CEQA requires that indirect impacts of a project be evaluated. In this case, these include the generation of electricity to support the project. The DEIR did not reveal the increase in electricity consumption that would be required to support the project nor evaluate the air quality impacts of generating additional electricity to support the project.

5-152

Presumably, the project would be supplied electricity by Los Angeles Department of Water and Power ("LADWP"). LADWP operates a number of in-basin older, largely uncontrolled plants that emit substantial amounts of criteria pollutants. It also operates and/or wheels power from high-emitting, coal-fired power plants perched on California's border. The emissions from electricity generation, wherever they may occur, are potentially large, at least as large or larger than other sources of emissions that were included in the air quality analyses. Under 14 CCR § 15126.2(a), an EIR is required to evaluate secondary, indirect impacts.

5-153

The LADWP currently produces 52% of its power from coal. This share is projected to decline to 39% by 2010, due to the proposed divestiture of the Mohave Generating Station. (LADWP 8/15/00,[64] p. 13.) The merchant power provider AES has offered to buy 100% of Mohave GS, but the deal has run into snags, namely the reneging of Nevada Power. Further, divestiture does not mean that LADWP will cease to rely on power from Mohave. LADWP will continue to own shares in other out-of-basin coal plants, including the Intermountain Generating Station and the Navajo Generation Station. (*Id.*, p. B-1.) The LADWP also wheels power from other coal-fired units, located along California's border. (*Id.*, Fig. F-1.)

The emissions from these coal-fired units are substantially higher than from the Harbor Cogeneration Facility, LADWP's cleanest in-basin facility. The Intermountain Generating Station, located in Delta, UT, is the largest coal-fired power plant in the U.S., and LADWP owns a 67% "take-or-pay" entitlement to 1095 MW during summers and 1108 MW during winters. (LADWP 8/15/00, p. B-1.) The Intermountain GS emits 23 ton/MW-yr of NOx and 7 ton/MW-yr of SOx.[65]

5-154

If the electricity to supply the project came from this or other similar or dirtier coal-fired plants owned by LADWP or that otherwise supply LADWP's

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[64] Los Angeles Department of Water and Power, 2000 Integrated Resource Plan, As Amended and Adopted by the Board of Water and Power Commissioners and the Los Angeles City Council, August 15, 2000.

[65] State of Utah, Title V Operating Permit, No. 2700010001, Intermountain Power Service Corporation, January 9, 1998, Revised February 25, 2000.

power demand along California's border, the project would substantially increase emissions of NOx and SOx compared to those estimated in the DEIR and contribute to regional ozone and visibility problems. The increase cannot be estimated because the DEIR did not report the increase in electricity generation. However, it would certainly be larger than 1 MW and likely larger than 5 MW, to support the new processing unit and 15 new pumps at the Refinery plus new off-site blending operations. (DEIR, pp. B-7/9.) Thus, indirect electricity generation could increase NOx emissions by at least 126 lb/day and SOx emissions by 38 lb/day. The increase in NOx emissions alone exceeds the significance threshold of 100 lb/day.

5-154 cont'd

Although all of the coal-fired plants that LADWP relies on are outside of California, there are at least two coal-fired plants near the California border in Nevada and Arizona that are tied into LADWP's transmission system - Reid Gardner and Mohave. These two plants are about 70 and 2 miles, respectively, from the California border. Thus, emissions from these coal-fired plants contribute to regional ozone and visibility problems in California and thus impact air quality in California due to their proximity.

5-155

In addition, some of the proposed air quality mitigation measures, e.g., use of electric generators and electric construction equipment, will increase the electricity demand. These secondary impacts of proposed mitigation measures were not considered.

III.F Other Errors And Inconsistencies In Emission Estimates

The DEIR contains additional inconsistencies that affect the emission (and risk of upset) estimates. These cannot be resolved with the available information. These are:

1. Page B-13 used 10 heavy duty diesel truck trips to estimate exhaust emissions while page B-16 uses 20 trips for the same heavy duty diesel trucks. It would appear that 20 is correct, since it corresponds to round trips, while the ten trips corresponds to one way trips.

