

# Good Neighbor Steering Committee<sup>1</sup> Benicia CA

## VIA EMAIL

August 11, 2003

Ms. Brenda Cabral, Title V Project Manager  
Bay Area Air Quality Management District  
San Francisco, CA 94109  
bcabral@baaqmd.gov

**SUBJECT: VALERO BENICIA ASPHALT PLANT—TITLE V REVIEW**

Dear Ms. Cabral:

To follow please find our comments regarding the Valero Benicia Asphalt Plant Title V permit.

## INTRODUCTION

As a preface we would like to express our tremendous appreciation for the Air District's recent efforts to secure increased monitoring for the Benicia community in the form of an SB25 type system. The Air District's efforts on that project, in cooperation with the City of Benicia, Valero, and the Good Neighbor Steering Committee (GNSC), are an example of exactly the kind of attention local air quality issues demand. Such cooperative efforts are critical to future protection of the health and safety of the citizens of Benicia. We are very pleased to note the Air District staff's apparent recognition of that fact.

Secondly, we would also like to commend the Air District for the enormous progress recently made in the area of flare monitoring. It is true that some adjustments may ultimately be required of the new flare rules. Nonetheless, the implementation of the rules by the Air District, along with all the staff work that has gone into that implementation, has great significance to us. We believe it points to a growing recognition by the Air District that there is a need for *increased* monitoring of gross polluting entities on many levels. We hope this is not only because of federal mandates, but also because of a desire to see the public protected as much as possible, not as little as necessary. We applaud your effort and your developing understanding of that critical need.

All this being the case, there is still work to be done. Among problems yet to be addressed is the Title V permit, in this case for Valero Benicia Asphalt Plant. First, while monitoring is described and required on some level in the permit, those requirements do not go far enough. The monitoring required by and of the Air District as detailed in the draft permit is inadequate and because of this members of the public are forced to do their own investigations in order to get a true picture of the emissions generated by the facility in certain circumstances. This is not only overly burdensome to

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<sup>1</sup> Good Neighbor Steering Committee (GNSC) is a local organization concerned with issues related to the Valero Benicia Refinery. GNSC is a member organization of CREATE, Coalition of Responsible Environmentalists Against Toxic Emissions, a regional coalition working to improving Southern Solano County air quality.

the general public, but also completely contrary to the philosophy behind the Title V mandate. Second, the permit itself sometimes lacks critical information required for the general public to understand what is expected of the facility operator. Both of these problems need to be corrected in order for this permit to be an effective tool for carrying out the fundamental purposes of Title V. Among other things, Title V permits are supposed to do all of the following:

1. Record in one document all of the air pollution control requirements that apply to the source. This is meant to give members of the public, regulators, and the source a clear picture of what the facility is required to do to keep its air pollution under the legal limits.
2. Require the source to make regular reports on how it is tracking its emissions of pollution and the controls it is using to limit its emissions. These reports should be readily available to the public from the permitting source.
3. Add monitoring, testing, or record keeping requirements where needed to assure that the source complies with its emission limits or other pollution control requirements.
4. Require the source to certify each year whether or not it has met the air pollution requirements in its title V permit. These certifications are public information.

As set out below, we believe the draft permit for the Valero Benicia Asphalt plant fails to do these things sufficiently to meet Title V standards.

#### THE MONITORING REQUIREMENTS ARE INADEQUATE.

The Valero Asphalt Title V permit is deficient in its monitoring requirements in several areas, especially in the area of fugitive emissions monitoring.

- The permit does not adequately address the problem of fugitive emissions from valves.<sup>2</sup>

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<sup>2</sup> We find CBE's comments on the Chevron Title V permit just as applicable to this permit and so incorporate them here.

#### Monitoring of Pressure Relief Devices

Currently the monitoring of Pressure Relief Devices is in effect non-existent. The Draft Permit fails to create additional monitoring for sources of pollution that have been identified as underreported. For example, Refinery Pressure Relief Valve ("PRVs") emissions are underreported. District staff previously identified the problem of underestimating emissions from pressure relief valves. They stated: "None of the refineries had a reliable system to identify or track lifts. The emissions from PRV lifts are probably underreported because these valves are not instrumented and emission quantification for lifts is not required. ... These detection methods are not definitive and clearly indicate many PRV lifts likely go undetected."

