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Socioeconomic Impact Analysis of Amendments to Refinery Definitions

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Bay Area Air Quality Management District

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1. INTRODUCTION

The Bay Area Air Quality Management District (Air District) has developed amendments to several regulations to ensure that rules currently applicable to refineries continue to apply to the same facilities after operations are modified to produce products by processing alternative feedstocks which may not be derived from petroleum.

Two of the five petroleum refineries in the Bay Area have submitted applications to modify the facility operation to process alternative, non-petroleum, feedstocks with the intention of producing “renewable” fuel and other products. Petroleum refineries are subject to a variety of Air District rules and regulations, some of which are also applicable to other facilities besides petroleum refineries. Most of these rules determine the applicability using the definition of petroleum refinery. There are also instances where a particular standard, requirement or exemption is dependent on terms like fossil-derived, fossil fuel, petroleum or crude oil.

The purpose of the proposed amendments is to ensure that the facilities that produce fuels and other products from non-petroleum feedstocks remain subject to and in compliance with the same emission standards and rule requirements that were in effect when the feedstock was petroleum based. Without this rule development and the adoption of the proposed amendments, the facilities that change to non-petroleum operation may no longer be subject to the emission standards and other regulatory requirements that currently apply to these facilities.

After this introduction, this report discusses in greater detail the proposed refinery definition amendments (Section Two). The final chapter discusses the potential for socioeconomic impacts from the proposed refinery definition amendments. The report is prepared pursuant to Section 40728.5 of the California Health and Safety Code, which requires an assessment of socioeconomic impacts of proposed air quality rules. The findings in this report can assist Air District staff in understanding the socioeconomic impacts of the proposed requirements, and can assist staff in preparing refined versions of the amendments.

2. BACKGROUND AND OVERVIEW OF REFINERY DEFINITION AMENDMENTS

INDUSTRY DESCRIPTION

Petroleum refineries process crude oil into a variety of products such as gasoline, aviation fuel, diesel and other fuel oils, lubricating oils, and feedstocks for the petrochemical industry.

INDUSTRY / FACILITY OPERATIONS

The processing of crude oil occurs in various process units or plants throughout these facilities including; separation processes (e.g., atmospheric or vacuum distillation, and light ends recovery), petroleum conversion processes (e.g., cracking, reforming, alkylation, polymerization, isomerization, coking, and visbreaking), petroleum treating processes (e.g., hydrodesulfurization, hydrotreating, chemical sweetening, acid gas removal, and deasphalting), feedstock and product handling (e.g., storage, crude oil blending, non-crude oil feedstock blending, product blending, loading, and unloading), and auxiliary facilities (e.g., boilers, waste water treatment, hydrogen production, sulfur recovery plants, cooling towers, blowdown systems, compressor engines, and power plants). Some of these processes will be retained or repurposed for non-petroleum operation.

The new non-petroleum feedstocks are generally termed biological-based oils, and include tallow, cooking oils, vegetable oils and rendered fats. Additional processes for the non-petroleum operation include esterification, hydrodeoxygenation, and fermentation.

The two facilities that are planning to convert their refining operations to non-petroleum operations do not intend to produce any petroleum products but will have the ability to receive, blend, and ship petroleum based materials. Additionally, these facilities, or any future facility, can retain the permits of any equipment or sources, which will provide the facility the opportunity to process crude oil or other petroleum based feedstocks in the future if so desired.

POLLUTANTS AND EMISSIONS SOURCES

Pollutants and emission sources for the non-petroleum operation will be similar to the current petroleum operation:

- Organic Liquid Storage Tanks
- Process Heaters
- Internal Combustion Engines
- Wastewater Treatment
- Cooling Towers
- Loading Operations
- Hydrogen Production

- Fugitive Emissions from Equipment Leaks
- Flares

Some of the significant changes that will occur for the non-petroleum operation include:

- Fluid Catalytic Cracking Unit no longer required
- Delayed Coker no longer required

CURRENT EMISSIONS CONTROL TECHNOLOGY AND METHODS

There will be no change in the emissions control methodology or technology. If an existing source operates with an abatement device in the petroleum operation, it will continue to operate with an abatement device in the non-petroleum operation. In addition, if a source required for the non-petroleum operation is new or modified, the source will be evaluated pursuant to Regulation 2, Rule 2 New Source Review, including the determination of the Best Available Control Technology.