5-156

2. Page B-15 used 160 miles to estimate exhaust emissions from ethanol trucks traveling from Carson to Orange while page B-14 reports 560 miles for the same trucks.

5-157

3. Page B-14 reports a total of 960 miles per day for ethanol transport. The transportation risk of upset analysis also assumes 960 miles total traveled by ethanol trucks. (DEIR, p. 4-32.) However, ethanol truck transport emissions are estimated assuming 960 miles per day one way or 1,920 miles roundtrip (not withstanding the error in Carson to Orange mileage).

5-158

These errors do not cause any new significant impacts. However, they increase the NOx emissions from 175 lb/day to 207 lb/day and the CO emissions from 230 lb/day to 330 lb/day, increasing the amount of NOx that must be mitigated by 33 lb/day. 5-159

III.G Health Impacts Underestimated

The DEIR concluded that toxic emissions from the project would not cause significant health impacts because the acute and chronic hazard indices are less than 1 and the cancer risk is less than ten in one million. (DEIR, pp. 4-15/17.) However, the DEIR does not contain sufficient supporting information to review and confirm these estimates.

The toxic emission estimates are the heart of a risk assessment. The DEIR presents a toxic emissions inventory, but does not explain how it was developed. (DEIR, Table 4-7; DEIR II, Table 2.) The DEIR does not contain any of the supporting data required to confirm these emissions, including the sources that were included, the tank properties, tank throughputs, product speciation profiles, and product physical property data. However, the relative magnitude of the resulting estimates suggest that the estimates are not accurate. Further, the DEIR omitted significant sources of toxic emissions and one of the most potent carcinogens, diesel exhaust. It is likely that health impacts will be significant when these errors and omissions are corrected. 5-160

III.G.1 Major Sources Of Toxics Omitted

The DEIR has omitted the major sources of toxic emissions. The only project sources that apparently were included in the DEIR's analysis are fugitive sources -- tanks, valves, pumps, fittings, and drains. The DEIR did not evaluate toxic emissions from indirect transportation sources -- trucks and trains -- required to support the project. The DEIR also did not include toxic emissions from off-site blending operations. 5-161

III.G.2 Diesel Exhaust Excluded

The DEIR did not include diesel exhaust. Most commercial trucks (except gasoline-powered pickups) and mobile construction equipment combust diesel fuel. The combustion of diesel fuel in engines produces diesel exhaust. In 1998, after extensive scientific review and public hearing, CARB formally identified particulate emissions from diesel-fueled engines as a toxic air contaminant, finding that it caused cancer and a wide range of health impacts including respiratory disease; decreased lung function; alterations in lung tissue and 5-162

respiratory tract defense mechanisms; and premature death. (CARB 6/98.[66]) Thus, project construction and operation would expose workers and residents to elevated concentrations of diesel exhaust which could result in significant health impacts.

5-162 cont'd

III.G.3 Emission Decreases Questionable

The DEIR concludes that the project would cause the emissions of many substances to decrease, e.g., ammonia, aniline, cresols, hydrogen sulfide, naphthalene. (DEIR, Table 4-7.) These decreases are attributed primarily to commodity changes in storage tanks. (DEIR, pp. 2-14, 4-15.) These decreases do not appear to be reasonable, as explained below. Therefore, the DEIR should be revised to include the calculations and assumptions used to estimate toxic emissions and recirculated for public review.

The proposed modifications to the Light Ends Recovery Unit and the Naphtha Hydrotreater will increase the hydrogen sulfide content of fugitive gases emitted from new and existing pumps, compressors, valves, and flanges in these units. Further, the project will add a new Mercaptan Treater to handle the increase in hydrogen sulfide in the overhead gases from these units. (DEIR, p. 2-14.) The emissions from 2 new pumps, 527 new valves, 997 new fittings, 24 new drains, and 8 new pressure relief values in the Mercaptan Treater (DEIR, p. B-8) will also contain elevated concentrations of hydrogen sulfide. Therefore, hydrogen sulfide emissions should have increased, not decreased.