District regulations focus on setting leak standards for valve seals when the devices are closed but exempt emissions when the valves open. District regulations do require controlling emissions for repeated valve openings. However, the District has no means to identify whether a PRV has vented even once, except for self-reporting by the facility (since valves simply shut again, after opening). There is actually an incentive for industry not to report valve openings, since controls will be required if a facility reports repeat events, and

- The permit does not include a method of estimating or monitoring for fugitive emissions for material used as feedstock at the plant. The magnitude of this omission is painfully clear after the recent styrene fires discussed below.
- There is no way to correlate process emission limits with total permitted emissions. An example of this is on page 165 where it states “an applicable emission limit for a process is 98.7% vapors by weight”. How is this supposed to be verified? There is no mention of monitoring or control systems that currently are in place to perform verification. The permit apparently allows the refinery to increase throughput at will, as long as 98.7% of the vapors are captured.
- There is no specification of the composition of the material processed (see page 165). Thus a process change can occur without the public having any access to knowledge of the change. Monitoring and recording of composition should be required so that interested parties can better understand expected emissions level and better evaluate the facility’s performance.
- The facility is required to perform N0x and CO abatement. But these strategies may increase the emission of other gases such as SO2. Nothing addresses this concern.
- The permit does not give a basis for emission limits. The permit should include an analysis of how this facility compares to other facilities that perform the same task in order for the public to have a clear picture of the facility’s emissions record.

#### AIR DISTRICT MONITORING OF THE FACILITY IS INADEQUATE.

We are particularly concerned, having experienced first hand, on June 25th of this year, a major fire at the asphalt plant involving hundreds of containers of styrene pellets, a co-polymer product used as elasticizer in asphalt production. Pallets of roughly 2400 containers were being stored that day out in the open, on a hot asphalt-paved area near huge storage tanks. The approximate number of containers burned was given at 500. This was a tremendous fire that occurred on a day with temperatures reaching 100 degrees, with adverse wind conditions, where a thick black plume of smoke traveled southwestward, off site, over Benicia's neighborhoods, toward our downtown.

A "shelter in place" warning was called, but few were alerted (no sirens were utilized) and the warning was called off within about an hour of its issuance, because according to Benicia Fire Chief Hanley, the "fire was not determined to be toxic" and "the smoke had dissipated". At the time of the incident not only did we have concern about how the fire was triggered, but we wanted to know how the Air District, our Fire Chief and Valero could verify that the fire posed no threat to public health.

The fire at the asphalt plant was serious and alarming. It was even more disturbing to realize that the Air District did not have portable air-monitoring equipment that would give instant measurements of the type of gases that are by-products of burning styrene such as formaldehyde. As a further complication the Air District did no monitoring for PM10 at the time of the fire. (Mr. Kelly Wee confirmed this fact by phone.) Nor did anyone perform dispersion modeling for

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since the District can’t independently identify this venting. During previous regulatory workshops, the District refused to require basic monitoring such as installation of tell-tale indicators (simple flag devices that pop up and stay up when a valve opens).

formaldehyde or other burn by-products we understand could have been present within 100 meters of the fire site.

While we acknowledge that so-called “emergency response” is not within the purview of the Air District, the monitoring of all emissions, whether from standard sources or from upset or emergency conditions, is. Any one of the thousands of people who were witness to the fire that day can tell you that emissions resulted from it. Many in the community ended up with pieces of melted styrene and particles in their own yards.

In situations like that of the June 25<sup>th</sup> fire, the Air District should be monitoring for the kind of contaminants that result from such an incident as noted above, or under the Title V permit the District should require the facility to do so and report the results.

