5.0 PROJECT ALTERNATIVES

5.1 Introduction

The following sections identify and compare the relative merits of alternatives to the proposed project as required by the CEQA guidelines. According to CEQA Guidelines § 15126.6 (a), "An EIR shall describe a range of reasonable alternatives to the proposed project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project…" The alternatives presented in this section have been selected based on the assumption that each is potentially capable of reducing or eliminating significant effects of the project.

Section 15126.6(f) of the CEQA Guidelines stipulates that the range of alternatives required in an EIR is governed by a rule of reason in that the EIR must discuss only those alternatives "necessary to permit a reasoned choice" and those that could feasibly attain most of the basic objectives of the project. The CEQA Guidelines also state in §15126.6(f)(2)(B) that if the lead agency concludes that no feasible alternative locations for the project exist, it must disclose the reasons for this conclusion, and should include the reasons in the EIR.

An alternatives analysis typically includes an evaluation of the "no project" alternative as a basis for comparing the relative merits and potential significant environmental impacts of the proposed project and the project alternatives. However, in accordance with Public Resources Code §21178(g) the "no project" alternative and alternative sites outside of existing refinery boundaries are not discussed in this EIR.

Section 15126.6(c) of the CEQA Guidelines states that the EIR should identify alternatives that were considered but rejected as infeasible. These alternatives and the reasons that they were considered infeasible are discussed in Section 5.2.

Three project alternatives are proposed for consideration. Project alternatives were developed by considering different ways or engineering designs that would allow the proposed project to phase out MTBE and comply with CARB Phase 3 gasoline specifications. Analyses of the alternatives are presented in this section along with a description of the modifications and/or additions that would be required at the Refinery and terminals.

5.2 Alternatives Rejected as Infeasible

The project design presented in Section 2.0 was developed by Chevron after extensive evaluation of existing refinery facilities and necessary process modifications/additions. During this evaluation, the following alternatives were investigated and determined to be infeasible:

- Building a propylene polymer plant to produce additional blending stocks from the additional LPG production. This alternative was rejected because this is a less economical alternative and the quality of the blending stock produced by this process is more variable than the

proposed project. Additionally, handling the spent catalyst for this process (phosphoric acid) is more difficult because it is highly corrosive, which could create additional hazard impacts.

- Building a dimersol plant to produce hexene from propylene, similar to the propylene polymer process described above. The dimersol process is significantly more difficult to operate as it requires the use of extremely hazardous catalysts. In addition, this process is more expensive to operate than the propylene polymer process.
- Locating the FCC Light Gasoline Splitter upstream rather than downstream of the C-5700 Light Gasoline Depantanizer. If the FCC Light Gasoline Splitter were located upstream of the C-5700 Light Gasoline Depantanizer, it would have to be made larger to handle the additional overhead product. This larger splitter would increase the cost of the project. The proposed project (locating the FCC Light Gasoline Splitter downstream) is an economically superior alternative because it reduces the amount of overhead product from the Splitter.
- Installing a tank to store the bottoms stream from the FCC Light Gasoline Splitter Column before feeding it to the NHT. This alternative was rejected because the splitter bottoms stream would need to be cooled to ambient temperature before putting it into the new storage tank, which would create an energy detriment.
- Feed excess pentane to the Alkylation Plant. This alternative was rejected because the alkylate produced from the pentane would be very poor quality gasoline blending stock and it would adversely affect the quality of the refinery gasoline pool.
- Sell excess refinery pentane to a nearby stationary source for use as fuel. This alternative was rejected because, at this time, there do not appear to be economically viable choices for such an arrangement.
- Blend ethanol into the refinery's gasoline product stream rather than at the offsite marketing terminals. This alternative was rejected because it would severely degrade the quality of the gasoline. If water were introduced into the gasoline distribution system, the ethanol would separate from the gasoline and the benefits of having an oxygenate in the gasoline would be lost.
- Modify existing furnaces at the NHT-1 instead of replacing the reactor feed furnace. This alternative was rejected because the amount of heat needed to adequately desulfurize the FCC Light Gasoline Splitter bottoms stream is greater than the heating capacity available if the existing furnaces were modified. A new reactor feed furnace is necessary to achieve adequate gasoline hydrotreating capacity.
- Ship excess refinery pentanes by pipeline to Los Angeles Harbor. This alternative was rejected because the cost of loading the pentane onto refrigerated tankers needed to transport the pentane was prohibitive.