REGULATORY HISTORY

The regulatory history for petroleum refineries is complex and comprehensive. Petroleum refineries are subject to federal, state, and Air District regulations; all of which have been developed and promulgated over decades. Since the purpose of the proposed amendments is to keep current petroleum facilities that are converting to non-petroleum operations subject to the same rules and regulations, a detailed regulatory history is not applicable. From a historical perspective, it is important to point out that all of the Air District refinery sector regulatory action is constrained to the 5 major petroleum refining industrial complexes that have been operating in the Bay Area for decades. The intent of this rule development effort and the proposed scope of amendments are limited to these 5 major facilities and does not set out to change the regulatory landscape for any other currently permitted facility.

TECHNICAL REVIEW

The proposed amendments will not result in significant emissions impacts. As previously stated, the proposed changes are administrative and intended to ensure the 5 Bay Area petroleum refineries continue operation in compliance with the rules and regulations that apply to their operation after any repurposing to process feedstocks that are not petroleum based.

Without adoption of the proposed amendments, it is possible that the repurposed facility (one that no longer uses crude oil or other petroleum feedstocks) would no longer be a petroleum refinery as currently defined in Air District rules. As a result, these refineries may not be subject to the emissions standards that are currently applicable prior to the repurposing of their facility. The purpose of this rulemaking is to ensure that enforceable emission standards remain in place, avoiding possible increases in emissions.

While it appears that the volume of fuels produced will be lower than the current petroleum operation, the products will be very similar, if not identical, to the current products produced by the petroleum operation. Furthermore, each facility is likely to import petroleum based products for distribution or blending, so there will be both petroleum and non-petroleum materials at the facility.

The types of air pollution emitted by the repurposed facilities will be similar to current operation. The proposed amendments will ensure emissions will not increase, keeping existing community protections in place.

PROPOSED AMENDMENTS

Section 200 Definitions:

The proposed amendments to definitions (Section 200) of petroleum refinery, liquid petroleum gas (LPG) and gasoline will apply to each applicable refinery rule. Left unchanged, the refineries which convert to non-petroleum refining operations may no longer be subject to the current emissions standards or other requirements that are narrowly specific to petroleum refining operations. This approach is intended to have no impact on the facilities that are currently subject to emissions standards, and requirements for petroleum operation will remain subject to the same emission standards and requirements for non-petroleum operations. In addition, the proposed amendments will not impact any facility other than the major petroleum refineries that are currently subject to these rules. Careful attention has been paid to ensure that no facility which was previously unregulated by a petroleum refinery rule is now regulated under the proposed rule development action, and similarly, that no current refinery is left unregulated after they convert their processes to non-petroleum feedstocks.

The Air District will delete the definitions of Petroleum Refinery, Liquid Petroleum Gas (LPG) and Gasoline from all applicable rules. In addition, all references to Petroleum Refinery in the rules will be converted to "Refinery". The Air District will then add the proposed definitions of Refinery, Liquid Petroleum Gas and Gasoline listed below to Regulation 1 as general definitions which will apply to all applicable rules where these terms are referenced.

The three definition changes are:

Petroleum Refinery

The proposed definition change ensures any emission standards, exemptions, or limited exemptions that are currently applicable to the five existing petroleum refineries continue to apply even if the facility is repurposed to process material that is not petroleum. The amendment removes the term "petroleum" from the name and adds language which includes the processing of non-petroleum based organic feedstocks. It also sets a lower processing throughput limit of 10,000 barrels per day which ensures that smaller intermediate re-refining operations continue to not be subject to the refinery rules. The intent of the language amendment is to accomplish the task of retaining all five major refineries under the rules that are currently applicable. This definition is derived from the existing definition in Regulation 12, Rule 15, with the generalization of feedstocks to cover the repurposed facilities, and a throughput threshold to ensure the smaller operations in the Air District are not impacted.

Refinery: An establishment that is located on one or more contiguous or adjacent properties that processes more than 10,000 BPD of any organic feedstock, to produce more usable products such as

gasoline, diesel fuel, aviation fuel, lubricating oils, asphalt or petrochemical feedstocks, or any other similar product. Refinery processes include separation processes (e.g., atmospheric or vacuum distillation, and light ends recovery), conversion processes (e.g., cracking, reforming, alkylation, polymerization, isomerization, coking, and visbreaking), treating processes (e.g., hydrodesulfurization, hydrotreating, chemical sweetening, acid gas removal, and deasphalting), feedstock and product handling (e.g., storage, crude oil blending, non-crude oil feedstock blending, product blending, loading, and unloading), and auxiliary facilities (e.g., boilers, waste water treatment, hydrogen production, sulfur recovery plant, cooling towers, blowdown systems, compressor engines, and power plants).