### TOO MUCH MONITORING IS LEFT TO THE PUBLIC TO DO.

Because of the limited monitoring of emissions resulting from the June 25<sup>th</sup> fire, we were forced to fashion our own analysis to determine the type of exposure the community received as a result of the fire. We took the following steps:

We obtained the MSDS product reference sheets from our Fire Chief and learned from these that styrene could "self-ignite"<sup>3</sup>,

We obtained limited meteorological data made available to us by our Fire Chief. (We were given data from only one met tower located at a fire station approximately 1 mile northwest of the fire.)

We contacted ECOSERV, Ltd., an independent, specialist environmental and occupational health consulting company located in Durban, South Africa, and asked for their assistance to create an "air model" of the asphalt plant fire plume on June 25<sup>th</sup>.<sup>4</sup>

Even given the limited information available to us, ECOSERV was able to show that formaldehyde was likely present in the plume and that concentrations could have been found at 100 meters from the fire source. This is materially relevant to the air permit because in the June 25<sup>th</sup> incident, off-site emissions were seen crossing the fenceline of the facility thus demonstrating the possible off-site impact to the general public which we have described above. Using the EPA's Screen 3 air dispersion model, ECOSERV determined that there were indications that receptors at 100 meters from the fire would have detected formaldehyde. It does not appear that the Air District had receptors available on the day of the fire that would screen for formaldehyde in real time. Please see our ECOSERV ATTACHMENT regarding the findings of this dispersion modeling exercise. We believe this effort is of critical importance to the Title V review since it points to potential emissions that are unaccounted for by the Air District—especially spike concentrations from "unpredictable" events that get lost in "annual averages".

We should not have had to do this. If this kind of analysis is available to a small group of concerned citizens, it is quite obviously available to an organization like the Air District. As stated above, we

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<sup>3</sup> Chief Hanley subsequently issued a finding indicating self-ignition was the cause of the fire.

<sup>4</sup> We are submitting ECOSERV's air-modeling analysis, as well as their "Statement of Qualifications" as part of our review.

believe the Air District should be responsible for this type of analysis. Additionally, the public should have "real time" access to data regarding a potentially toxic plume arising from the refinery or the asphalt plant. Either the Air District should perform these monitoring functions or they should require it of the facility operator in the Title V permit.

THE PERMIT ITSELF SOMETIMES LACKS CRITICAL INFORMATION REQUIRED FOR THE GENERAL PUBLIC TO UNDERSTAND WHAT IS EXPECTED OF THE FACILITY OPERATOR.

In preparing to comment on this permit we reviewed Title V comments for other facilities. As we found in our own analysis there was a consistent problem with analyzing true emissions because there was no mention of actual throughput at the facility. We note that Communities for a Better Environment (CBE) comments set forth below are as applicable to the Valero Benicia Asphalt permit as they were for the Chevron permit for which they were originally submitted.<sup>5</sup>

"In general it is practically impossible for the public to be able to tell the appropriate emissions limits that should be in the title V permit if the actual throughput are unknown, characterization of the product in question (for example in tanks), the vapor pressure of the material, the emission factors used, etc. These should be included at least in the statement of basis. Otherwise the public must review voluminous amounts of material in the original Air District permit files, source tests, databases, etc. to determine these matters for ourselves. We spent a large amount of time doing this for specific sources, but clearly it was impossible for us to do this for every source listed in the Title V permit during the comment period."

CONCLUSION

The Air District has made great strides of late to address our community's concerns regarding air quality monitoring. However, as noted above more work is needed. In particular, the draft permit should be revised to include increased monitoring as detailed above. Further, the permit should include more and better information to enable the public to get a clear picture of all the permit requires of the applicant.

Thank you for the opportunity to comment on the Valero Asphalt Plant Title V permit.

Respectfully Submitted,

Dana Dean  
Spokesperson

Marilyn Bardet  
Research Coordinator

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<sup>5</sup> We also find CBE comments on to fugitive emissions relevant to the Valero permit and incorporate them by reference here

**Prepared for the Good Neighbor Steering Committee, Benicia CA, regarding styrene fire at Valero Asphalt Plant, June 25 2003.**

### **Opinion on burning of Styrene-Butadiene Styrene Block copolymer**

Following our discussions and the data you have sent ECOSERV we have reviewed your enquiry into a fire involving the above material. A literature review was performed to ascertain the potential pollutants from the fire and maximum ground level carbon dioxide concentrations were predicted. Other gases would have been in proportion to this major gas emitted.

