



Benicia Refinery • Valero Refining Company - California

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**FILED**

**MAR 10 2022**

HEARING BOARD  
BAY AREA AIR QUALITY  
MANAGEMENT DISTRICT

March 10, 2022

Chairperson Valerie Armento, Esq. and Members of the Hearing Board  
Bay Area Air Quality Management District  
375 Beale St., Suite 600  
San Francisco, CA 94105

**Re: Valero Refining Company-California Separate Statement; Stipulated Order of Abatement; Docket #3731**

Dear Chairperson Armento and Members of the Hearing Board:

On January 20, 2022, Valero Refining Company-California (“Valero”) and the Bay Area Air Quality Management District (“District”) signed a Stipulated Order of Abatement (“SOA”) related to Valero’s refinery located in Benicia, CA (“Benicia Refinery”). Pursuant to Section 12 of the SOA: “Each Party may file with the Hearing Board its own Separate Statement to explain why it entered into this SOA and to provide additional relevant factual background.” Valero files this Separate Statement as a means to provide relevant factual background pertaining to a complicated issue, which the SOA addresses, and to illustrate the collaborative effort between the District and Valero in reaching the SOA.

Valero takes its role as a member of, and provider of essential services to, the City of Benicia and wider Bay Area community seriously. The discovery of the District Regulation 8-2 non-compliance that led to this SOA, while a surprise, was expeditiously addressed. Throughout the entirety of the investigation process and the design of the resolution to the issue, Valero maintained consistent contact with District staff. In late 2019, Valero approached the District about entering into an enforcement agreement to achieve enhanced compliance with Regulation 8-2. These efforts resulted in this SOA. The SOA was filed with the Hearing Board on January 24, 2022, and is set for public hearing on March 15, 2022.

#### **Facility Background**

Valero purchased the Benicia Refinery in 2000. The Benicia Refinery employs nearly 450 employees and produces a range of petroleum products including gasoline and diesel meeting California’s strict clean fuel requirements, jet fuel, and asphalt. Since purchasing the facility, Valero has invested nearly \$1.6 billion on environmentally-beneficial emission reduction projects

such as one of the world's largest flue gas scrubbers which lowered sulfur dioxide emissions by 95% and nitrogen oxide emissions by 55%.

Unique from its Bay Area counterparts, the Benicia Refinery is a highly integrated refinery. This means that numerous processing units are interconnected such that if one process unit experiences an upset or is shut down, the entire refinery may be impacted. The integrated nature of the refinery also means that a full refinery turnaround is required to complete some of the maintenance or capital project work on individual process units.

Valero generates its own hydrogen onsite, through two Hydrogen Plants ("H2U-A" and "H2U-B") and a Naphtha Reformulation Unit ("NRU"), in order to reduce the sulfur content of its fuels and comply with federal and California regulations. Numerous hydroprocessing units within the Benicia Refinery rely on the plant's hydrogen production. Although efforts are made to continuously balance the Benicia Refinery's supply and demand for hydrogen, there is at times an excess of hydrogen and for safety reasons it is necessary to vent it to the atmosphere through vent ST-302.

Valero's process engineers monitor the composition of each stream serving the Hydrogen System because hydrogen purity is important to establish effective and reliable system operations. The streams from the two Hydrogen Plants have a higher hydrogen purity, and those streams are in compliance with Regulation 8-2. The NRU stream contains a lower purity of hydrogen, with the remaining composition being mainly methane, and some non-methane hydrocarbons that exceed the thresholds of Regulation 8-2 when vented as part of the combined stream at ST-302. The composition of the NRU stream and its prior venting through ST-302 is the subject of the SOA.

### **Background on the SOA**

#### **1. Discovery of the Issue in 2018.**

Valero is authorized to operate the refinery pursuant to a valid Title V permit issued by the District. Title V permits are intended to contain all applicable requirements whether federal, state, or local (e.g., BAAQMD rules and regulations). The Title V program was created under the 1990 amendments to the federal Clean Air Act and permits are periodically updated by the District (working with the facility) to account for any changes in facility sources as well as any new, or amended applicable requirements that need to be included in the Title V permit. The existing Title V permit was already issued and in place when Valero purchased the Benicia Refinery in 2000 and was most recently updated in 2015.

District Regulation 8, Rule 2 *Miscellaneous Operations* ("Reg. 8-2") applies to "miscellaneous operations"—operations not covered by other rules of the District's Regulations 8, 10, or Regulation 12, Rule 12—and limits total carbon emissions, as defined in Reg. 8-2-202, to 15 pounds per day and a concentration of 300 parts per million. The Benicia Refinery Title V permit does not, and has never, included Reg. 8-2 as an applicable requirement to any of its sources.

In November 2018, after discovering a similar issue at another refinery, the District contacted Valero about the Benicia Refinery Hydrogen System. Immediately after being contacted

by the District, Valero began assembling a team to investigate the issue and evaluate resolutions. This effort included identifying and implementing immediate actions to reduce emissions from ST-302 while investigatory processes were ongoing. In response to an inquiry from the District, Valero conducted an investigation and discovered that the combined hydrogen stream at ST-302 contained trace amounts of pollutants in excess of Regulation 8-2 limits. Based on these findings, the District issued NOV # A58465 on March 21, 2019.