Table 1 shows the rules where this definition would apply.

Table 1: Proposed Administrative Changes to Refinery Definition

RULE	SECTION	ACTION	RATIONALE
6-5 Particulate Emissions from Petroleum Refinery Fluidized Catalytic Cracking Units	6-5-208	Delete Definition	Updated Refinery definition included in Regulation 1 for consistency.
8-1 General Provisions	8-1-203		
8-8 Wastewater Collection and Separation Systems	8-8-224		
8-9 Vacuum Producing Systems	8-9-202		
8-10 Process Vessel Depressurization	8-10-202		
8-18 Equipment Leaks	8-18-213		
8-28 Episodic Releases From Pressure Relief Devices at Petroleum Refineries and Chemical Plants	8-28-209		
8-53 Vacuum Truck Operation	8-53-216		
9-10 Boilers and Heaters in Petroleum Refineries	9-10-213		
12-11 Flare Monitoring at Petroleum Refineries	12-11-205		
12-12 Flares at Petroleum Refineries	12-12-206		
12-15 Petroleum Refining Emissions Tracking	12-15-210		

Liquefied Petroleum Gas (LPG)

The proposed definition change ensures any emission standards, exemptions or limited exemptions that are applicable to LPG continue to apply even if the material is not actually manufactured from a petroleum feedstock. The Air District will amend the definition of LPG to the proposed definition below within all the applicable regulations (Table 2).

Liquefied Petroleum Gas: A compressed gas composed of one or more of the following flammable hydrocarbons (propane, n-butane, isobutane, propylene, and butylenes), which is used especially as a fuel or as raw material for chemical synthesis, including hydrocarbons that are obtained, originate or manufactured from non-petroleum materials.

Table 2: Proposed Administrative Changes to LPG Definition

RULE	SECTION	ACTION	RATIONALE
8-6 Bulk Plants and Bulk Terminals	8-6-215	Delete Definition	Update LPG definition and include in Regulation 1 for consistency.

Gasoline

The proposed definition change ensures any emission standards, exemptions or limited exemptions that are applicable to gasoline continue to apply even if the material is not actually manufactured from a petroleum feedstock. The Air District will amend the definition of gasoline to the proposed definition below within all the applicable regulations (Table 3).

Gasoline: Any distillate, including aviation gasoline and additives, that has a Reid vapor pressure of four (4.0) pounds or greater.

Table 3: Proposed Administrative Changes to Gasoline Definition

RULE	SECTION	ACTION	RATIONALE
8-5 Storage of Organic Liquids	8-5-205	Delete Definition	Update Gasoline definition and include in Regulation 1 for consistency.
8-7 Gasoline Dispensing Facilities	8-7-202		
8-33 Gasoline Bulk Terminals	8-33-202		
8-39 Gasoline Bulk Plants	8-39-202		
8-44 Marine Vessels	8-44-209		
8-53 Vacuum Truck Operation	8-53-209		

Section 600 Manual of Procedures

The other proposed set of amendments which affect multiple regulations is the amendments proposed for the 600 sections pertaining to the Manual of Procedures. Since many of the rules that are included in the proposed amendments have not been amended for decades, and are not likely to be amended any time soon, Air District staff is proposing to update outdated or obsolete language to the 600 section for Manual of Procedures. For example, Regulation 8, Rule 6, Terminals and Bulk Plants, was last amended in 1994. While the emissions standards and other requirements of the seldom-amended rules remain applicable, often the specified methodologies used to estimate emissions and determine compliance become ineffectual, impractical, or otherwise obsolete. While any lab method or test procedure is subject to a continuous improvement process resulting in Manual of Procedure updates, there have been isolated situations where strict adherence to rule requirements produces an unexpected or unusable outcome. Furthermore, in the event that a facility repurposed to non-petroleum feed stock discovers an alternative test method to better determine compliance, this proposed language will allow the Air District to consider such an adjustment. Allowing the flexibility to use a better methodology benefits both the Air District and the regulated community. An example is shown below from the aforementioned Regulation 8, Rule 6.