### **Products of combustion of the material**

A literature review indicated that the following gases could be present in the emissions from the fire depending on the efficiency of combustion:

- Carbon dioxide
- Carbon monoxide
- Styrene
- Aldehydes (such as formaldehyde)

Carbon dioxide was modelled as the major gas emitted in order to ascertain the maximum ground level concentration of the gases. The other pollutants would be in proportion to this. A discussion on the other gases will follow.

### **Model Inputs**

Due to a lack of terrain data a Screen 3 model was used to model the gases. Emission rates were calculated using a pool fire model. The inputs to the Screen 3 model were:

- Material burnt: styrene
- Temperature of container: 204 C
- Type of burning simulation: Propagating pool fire
- Initial mass of material: 3 t
- Reaction rates as below per period
- 2 m pool depth
- Concrete substrate
- Open top containment
- Shape of volume: rectangle 6m x 2m x 2m
- Wind speed: 5 m/s
- Ambient temperature: 25 C
- Relative humidity: 25 - 40%
- Solar radiation calculated for 15/07/2003 10:00:00
- Roughness length: 0.01m
- Cloud cover: 0

- Burn time: 180 min

Please note some assumptions had to be made due to a lack of monitoring data for the fire.

### Results of the modelling exercise

Results of modelling are shown in the tables below:

#### Maximum ground level concentration of CO<sub>2</sub>

Time	Mass start	Rate(kg/s)	Mass end	Wind speed m/s)	Max Conc of CO <sub>2</sub> micrograms/m <sup>3</sup> )	At distance
0	3000	0.0065	2988.3	6	9369	14
30	2988.3	0.0059	2977.68	5	10210	14
60	2977.68	0.006	2966.88	5	10380	14
90	2966.88	0.006	2956.08	7	7413	14
120	2956.08	0.006	2945.28	5	10380	14
150	2945.28	0.0062	2934.12	5	10720	14
180	2934.12	0.0062	2922.96	4	13400	14

#### CO<sub>2</sub> concentration with distance

Distance from fire (m)	Concentration of CO <sub>2</sub> (µg/ m <sup>3</sup> )
0.	0.0000
00.	1013
00.	325.4
00.	161.4
00.	97.49
00.	65.89
00.	47.89
00.	36.62
00.	29.08
00.	23.76
000.	19.87

## Discussion and Conclusions

Based on the above it can be concluded that:

- The maximum ground level concentration of pollutants would occur 14 m from the fire.
- At a distance of 100 m from the fire pollutants are a factor of 10 lower in concentration
- At a distance of 1 km from the fire pollutants are 100 times lower in concentration than at 10 m from the fire.
- In the modelling exercise CO<sub>2</sub> was modelled. If one were interested in hydrocarbons such as styrene for example the concentrations would be in proportion to the percentage emission of the CO<sub>2</sub> and styrene from the fire. This is unknown but if it was assumed that the fire burnt styrene very inefficiently and 1000 ppm of styrene was emitted from the fire (or approximately 6 % of the CO<sub>2</sub> emission) then the following concentrations would result:
  - At 14 metres 649 µg/m<sup>3</sup> ( this is 300 times less than NIOSH occupational health guidelines)
  - At 100 metres 63 µg/m<sup>3</sup> (14 times less than California Air Resources Board Chronic inhalation guideline)
  - At 1 km 1 µg/m<sup>3</sup> (difficult to detect by standard air quality test methods)
- The same argument can be followed for aldehydes such as formaldehyde assuming 100 ppm or 0.6 % of CO<sub>2</sub> (probably less than styrene as it is a reaction product):
  - At 14 metres 62 µg/m<sup>3</sup> ( this is 1.5 times less than NIOSH occupational health guidelines)
  - At 100 metres 6 µg/m<sup>3</sup> (15 times **less** than the acute and 2 times **more** than the chronic California Air Resources Board inhalation guideline but difficult to detect by standard air testing methods)
  - At 1 km 0.1 µg/m<sup>3</sup> (not possible to detect by standard air quality test methods)
- Note the fire was only for 3 hours so the chronic guideline would probably not apply.
- Note these are conservative estimations of the concentrations of some toxic gases from the fire, the following stand out from this analysis:

It is likely that emergency personnel were not in danger during the fire

Air measurements more than 100m from the fire would most probably shown non-detects for hydrocarbon gases

Receptors at 100m from the fire (assuming that they were outside of the plant boundaries) should have had formaldehyde monitored. UV being a good technique for this.