5-163

Similarly, according to the DEIR, most of the decreases are due to changing tank service from MTBE to other blending stocks. (DEIR, p. 2-14.) MTBE is a pure substance and MTBE tanks would only emit MTBE. Other gasoline blending stocks, such as various gasoline streams, contain elevated concentrations of naphthalene. Thus, naphthalene should increase, not decreased.

5-164

IV. THE MITIGATION PROGRAM FOR OPERATIONAL EMISSIONS IS INADEQUATE

The DEIR concluded that VOC and NOx emissions are significant. (DEIR, Table 4-6.) As discussed in Comment III, actual emissions of these pollutants are substantially higher than claimed in the DEIR. In addition, as discussed in Comments III.B and III.C, both SOx and PM10 emissions are significant. The DEIR did not propose any mitigation for the significant VOC and NOx emissions.

5-165

[66] California Air Resources Board (CARB), Initial Statement of Reasons for Rulemaking, Proposed Identification of Diesel Exhaust as a Toxic Air Contaminant, Staff Report, June 1998. (Exhibit 1.)

In the case of VOCs, the DEIR argues that most of these emissions arise from fugitive components, but since BACT is being required, nothing further can or need be done. In the case of NOx, the DEIR argues that most of these emissions arise from indirect sources (e.g., trucks, railcars), and since SCAQMD has no authority to regulate these emissions, nothing further can or need be done. These positions are contrary to CEQA and standard practices.

5-165 cont'd

IV.A Emissions Do Not Have To Be Mitigated With Like Emissions

The DEIR tacitly assumes that emissions must be offset with reductions from the same source. The DEIR suggests that fugitive VOC emissions must be mitigated with fugitive VOC reductions from the same components, and indirect mobile source emissions must be mitigated with similar mobile source emissions. CEQA does not require that increases be mitigated with reductions from similar or identical equipment, only that the mitigation occur in the same time frame and benefit the same general area that would otherwise be affected by the project.

5-166

There are numerous sources of VOC emissions in the Refinery (and nearby industrial areas), not related to this project, that could be controlled or retrofit to achieve the required VOC reductions, beyond the reductions that would be required under Reclaim. These include tanks, pumps, compressors, valves, sumps, vents, and flanges. Similarly, there are numerous sources of NOx in other parts of the Refinery (and nearby industrial areas) that could be controlled or retrofit to achieve the required VOC emissions, beyond the reductions that would be required under Reclaim. These include conventional combustion sources such as boilers, heaters, and turbines. For example, SCONOx, which removes over 90% of the NOx, CO, and VOCs, and 20% of the PM10, could be installed on boilers and heaters. Similarly, existing pumps, compressors, valves, and flanges could be retrofit with leakless technology, the frequency of inspections could be increased, or the more stringent BAAQMD regulations could be adopted for specific refinery components.

5-167

In addition, VOCs and NOx are ozone precursors. Ozone forms in the atmosphere, downwind from emission sources, and thus is a regional air quality problem. Because VOCs and NOx are regional pollutants, as opposed to local pollutants, emission reductions achieved at distant sources would be satisfactory mitigation under CEQA. A good example of this is the Arco Clean Fuels Project retrofit of a bus fleet in San Diego, distant from the Arco refinery in Carson.

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IV.B Authority To Regulate Not Determinative

The DEIR states that the SCAQMD has no authority to regulate railcar (and other mobile source) emissions and defers to future regulatory actions that

5-169

may be taken by the U.S. EPA and CARB. (DEIR, pp. 4-19/20.) Thus, the DEIR concludes there are no "feasible" mitigation measures to minimize or eliminate mobile source emissions. As discussed in Comment IV.A, mobile source emissions do not have to be mitigated with other mobile source emissions. 5-169 cont'd

There are many ways to bind an applicant to a mitigation program, including recording conditions of approval on property title, including conditions in development agreements, posting bonds, adopting a local ordinance, drawing up a legal agreement between the applicant and lead agency, among others. (SCAQMD 3/93, p. 11-2.) The applicant, for example, could agree to retrofit or otherwise control the engines in its own, or someone else's truck fleet, port-side equipment at the Port of Long Beach, or engines in tugs that serve the Port. 5-170