8-6-603 **Analysis of Samples, True Vapor Pressure:** *Samples of organic compounds as specified in Section 8-6-110 shall be analyzed for true vapor pressure at 25°C (77°F), as prescribed in the Manual of Procedures, Volume III, Method 28, or any other method approved or requested by the APCO. For organic liquids and organic liquid mixtures to which heat is applied, the true vapor pressure shall be determined at 25°C (77°F) or the actual loading temperature, whichever is higher.*

Table 4: Proposed Administrative Changes to 600s Sections

RULE	SECTION	ACTION	RATIONALE
8-1 General Provisions	8-1-602	Add provision for other test methods.	Provides flexibility to use current or more applicable method.
8-2 Miscellaneous Operations	8-2-601		
8-5 Storage of Organic Liquids	8-5-601		
	8-5-602		
	8-5-603		
8-6 Bulk Plants and Bulk Terminals	8-6-603		
8-7 Gasoline Dispensing Facilities	8-7-606		
8-8 Wastewater Collection and Separation Systems	8-8-601		
	8-8-602		
8-9 Vacuum Producing Systems	8-9-601		
8-18 Equipment Leaks	8-18-603		
8-33 Gasoline Bulk Terminals	8-33-604		
	8-33-605		
8-39 Gasoline Bulk Plants	8-39-601		
	8-39-602		
	8-39-603		
	8-39-604		
	8-39-605		
8-40 Soil Remediation	8-40-603		
8-53 Vacuum Truck Operation	8-53-601		
	8-53-602		
	8-53-604		
9-1 Sulfur Dioxide	9-1-602		
	9-1-606		
	9-1-607		
	9-1-608		
	9-1-609		

3. SOCIOECONOMIC IMPACT ANALYSIS OF REFINERY DEFINITION AMENDMENTS

The two refineries proposing to convert operations to alternative feedstocks have published brief information about the projects.

MARATHON

Marathon Petroleum Company (MPC) plans for the converted facility to produce 730 million gallons per year of lower carbon-intensity renewable fuels, or about 47,600 barrels per day (BBL/Day). The most recent data for this refinery when operated as a petroleum refinery indicated a throughput capacity of 161,500 BBL/Day. According to the company website. "MPC estimates its conversion of the Martinez facility from petroleum refining to renewable diesel production will reduce the facility's manufacturing greenhouse gas emissions by 60%, total criteria pollutants by 70% and water use by 1 billion gallons every year."¹

PHILLIPS 66

The Rodeo plant conversion would create capacity to produce 680 million gallons annually of renewable diesel, renewable gasoline, and sustainable jet fuel. Combined with an additional project onsite that is under development, the plant would produce a total of 800 million gallons per year, or about 52,200 BBL/Day. The most recent data for this plant as a petroleum refinery indicates that it had a capacity for 120,200 BBL/Day.

The company's website states that, "This capital efficient investment is expected to deliver strong returns through the sale of high value products while lowering the plant's operating costs."² The plant is expected to employ 400 workers when operations are fully stabilized.

DISCUSSION OF IMPACT

The purpose of the refinery definition amendments is to ensure that existing emission control standards remain in place at these facilities, as applicable to the new type of operations. The facility definition changes do not require installation of new equipment or emissions control programs and there are no cost impacts directly associated with them. According to company plans, both facilities would operate at lower throughput levels than previously, but the companies indicate to investors that the facilities are expected to "deliver strong returns" on the investments in the conversion. While no

¹ <https://www.marathonpetroleum.com/Newsroom/Company-News/Marathon-Petroleum-to-Proceed-with-Conversion-of-Martinez-Refinery-to-Renewable-Fuels-Facility/>

² <https://investor.phillips66.com/financial-information/news-releases/news-release-details/2020/Phillips-66-Plans-to-Transform-San-Francisco-Refinery-into-Worlds-Largest-Renewable-Fuels-Plant/default.aspx>

detailed operating costs data is available for these types of facilities, the implication from company communications is that per unit operating costs will be lower than for petroleum refining operations. We expect these amendments to have little or no impact on the local economy. As stated previously, the proposed amendments will not result in significant emissions impacts. Under this condition, it may be expected that the new plant operations will be able to absorb the ongoing cost of in place investments in emissions control technologies that were previously absorbed by the petroleum refining facilities. Therefore, there is no basis to conclude that the refinery definition amendments would create an adverse socioeconomic impact under the meaning of Section 40728.5 of the California Health and Safety Code.