committee held a public meeting in Rodeo in addition to several meetings on the subject at the District office.

Council Findings: The fenceline air monitoring system at ConocoPhillips Rodeo monitors 38 compounds and primarily registers ground level fugitive emissions. Alarm levels based on health effects data obtained from the Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA) are programmed into the system. Since the Rodeo system was installed, more sophisticated monitoring instruments have come onto the market, some of which is being installed at Rodeo. The District also operates a few ground level monitors near refineries, and refineries operate their own ground level monitors as well as numerous continuous emission monitors in certain stacks.

In advocating for the system at the Rodeo refinery, residents hoped that it would provide useful information directly to the community, the BAAQMD and other agencies for health protection, regulatory, enforcement and emergency response purposes. They said the fenceline monitoring data was reassuring and empowering, especially since it is provided independently of the refinery. They proposed several specific refinements and updates to the system at ConocoPhillips, and urged the District and other agencies to access and use the fenceline monitoring data.

Public access to the monitoring data is limited to a few residents who are advocates of the system. Contra Costa County, working with community members and ConocoPhillips, has created a web site that provides public access to historical information from the monitors. The web site includes real-time meteorology data and toxicology information on relevant substances. In the future, the site will allow access to real-time data.

Since the fenceline monitoring system was installed in 1997, no alarm level has been reached. Little correlation has been found between the monitoring data and the occurrence of an accidental release; emissions from incidents may be too high to reach the monitors. Optical remote sensing monitors such as those at ConocoPhillips are in place in several locations in the United States and elsewhere (one is located in downtown Benicia), but no peer-reviewed accepted protocol exists for review of the data they create in fenceline monitoring.

The public's interest in real-time information about emissions from petroleum refineries reflects genuine concerns about both short-term health effects during incidents and long-term health effects from emissions during normal operation, regardless of regulation. The Council did not find sufficient information to support a recommendation for fenceline monitoring at refineries other than the ConocoPhillips refiinery, but did find several other steps that the District can take to make refinery emission data publicly available, some in

real time and some shortly after its creation. Such information would be useful to District, state and local officials, as well as the general public.

Recommendations: The District can improve the public's access to real-time and recent refinery emissions data in the following ways:

1) The ground level monitors (GLMs) that the District operates near refineries to monitor for H_2S and SO_2 are equipped to allow the data to be posted within about an hour on the District's web site, like the data posted from the ambient air monitoring network. The Council applauds this activity and looks forward to seeing this information on the District's web site.

2) Consider adding to each of the District's GLMs a hydrocarbon analyzer and a continuous particulate matter monitor, which would increase the number of substances monitored. An automatic sampler could be added and programmed to activate sampling based on specified levels detected by the monitors; such samples could be analyzed to speciate compounds released during an event. The sampler could also allow for manual sampling.

3) Evaluate the number and location of GLM sites near refineries and consider whether to move or add monitors based on all-season wind patterns and population changes.

4) Refineries also operate GLMs. At permit renewal or under compliance settlements, the District should consider requiring installation of any or all of the equipment noted in 1) and 2) above. We appreciate the District's recent efforts in this regard.

5) Refineries operate approximately 300 continuous emission monitor (CEM) analyzers, which are programmed with alarm levels and provide information from inside stacks as emissions are occurring to assist in quick identification and control of improper operation. Refineries provide the District with CEM data on the 10^{th} of each month for the previous month's data. These reports could be standardized and posted on the District's web site with general explanatory information so that they can be read by the public.

6) The District should consider evaluating the refinery CEM locations to determine whether additional CEMs should be installed.

7) The District's new CARE program should exercise its potential to identify other sources of real-time information from refineries and other facilities or locales.