IV.C All Feasible Mitigation Not Required

The DEIR did not require any mitigation whatsoever for admittedly significant NOx and VOC emissions in an area with the most significant ozone nonattainment problem in the nation. CEQA requires all feasible mitigation. There are numerous feasible measures that should be required for this project. Some are discussed above in Comment II.E with respect to construction equipment. These are also applicable for operational emissions and include PuriNOx, post-combustion controls, and fuel additives. In addition, existing stationary sources can be retrofit with SCR or SCONOx and/or truck, ship and locomotive engines can be retrofit with new diesel engines, alternate fuel engines, or post combustion controls. 5-171

IV.C.1 Retrofit Existing Stationary Source

There are numerous opportunities to reduce emissions from stationary sources at the Refinery or elsewhere in the South Coast Air Basin. In Los Angeles County alone, combustion sources (e.g., boilers, heaters, and turbines in refineries and power plants) emit 494 ton/day of NOx and 41 ton/yr of VOCs.[67] These emissions could be reduced by installing state-of-the art pollution control equipment on existing sources. The regulations of the SCAQMD, for example, require that most of these sources meet a NOx limit of 30 ppm or higher and a CO limit of 100 ppm or higher. There is currently technically feasible and cost effective technology that can meet NOx limits of 1 to 2 ppm and reduce VOCs up to 90% on most types of combustion sources, including heaters, boilers, furnaces, generators, and turbines. For example, both SCONOx and selective catalytic reduction ("SCR") can reduce NOx by over 95%. Similarly, oxidation catalysts 5-172

[67] www.arb.ca.gov/app/emisinv/emssumcat_query.php.

and SCONOx can reduce VOCs by 90% or more. Therefore, the applicant could retrofit large combustion sources in other industries in the general region with SCR, SCONOx, and/or oxidation catalysts (as well as other technologies) and meet its mitigation obligation. Some examples follow.

5-172 cont'd

IV.C.2 Diesel Generators

There are thousands of uncontrolled diesel generators in the South Coast. Most of these emit very high levels of NOx, which can be controlled using SCR, and PM10, which can be controlled by particulate traps.

There are hundreds of diesel generators in operation around the world that are controlled by SCR systems designed to remove 80% to over 95% of the NOx. Most of the operating units are in Europe and Japan, although there are also many installations in the United States. These systems are offered by a number of vendors including Steuler, Miratech, Johnson Matthey, Engelhard, and RJM, among others. Steuler, Miratech, and Engelhard will guarantee NOx reductions of 99+%, even on emergency diesel engines. Some US installations are summarized in Table 1. See Hug installation list in Exhibit 3.

5-173

CARB has comprehensively evaluated the control of PM10 emissions from emergency diesel generators to minimize health risks caused by exposure to diesel particulate matter, which has been classified as a potent human carcinogen by California. (CARB 10/00.) CARB has concluded that it is feasible to control PM10 using certified engines and particulate traps. Some applications of this technology are summarized in Table1.

IV.C.3 Heaters and Boilers

Existing fired sources within the Refinery and at nearby stationary sources could be retrofit to reduce NOx and VOC emissions below the levels currently required by SCAQMD rules and regulations. Most fired equipment currently uses low NOx burners to achieve emission limits in Rules 1109 and 1146 (≤30 ppm). This equipment could be retrofit with ultra low-NOx burners, SCR, SCONOx, low temperature oxidation, and/or oxidation catalysts to reduce NOx and VOC emissions. (SJUAPCD 6/99.[68])

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[68] San Joaquin Valley Air Pollution Control District (SJVUAPCD), Best Available Control Technology (BACT) NOx Controls for Natural Gas-fired Boilers, Process Heaters and Steam Generators, June 1, 1999.

