of NOx removed. (CARB 1994.[78]) In 1997, CARB again evaluated SCR and a number of other control options for locomotives, including alternative fuels, engine modifications, engine retrofits, reduction in fuel consumption, and electrification. CARB concluded there were many technically feasible and cost effective methods to control locomotive emissions.[79] The Carl Moyer Program includes locomotive projects and Ventura County APCD has funded several with its Moyer funding.[80]

SCR and other post-combustion controls are used on large mobile diesel engines in Europe where more stringent regulations require it. 5-183 cont'd
Hug, a Swiss engineering firm, has installed SCR, particulate traps, and/or oxidation catalysts on over 14 locomotives in Europe since 1996. NOx reductions in excess of 95% have been achieved on these locomotives using urea injection. See Hug installation list in Exhibit 1. Steuler, a German engineering firm, has installed SCR and oxidation catalysts on 11 locomotives in Switzerland and France since 1989. See Steuler installation list in Exhibit 3. In the U.S., Peerless, Steuler, Miratech, and Engelhard will quote SCR installations on locomotives. Thus, the applicant could work with a railroad that serves the local area to fund a SCR (for NOx) and oxidation catalyst (for VOC) demonstration program as CEQA mitigation.

IV.C.5 Ultra Low-Sulfur Diesel

Sulfur in fuels is converted into sulfur dioxide (SO_2) and sulfur trioxide (SO_3) during combustion. Sulfur trioxide combines with moisture in the exhaust gas, forming sulfuric acid, which contributes to PM10 emissions. 5-184
Thus, PM10 and SOx emissions could be reduced by using ultra low sulfur fuel, 15 ppmw to 30 ppmw, in the truck fleets that service the Refinery and blending terminals.

Most fuel currently used in stationary and mobile diesel engines in California contains 0.05% sulfur (500 ppmw). 5-185
Lower sulfur fuels, as low as 15 ppm, have been required elsewhere, where available. The BACT guidelines for fuel sulfur for diesel generators in the SJVUAPCD, for example, require the use of <15 ppmw diesel, when available. The California Energy Commission (CEC) has also required the use of ultra low sulfur fuel where available, including in the

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[78] California Air Resources Board, Controlling Locomotive Emissions in California, Report Prepared by Christopher S. Weaver, Engine, Fuel, and Emissions Engineering, Inc., Sacramento, for the CARB.

[79] C.S. Weaver and D.G. McGregor, Controlling Locomotive Emissions in California: Technology, Cost-Effectiveness, and Regulatory Strategy, 1997. See also Research Notes, February 1997 at www.arb.ca.gov/research/resnotes/notes/97-4.htm.

[80] Ventura County Air Pollution Control District, Locomotive Project Applications, Fiscal Year 2000/2001, May 18, 2000.

recently decided cases of Thee Mountain Power[81] and Huntington Beach (exclusive use of 15 ppm S fuel).[82] Similarly, New York is currently adopting regulations that will require the use of ultra low sulfur fuel for diesel generators.[83]

Ultra low sulfur fuels are currently available in the South Coast from the nearby Arco Refinery and could be required for all diesel-fired Refinery equipment and truck fleets that serve the Refinery and/or are controlled by the applicant and/or its contractors. 5-185 cont'd

CONTAMINATED SOILS

[81] California Energy Commission, Commission Decision, Three Mountain Power Plant Project, May 2001, Condition AQ-26, p. 142.

[82] California Energy Commission, Commission Decision, Huntington Beach Generating Station Retool Project, May 2001, Condition AQ-C2, p. 30.

[83] New York State Department of Environmental Conservation, DEC to Regulate Emissions from Distributed Generation, May 3, 2001 www.dec.state.ny.us/website/press/pressrel/2001-69.html.

V. IMPACTS OF CONTAMINTED SOILS ON WORKERS NOT EVALUATED

The DEIR concedes that contaminated soils are likely to be encountered during construction. The DEIR notes, for example, that "Previous construction activities have been conducted at the Refinery and contaminated soils have been uncovered. Given the heavily industrialized nature of the site, the fact that the site overlies the Wilmington Oil Field and that refining activities have been conducted at the site since the 1970s, contaminated soils may be uncovered during construction activities. It is not uncommon for a refinery and other types of industrial properties to contain contaminated soils and ground water." (DEIR, p. 4-23.) 5-186

Trenching for the pipelines is also likely to encounter contaminated soils. "There is a possibility that contaminated soil will be encountered during construction of the pipeline since there has been a significant amount of industrial development in the vicinity of the pipeline route." (DEIR, p. 4-23.)