- Store excess refinery pentanes in offsite salt domes and ship it back to the refinery for blending during the winter months. This alternative was rejected because of the increased risk of shipping pentanes twice (out of and back into the refinery) and because the shipping cost would reduce the economic benefit of blending the pentanes into gasoline in the winter.

5.3 Project Alternatives

Three project alternatives have been identified as technically feasible, but each was rejected in favor of the proposed project. Unless otherwise stated, all other components of each project alternative are identical to the proposed project.

Alternative 1 – New Alkylate Depentanizer

As an alternative to reusing an existing column (C-5740) in the TAME Plant, building a new depentanizer in the Alkylation Plant was considered. An additional 75 construction workers would be required to build the new depentanizer and these workers would be onsite during the peak construction period. Construction of the new depentanizer would occur at the same time as the construction of the other new columns planned as part of the proposed project. This alternative was not included as part of the proposed project because it would be more cost effective to reuse an existing column and its infrastructure than building a new one.

Alternative 2 – Construction of a Refrigerated Pentane Storage Tank Instead of a Pentane-Gasoline Mix Storage Tank

A refrigerated pentane storage tank was considered as an alternative to the new pentane-gasoline mix storage tank. The refrigerated storage tank would have a 200,000-bbl working volume, which is smaller than the proposed 493,000-bbl working volume of the pentane-reformate storage tank. With this alternative, it would still be necessary to construct the proposed pentane storage sphere and associated railcar loading facilities to export pentanes out of the Refinery during the summer months. This alternative was not included as part of the proposed project because the pentane sphere would still need to be constructed and there are higher costs associated with a refrigerated tank.

Alternative 3 – Feeding All of the Incremental Butanes Produced at the FCC to the Alkylation Unit

This alternative would replace the Refinery Deisobutanizer Reactivation portion of the proposed project. The proposed project calls for the incremental butane produced at the FCC to be fed to the reactivated C-1 Deisobutanizer in order to separate the normal butane from the isobutane. The isobutane would then be fed to the Alkylation Unit. With Alternative 3, all of the incremental butane produced at the FCC would be fed to the Alkylation Unit and the normal butane would be removed after it goes through the Alkylation Unit, downstream of the contactors. Thus, Alternative 3 eliminates the need for splitting butanes prior to feeding them to the Alkylation Unit, eliminating the need to reactivate the C-1 Deisobutanizer. This alternative would increase the total flow rate

through the Alkylation Unit and would require the addition of two new contactors and a new acid settling drum.

5.4 Alternatives Analysis

This section contains an analysis of the three alternatives by each environmental topic. Because air quality and hazards have the greatest potential to be adversely affected by the proposed project and project alternatives, each alternative is evaluated separately for these resource issues. For the other environmental topics, alternatives are discussed together.

5.4.1 Air Quality

Table 5.4-1 summarizes the emissions associated with construction for the project alternatives in comparison with the proposed project. Details of the emission calculations are in Appendix B. Peak daily construction emissions are higher for Alternative 1 than for the proposed project, while peak daily construction emissions from the other alternatives are anticipated to be the same as for the proposed project. The emissions from sources subject to RECLAIM are the same for the alternatives as for the proposed project.

Table 5.4-1
Summary of Construction Emissions For Alternatives

Pollutant (lb/day)	Project	Alternative 1	Alternative 2	Alternative 3	SCAQMD CEQA Threshold (lb/day)
CO	1,704	1,835	1,704	1,704	550
VOC	429	451	429	429	55
NO_X	1,911	1,997	1,911	1,911	55
SO_X	164	172	164	164	150
PM_{10}	616	624	616	616	150

Alternative 1 – New Alkylate Depentanizer

Construction activities associated with this alternative would require an additional 75 construction workers during the peak construction period. At an average vehicle ridership of 1.0 workers per commuting vehicle, this would lead to an additional 58 commuting round trips per day.

Construction of the new depentanizer would occur at the same time as the construction of the other new columns planned as part of the proposed project. It is anticipated that the peak daily construction equipment requirements would be twice the requirements for modifying the existing column.

Both direct and indirect operational emissions associated with this alternative would be the same as for the proposed project.