Ultra low NOx burners have been installed and successfully used on many boilers. These burners can achieve NOx limits of 7 ppm to 9 ppm.[69] Even lower NOx lower limits have been achieved by SCR. Some examples follow. 5-175

Three 40,000 lb/hr Foster-Wheeler auxiliary boilers at the Crockett Cogeneration Facility in California were permitted at 8.2 ppm NOx @ 3% O_2 in 1996, achieved using SCR with a 20 ppm ammonia slip. The June 1997 source test measured 5.47 ppm NOx and 4.92 ppm NH_3 from Boiler B and the June 1998 source test measured 5.39 ppm NOx and 5.84 ppm NH_3 from Boiler C, all reported at 3% O_2.[70]

A 31.5-MMBtu/hr Scotch Marine fire tube boiler was permitted by the SCAQMD in December 1999 at 7 ppm NOx @ 3% O_2, achieved using low-NOx burners and SCR with a 5 ppm NH3 slip. A second similar 21-MMBtu/hr Cleaver Brooks fire tube boiler was permitted by the SCAQMD in August 2000 at 7 ppm NOx @ 3% O_2 averaged over 15-minutes, achieved using SCR with a 5 ppm NH_3 slip averaged over 15-minutes.[71] Source tests for a similarly equipped 100-MMBtu/hr boiler at Darling Delaware in Los Angeles achieved NOx emissions of 6-7 ppm. (SJVUAPCD 6/99.) 5-176

A 56-MMBtu/hr auxiliary boiler at a cogeneration facility in the Equilon Refinery, Martinez, California (former Shell Refinery) was permitted by the BAAQMD in December 1993 at 5 ppm NOx @ 3% O_2, achieved using SCR. The unit has been successfully source test. (SJVUAPCD 6/99.)

IV.C.4 Retrofit Off-Road Mobile Sources

The U.S. EPA has provided guidance (Howenkamp 3/14/00[72]) on developing mobile source emission reduction credits and approved this approach to offset stationary source NOx emissions from the recently licensed Otay Mesa Power Plant in San Diego.[73] Because offset requirements as mandated 5-177

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[69] See, for example, Western Environmental Services, Emission Performance Testing of One Boiler, U.S. Borax, Wilmington, California, December 21, 1995; Best Environmental, Inc., Emission Test Report for One Nebraska Boiler Located at the Morning Star Packing Co., 13448 S. Volta Rd., Los Banos, CA, December 26, 1994.

[70] Carnot, Final Report 1997 Emission Compliance Tests at the Crockett Cogeneration Facility, August 1997; The Avogadro Group, Final Report for 1998 Emission Compliance Tests at Crockett Cogeneration Crockett, California, July 24, 1998.

[71] SCAQMD, BACT Determination, Application No. 352348.

[72] David P. Howekamp, Director, Air Division, EPA Region 9, to Richard Sommerville, Air Pollution Control Officer, San Diego County, March 14, 2000, Re: Mobile Emission Reduction Credits.

[73] www.epa.gov/OMS/retrofit/exotaymesa.htm.

by federal law are more stringent than CEQA mitigation requirements, this is clear evidence that marine and other mobile source retrofits are candidates for mitigation under CEQA. Thus, retrofitting, replacing, or controlling engines in marine and rail applications should be required as CEQA mitigation, using the framework established in EPA's guidance.

5-177 cont'd

Marine Retrofits. The EPA mobile source offset guidance opined that permanent and enforceable emission reductions could be obtained by using clean diesel fuel and repowered engines in marine sources. The requirements to assure that the reductions are permanent and enforceable included: (1) the marine vessels must operate in, or in close proximity to shore, (2) the useful life of the replacement engines must be longer than it would take the SCAQMD to reach attainment, (3) pre- and post-retrofit emissions must be monitored to quantify the reductions, and (4) monitoring must be repeated every 5 years to confirm continuous compliance.