Nevertheless, the DEIR fails to evaluate the impacts of contaminated soils on construction workers. It also declines to require any mitigation, arguing that existing regulations are adequate to address this issue. However, the DEIR fails to discuss all of the impacts of this contamination. Further, these two mitigation measures are not adequate to mitigate the impacts to a less than significant level. (DEIR, p. 4-23.)

V.A Reliance On Existing Laws Not Adequate

The DEIR ignores the impact of contaminated soils on construction workers, arguing that they are regulated under California hazardous waste regulations, *viz.*, "Numerous state and federal rules and regulations govern the discovery, testing, and ultimate fate of hazardous materials so that compliance with these requirements is expected to minimize the potential for significant impacts." (DEIR, p. 4-23.) 5-187

Existing laws and regulations do not address construction at contaminated sites. These measures provide no means to identify undiscovered contamination during construction, creating a situation in which construction workers could be adversely exposed to undiscovered contaminated soils and groundwaters. Further, these rules and regulations do not require that all contamination is remediated prior to the start of construction, thus allowing exposure even if the contamination is discovered. In fact, the hazardous waste regulations in Title 22 do not address construction in contaminated properties at all. Thus, significant exposures are possible and unmitigated.

V.B Impacts Of Construction At Contaminated Sites Are Significant

Workers are exposed to contaminated soils and vapors during construction through ingestion, inhalation, and dermal absorption. Contaminants present in disturbed soils could cause cancer and temporary or permanent damage to the eyes, ears, skin, internal organs, or the nervous and circulation system of workers.

Dusts are generated and inhaled by construction workers during all phases of construction, but particularly during grading, excavation, and utility and pipeline trenching. In addition to dust, vapors may also be released during construction, particularly in areas with hydrocarbon contamination, as here. As a result of construction activities, such as grading and excavation, vapors could migrate to the surface and be inhaled by workers. Hydrocarbon and petroleum vapors would be expected to contain substantial amounts of benzene, a carcinogen and toluene, a neurotoxin, among others. 5-188

Workers' exposed skin (i.e., face, neck, hands, arms, and sometimes torso and thighs, particularly if loose-fitting clothing is worn) frequently becomes coated with wet muddy soil during construction. Contaminants, particularly fat-soluble compounds like polynuclear aromatic hydrocarbons ("PAHs") that are commonly present in petroleum-contaminated soil, can migrate from the soil through the skin and into the body.[84] Construction workers also commonly accidentally ingest dirt, transferred from dirty hands or tools. Dirt ingestion is often the major exposure route for construction workers.

Construction workers are also likely to encounter toxic chemicals from buried structures such as pipelines during earthmoving activities. Inadvertent

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[84] Thomas E. McKone, Dermal Uptake of Organic Chemicals from a Soil Matrix, Risk Analysis, v. 10, no. 3, pp. 407-31, 1990; R.A. Howd and T. E. McKone, Dermal Uptake of Chemicals at Hazardous Waste Sites, The Toxicologist, v. 11, 1991, pp. 193-102; Ronald C. Wester and others, Percutaneous Absorption of [^{14}C]DDT and [^{14}C]Benzo(a)pyrene from Soil, Fundamental and Applied Toxicology, v. 15, 1990, pp. 510-516; Thomas J. Franz, Absorption of Petroleum Products Across the Skin of the Monkey and Miniature Pig, American Petroleum Institute, Annual Report, March 15, 1979 to March 14, 1980; D. Goon, N.S. Hatoum, J.D. Jernigan, S.L. Schmitt, and P.J. Garvin, Pharmacokinetics and Oral Bioavailability of Soil-Adsorbed Benzo(a)pyrene (BaP) in Rats, The Toxicologist, v. 10, no. 1, February 1990, p. 218; D. Goon, N.S. Hatoum, M.J. Klan, J.D. Jernigan, and R.G. Farmer, Oral Bioavailability of "Aged" Soil-Adsorbed Benzo(a)pyrene (BaP) in Rats, The Toxicologist, v. 11, no. 1, February 1991, p. 345; John C. Kissel and David R. McAvoy, Reevaluation of the Dermal Bioavailability of 2,3,7,8-TCDD in Soil, Hazardous Waste & Hazardous Materials, v. 6, no. 3, 1989, pp. 231-240; T.A. Roy, J.J. Yang, A.J. Krueger, and C.R. Mackerer, In Vitro Percutaneous Absorption of Benzo(a)pyrene (BaP) from Crude Oil Sorbed on Soil Using Rat and Human Skin, The Toxicologist, v. 12, no. 1, February 1992, p. 114; In Vitro and In Vivo Percutaneous Absorption of Benzo(a)pyrene from Petroleum Crude-Fortified Soil in the Rat, Bulletin of Environmental Contamination and Toxicology, v. 43, 1989, pp. 207-214.