Alternative 2 – Construction of a Refrigerated Pentane Storage Tank Instead of a Pentane-Gasoline Mix Tank

With this alternative, it would still be necessary to construct the proposed pentane storage sphere and associated railcar loading facilities to export pentane out of the Refinery during the summer months. Because of its smaller size, overall emissions from construction of this storage tank would be about 80 percent of the emissions from construction of the pentane-gasoline mix storage tank. However, peak daily emissions associated with construction activities are anticipated to be the same as for the proposed project.

Operational VOC emissions from a new refrigerated pentane storage tank are expected to increase by two percent as compared to a new pentane-gasoline mix storage tank. No emissions from other pollutants are expected because it was assumed that the tank would be refrigerated with electrical- or steam-driven equipment rather than combustion equipment.

Table 5.4-2 summarizes the estimated operational emissions associated with this alternative for non-RECLAIM sources. As shown in Table 5.4-2, VOC emissions for Alternative 2 are anticipated to be slightly greater than for the project. However, Alternative 2 would have similar air impacts as those of the proposed project.

Table 5.4-2
Alternative 2 Operational Criteria Pollutant Emissions Summary for Non-RECLAIM Sources

Pollutant	Direct Emissions (lb/day)	Indirect Emissions (lb/day)	Alternative 2 Total (lb/day)	Project Total (lb/day)	SCAQMD CEQA Threshold (lb/day)	Significant?
CO	12.2	381.4~~380.7~~	393.6~~393.0~~	393.6~~393.0~~	550	NO
VOC	141.5	207.0~~206.7~~	348.6~~348.2~~	347.8~~347.4~~	55	**YES**
NO_X	0	3,138.4~~3123.3~~	3,138.4~~3,132.3~~	3,138.4~~3,132.3~~	55	**YES**
SO_X	0	2,336.6	2,336.6	2,336.6	150	**YES**
PM_{10}	282.5	560.8~~560.6~~	843.3~~843.2~~	843.3~~843.2~~	150	**YES**

Alternative 3 – Feeding All of the Incremental Butanes Produced at the FCC to the Alkylation Unit

With this alternative, construction activities and resulting emissions are anticipated to be the same as for the proposed project. Direct VOC emissions would increase by 1.9 pounds per day due to the additional components in fugitive service associated with the two new contactors and new acid settling drum. Indirect operational emissions associated with this alternative would be the same as for the proposed project.

5.4.2 Biological Resources

Alternatives 1, 2, and 3 are expected to have no significant impacts to biological resources, as with the proposed project. Construction of the alternatives would occur on previously disturbed land approximately 0.5 mile away from the butterfly sanctuary. Furthermore, the butterfly sanctuary is surrounded by existing commercial and industrial development.

5.4.3 Cultural Resources

No cultural resources are known to exist at the Refinery. As a result, Alternatives 1, 2, and 3 would create no significant impacts to cultural resources because, as with the proposed project, the alternatives involve modifications or additions within refinery boundaries. Furthermore, the mitigation measures outlined in Section 4.3 would ensure that, if cultural resources were encountered during earth moving activities at the Refinery or the terminal sites, impacts would be mitigated to insignificance.

5.4.4 Geology and Soils

As with the proposed project, no significant impacts to geology and soils are expected to occur from the implementation of any of the project alternatives at the Refinery. All changes associated with the various alternatives and the proposed project would occur within the confines of the existing Refinery boundaries. There also would be no substantial differences in geology and soils impacts between any of the alternatives and the proposed project.

5.4.5 Hazards

This section reviews the potential effects of the four alternatives on the risk of upset estimates.

Alternative 1 – New Alkylate Depentanizer

As an alternative to reusing an existing column (C-5740) in the TAME Plant, this alternative considers building a new depentanizer in the Alkylation Plant. The existing column in the TAME plant would remain idle or be demolished. The TAME Plant and the Alkylation Plant are in the same general vicinity and both locations are about 500 meters from the nearest fence line. The potential hazard impacts of this alternative are expected to be similar to the proposed project.

Alternative 2 – Construction of a Refrigerated Pentane Storage Tank Instead of a Pentane-Gasoline Mix Tank

A refrigerated pentane storage tank was considered as an alternative to the new pentane-gasoline mix storage tank. The refrigerated storage tank would have a 200,000-bbl capacity, which is smaller than the proposed 493,000-bbl capacity of the pentane- gasoline mix storage tank. With this alternative, there would be an incremental reduction in risk of fire or explosion due to the reduction in the size of the tank. The impact distance due to a fire or explosion of 200,000 bbl of pentane was compared with 493,000 bbl of mixture. For calculation purposes, the mixture heat of combustion and vaporization was assumed to be the same as pentane. The mixture is a combination of pentane and heavier liquids with a slightly lower heat of combustion and lower vapor pressure. It would have approximately the same explosive impact distance and slightly smaller fire impact distance, if equal amounts of pentane and mixture are compared. For this alternative, the 200,000-bbl pentane impact distance would be approximately 26 percent smaller for explosions and 29 percent lower for fires when compared with fires and explosions from 493,000 bbl of mixture. Use of this alternative would reduce the hazard impacts, but not to a level below significance.