While it is true that Valero has collected samples of the hydrogen streams as early as 2003, such sampling was conducted for the purpose of determining the purity of the hydrogen for operational purposes. Thus, these sampling results on their own were insufficient to evaluate the applicability of Reg. 8-2. Because hydrogen vent ST-302 was not included in the Refinery's Title V permit prior to Valero's ownership, and no design changes were made to the unit, Valero was unaware of the potential applicability of Regulation 8-2.

In May 2019, samples were collected by both Valero and the District. Sampling results confirmed that the ST-302 stream contained precursor organic compounds ("POCs") and trace amounts of other pollutants, in excess of the Reg. 8-2 limits. Upon receipt of the sampling results, Valero immediately requested a meeting with the District to discuss the most appropriate and expeditious path forward to address these newly discovered contaminants.

## **2. Immediate Actions Taken by Valero.**

Upon discovery of the issue in 2018, Valero took immediate action to engineer and implement changes designed to reduce ST-302 emissions. Since 2019, Valero has implemented three changes to the Hydrogen System, successfully reducing POCs by ~98% percent from 2019 levels and the number of days of exceedance of the Reg. 8-2 limits by ~95%. In addition, Valero has continuously monitored the emissions and continued to optimize the efficiency of the Hydrogen System to reduce emissions.

In January 2019, two months after learning of the compliance discrepancy and before the District issued NOV # A58465, Valero implemented a change to the Hydrogen System designed to reduce ST-302 emissions by storing more excess hydrogen within the piping system using an existing hydrogen grid line.

Then, in October 2019, Valero completed engineering and installation of a new jumper line to route hydrogen from one pressure grid to another, reducing the need to vent excess hydrogen. The District-approved project was designed, installed, and operational less than a year after the District first contacted Valero. Upon completion of the jumper project, Valero evaluated the emissions benefits and found that the project resulted in a substantial reduction of 71% compared to its 2018 emissions. Despite this initial success, Valero understood that additional preventive measures needed to be done and continued to evaluate other potential solutions to further reduce emissions. In July 2021, Benicia implemented a state-of-the-art program designed to help the compressors better match the hydrogen supply with hydrogen demand in real time. This project was successful and POC emissions were reduced by an additional 27%, bringing the overall reduction to ~98% from 2019 levels as illustrated in the below table.

CY	Total 8-2 Carbon		% reduction in emissions compared to 2019 data
	lbs.	tons	
2019	566,485	283	0%
2020	169,941	85	70%
2021	8,732	4	98%

### 3. Continued Improvements—Capital Project.

Despite the 98% reduction in emissions, Valero determined that an additional capital project would be needed to address the remaining 2% of emissions and help ensure enhanced compliance with Reg. 8-2. After considering several options, the project (“Vent Project”) that was selected as the most effective involves the design and installation of a series of new process piping and control valves to further control the venting and recover gases in lieu of routing them to a new dedicated flare. The objective of the capital project is to prevent venting at ST-302 through improved pressure control and staggered letdown facilities to manages swings in the hydrogen grid and using the existing flare header as needed.

Due to the complexity and vastness of sources at refineries and the integrated nature of the Benicia Refinery, significant changes to process equipment must be taken with care and in this case requires a shutdown of not only the process unit itself, but the entire refinery. Refinery-wide turnarounds are conducted about once every five years and the process for planning a given refinery-wide turnaround can start anywhere from 2-3 years before the actual turnaround occurs to ensure the proper planning and mitigation of any safety and environmental impacts.

For the Benicia Refinery, the unique interconnectedness of the processing units means that portions of the Vent Project can only be conducted during a refinery-wide turnaround. Importantly, the three hydrogen streams must be shut down at the same time for the Vent Project to be completed and some of the equipment will be installed on a system utilized by the entire refinery. As a result, the Vent Project cannot be reasonably and safely completed until the next refinery-wide turnaround following issuance of a permit by the District.

Valero is committed to constructing the Vent Project as quickly as possible pending the District’s actions on the permit approval process and the refinery-wide turnaround.

### Community Information

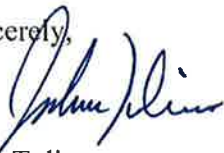
With respect to any concerns about ambient concentrations of benzene in the air, Valero is proud to say that its fence line monitoring system has consistently and repeatedly demonstrated

benzene levels well below EPA's action threshold (which itself is below any health-based standard).

**Conclusion**

The Valero Benicia Refinery remains committed to ensuring environmental compliance, working with the District and the community to ensure safe, stable, and environmentally protective operations. To this end, Valero took immediate action to address the newly-discovered emissions in 2019 and has made substantial progress in eliminating them – currently a 98% reduction. Valero is now undertaking a final engineering project to go after the remaining 2%, as reflected in the SOA. Valero appreciates the work of the District in helping achieve these results and hope the Board will clear the path to tackling the final 2% by approving the Stipulated Order of Abatement before it.

Sincerely,



Josh Tulino  
Vice President & General Manager, Valero Benicia Refinery