I hope this answers some of your questions.

Regards

Mark Baird  
(Director Environmental Services)



## *Statement of Qualifications*

### *ECOSERV Ltd.*

ECOSERV is a specialist environmental and occupational health consulting company offering clients solutions to their technical environmental and occupational concerns and questions. Our team of certified and experienced professionals, applying the most appropriate technology and analytical services available internationally, will help clients to identify the best way of making sustainable, auditable improvements in their environmental performance. Understanding the importance of environmental and occupational risk management as strategic business issues, ECOSERV applies innovative thinking and research to the operations of leading organizations, in accordance with the highest ethical standards. We are committed to developing a company which considers the interests of its clients and the environment, while providing its employees with opportunities to achieve their professional goals.

Our business focus areas include:

**Stack emissions monitoring** measures emissions from the process. ECOSERV applies United States Environmental Protection Agency methods to deliver reliable results. The quality assurance system applied for this service is under ISO 17025 review.

**Occupational assessments** are required by law to ensure that employee exposure does not exceed nationally and internationally-accepted safe working limits. ECOSERV maintains equipment and materials for detailed assessments of this nature. These services include training and information seminars, health program auditing, stress analysis, occupational exposure assessment and hazardous substance management

**Ambient and Fenceline monitoring programs** are designed to measure regional air quality. Examples of projects include the Durban South and Richards Bay air monitoring programs in South Africa, the first environmental monitoring networks in the country to be awarded ISO 25 certification for quality and competence in the operation of field air testing laboratories. ECOSERV uses open-path UV and FTIR air monitors, to monitor over 300 priority air pollutants in real time. Other United States Environmental Protection Agency Methods can be applied for off-site analysis.

Our list of successful monitoring projects using Open-path air monitors include:

- Sasol Secunda: OP-FTIR monitoring of ambient VOC's around Sasol 2 to set up a ranking of severity of sources on the site.
- Shell Chemicals: FTIR monitoring for benzene during loading operations at their Isipingo site.

- Shell Chemicals: FTIR monitoring for fugitive emissions during the thermal destruction of Freon 11 and Freon 12.
- SAPREF (Shell and BP Refineries): Ambient VOC monitoring using FTIR and USEPA TO-17A. Project to identify the industries responsible for an increase in hospitalization of children at a school in Wentworth.
- SAPREF (Shell and BP Refineries): Investigation into the accuracy of OP-FTIR for the detection of 1,3-butadiene and low ppb levels.
- SAPREF (Shell and BP Refineries): OP-FTIR investigation of gasoline spill remediation site to identify the site operations causing the greatest contribution to elevated ambient benzene concentrations. Development of on site maintenance and operation protocol to reduce off-site impacts.
- SAPREF (Shell and BP Refineries): Design of monitoring system incorporating passive and open path monitoring techniques to comply with EU ambient benzene monitoring objectives.
- ENGEN Petroleum: Fenceline VOC monitoring using FTIR to understand plant impacts on adjacent residential areas.
- ENGEN Petroleum: OP-FTIR investigations at Alkylation plant to assess potential emissions of hydrogen fluoride.
- Durban City Health Department: OP-FTIR monitoring at Island View storage terminal. Results were used to validate a health risk assessment performed around the facility.
- Durban City Health Department: OP-FTIR and TO-17 emergency response monitoring of chemical spills.
- Island View Storage: OP-FTIR monitoring to assess the impacts of fugitive emissions on residential areas during the loading/offloading of ships containing ammonia, 1,3 butadiene and styrene.