Alternative 3 – Feeding All of the Incremental Butanes Produced at the FCC to the Alkylation Unit

Under this alternative, there would be no change in the amount of butane processed at the Refinery. The location of the processing and the amount of feed processed would change, but the differences in risk between Alternative 3 and the proposed project would be small and less than the resolution of the U.S. EPA's RMP Guidance model used to estimate risk. The potential hazard impacts of this alternative are expected to be similar to the proposed project.

5.4.6 Hydrology/Water Quality

If implemented, Alternatives 1, 2, and 3 would yield little or no change in water use or water quality from that of the proposed project. These alternatives are expected to use similar quantities of water during construction and operation as that of the proposed project. Because there is

expected to be no significant impact to water resources from the proposed project, similarly there would be no significant impact to water resources from any of the alternatives.

5.4.7 Land Use and Planning

As with the proposed project, no significant impacts to land use are expected to occur from the implementation of any of the project alternatives. The alternatives proposed would be located within existing refinery boundaries currently used for industrial purposes. No acquisition of additional land or changes to existing land would be required if any of the alternatives were implemented.

5.4.8 Noise

Because the alternatives involve modifications/additions within the Refinery boundaries, noise levels generated by the alternatives are expected to be equivalent to those generated by the proposed project. While each of these alternatives would involve noise associated with industrial activities, none would include components that would generate substantially different noise during construction or operation than the proposed project.

5.4.9 Public Services

The impacts discussion of public services for the proposed project was limited to fire protection. As with the proposed project, Alternatives 1, 2, and 3 are not expected to create additional demands on the existing Refinery fire services or local fire stations.

5.4.10 Solid and Hazardous Waste

Alternatives 1, 2, and 3 are expected to be similar to the proposed project with respect to the amounts of waste generated. For construction-related solid and hazardous wastes, increases in waste disposal related to any of the alternatives would be small and temporary and the capacity of the landfills in Los Angeles and Orange counties is sufficient to handle project-related construction wastes. Similarly, operational wastes generated from implementation of any of the alternatives would be relatively small, and the Class I landfills in California have sufficient capacity to handle operational wastes. Based on these considerations, as with the proposed project, none of the alternatives are expected to have a significant impact on solid/hazardous waste.

5.4.11 Transportation/Circulation

Alternative 1 would increase the peak number of construction workers by 75 additional workers over the two month peak construction period and approximately 50 additional workers for the remaining construction period. As with the proposed project, because of the short duration of the peak construction period, the average manpower estimate was used in this analysis to more accurately reflect the anticipated traffic impacts that would result from construction of Alternative 1. Assuming an average vehicle ridership of 1.3 workers per commuting vehicle, this would lead to an additional 38 commuting round trips per day (50 workers divided by 1.3). Assuming the vehicle distribution would be similar to the proposed project, approximately 50 percent of the

vehicles would enter/exit the Refinery at Gate 8 on El Segundo Boulevard and 50 percent would enter/exit the Refinery at Gate 22 on Rosecrans Avenue. Based on this assumption, Alternative 1 would result in a maximum of 19 additional vehicles at the intersections in the vicinity of the Refinery. This small addition of vehicles at any one intersection is not expected to create additional impacts over that of the proposed project. Therefore, Alternative 1 is expected to have the same impacts as the proposed project.

Alternatives 2 and 3 are not expected to require additional construction workers, construction deliveries, or operational traffic over those required for the proposed project. As a result, Alternatives 2 and 3 are expected to have the same impacts as the proposed project.

5.5 Conclusion

Based on the comparisons of the different alternatives with the proposed project, none of the alternatives creates substantially different impacts to the environment than the proposed project. As a result, the proposed project is the preferred alternative to achieve the phase out of MTBE and production of CARB Phase 3 gasoline. Table 1.4-1 includes a summary of the merits of each project alternative compared to the proposed project.

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