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Tugs at a number of U.S. ports have been repowered with low-emission engines (e.g., Caterpillar, Cummins engines) or existing engines have been upgraded with retrofit kits. At the former Gaviota Marine Terminal in Santa Barbara County, support and crew vessels were required to use injection timing retard, turbocharging, and enhanced intercooling, and tanker gas turbines were required to use water injection to reduce NOx.[74]

The SBCAPCD and Santa Barbara County have investigated[75] and implemented CEQA marine emission control measures for at least a decade to mitigate emissions from offshore oil and gas operations. The types of vessels that are permitted to call at terminals and piers have also been restricted. Tankers that formerly called at the Gaviota Marine Terminal were restricted to Oregon gas turbines retrofitted with water injection to control NOx. Enforceable permit limits on the sulfur content of fuel (0.2% S) used in crew and supply ships are used to limit SOx emissions.

5-179

Emission controls are required on most crew and supply vessels that service offshore platforms, including reduced cruising speeds and enforceable marine diesel engine modifications such as 4 degrees of injection timing retard, turbocharging, and enhanced intercooling. Many local marine vessels have been repowered with low-emission marine diesel engines to obtain emission offset credits (ERCs) or to mitigate impacts under CEQA, including trawlers, fishing

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[74] County of Santa Barbara, State Lands Commission, U.S. Army Corps of Engineers, and California Office of Environmental Protection, GTC Gaviota Marine Terminal Project Final Supplemental Environmental Impact Report/Statement, Volume I, August 3, 1992, pp. B-8, C.2-26, F-45.

[75] Santa Barbara County Air Pollution Control District (SBCAPCD), Crew and Supply Boat NOx Control Development Program, June 1987.

vessels, day-time touring craft, crew boats, and supply boats. These repowers resulted in a NOx cost effectiveness of $1,214 per ton. Typical projects and their cost effectiveness, based on a 10-year project life, are summarized in Table 2.[76] Additional information for some of the larger repowers is provided in Table 3.

The SCAQMD's Technology Advancement Office co-sponsored the repowering of the Patcona II tugboat with low-emission diesel engines. The tugboat, owned by Connolly-Pacific Co. of Long Beach, is used primarily to haul barges of quarry rocks from Santa Catalina Island to the Port of Los Angeles. The tug's twin 675-hp engines were replaced with new, specially tuned Detroit Diesel engines. NOx emissions were minimized by electronically controlling fuel injection, cooling the turbocharged engine, and installing a crankcase vapor recovery system. Sea trials confirmed that the new engines emit 69% less NOx, reducing annual emissions by about 50 tons. The new engines also reduce CO by 95% and burn 22% less fuel on a per horsepower basis. The NOx cost effectiveness for a 10 yr operating life is about $1,010/ton.[77] Thus, the applicant could repower tugs that service the nearby Port of Long Beach, including ships that deliver its products.

SCR and oxidation catalysts are also in use on marine vessels. Hug, a Swiss engineering firm, has installed SCR and oxidation catalysts in numerous marine applications since 1995, including ferries, ice breakers, supply vessels, naval ships, and many others amounting to 188,00 hp of power output and operating for 336,000 hour per year. Most of these applications are in Switzerland. However, two workboats are in operation in the U.S. and one navy vessel in England. See Hug installation list in Exhibit 4. Steuler, a German engineering firm, has installed SCR and oxidation catalysts on a Norweigan supply ship and eight dredge barges operated by Great Lakes Dredge & Dock in Illinois. See Steuler application list in Exhibit 5. This technology is currently offered in the United States by Steuler and Miratech. A marine vessel that services USS Posco in the Bay Area has used SCR for nearly a decade. Thus, SCR is clearly feasible for marine applications. The applicant could retrofit tugs that service the nearby Port of Long Beach to mitigate its NOx emissions.

Locomotives. In 1993, CARB evaluated the use of SCR on locomotives and concluded that it was both technically feasible and cost effective at $3,433 per ton

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[76] Personal Communication, Mike Goldman, Permit Engineer, 805-961-8821, and Eric Peterson, Innovative Technology Group 805-961-8824, SBCAPCD.

[77] This and other research news from air quality management districts around the State is reported at www.aqmd.gov. The SCAQMD tugboat information is at /news/tugboat.html and /pubinfo/ad98v5n5.html.

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