discovery of buried pipelines during soil removal could pose a possible explosion hazard or result in the release of stored materials, such as fuels or solvents. Hazardous fumes, mists, or vapors, such as pockets of methane, could also be encountered. Removal activities could pose both health and safety risks.

These types of impacts are normally addressed prior to construction by performing a health risk assessment using the results from site assessments. The health risks of working in contaminated soil are typically significant and require mitigation. They cannot be estimated here because the DEIR did not perform a site assessment to identify the types, amounts, and locations of contaminants. 5-188 cont'd

V.C Mitigation Should Be Required For Contaminated Soils

The DEIR recognizes that currently undiscovered contamination may be encountered during construction, but does nothing about it. This is a serious deficiency because most contamination cannot be identified without the aid of a surveillance and monitoring program carried out by trained personnel. Observation can only identify the grossest indicators of contamination, such as buried tanks and pipelines, zones containing fragments of landfilled material, oily deposits, or highly odoriferous materials. Most contamination does not leave a trail of observable clues. There are numerous contaminants that are likely to be present that cannot be identified by appearance and smell, including metals, organic solvents, and benzene, toluene, ethylbenzene, and xylene ("BTEX"). Therefore, without requiring mitigation, there is no way to assure that workers and subsequent site occupants would not be exposed and potentially harmed. This is a significant impact that was not considered in the DEIR. 5-189

Normally, the accidental discovery of contaminated soils is addressed by preparing a Phase II Site Assessment of areas not previously characterized and implementing a construction monitoring program. The DEIR should be revised to incorporate the mitigation measures discussed below to assure that contaminated soils are identified and remediated before construction commences.

V.C.1 Phase II Site Assessment

Normally, to assure that construction workers are protected from undiscovered contamination in previously uncharacterized areas where contamination is likely, as here, soil and soil gas sampling is conducted prior to the start of construction. The resulting data are used to prepare a health risk assessment to evaluate impacts to construction workers. If significant risks are found, cleanup levels are set to protect construction workers and the site is remediated before the start of construction. Because Phase II Site Assessments 5-190 ordinarily require public review, these tasks are normally completed as part of CEQA compliance.

To help minimize the chance that workers will be exposed to undiscovered contamination, a Phase II site assessment should be conducted at all sites that have not been previously adequately characterized. Many cities require sampling prior to construction in areas with a long history of industrial use. The City of San Francisco, for example, requires building permit applicants proposing to disturb 50 cubic yards of soil to assess the soil for possible hazardous waste. Where hazardous wastes are found in excess of standards, the permit applicant is required to submit a site mitigation plan and certify its completion prior to issuance of a building permit.[85] 5-190 cont'd

This program should include surface and subsurface soil sampling and groundwater sampling for EPA 6010 metals, EPA 8024 volatile organic compounds, EPA 8260 semivolatile organics compounds, pesticides, and gasoline and diesel fractions of total petroleum hydrocarbons. The resulting data should be screened using EPA preliminary remediation goals, or other similar cleanup levels developed by other state agencies, e.g., City of Oakland, Regional Water Quality Control Board. If screening levels are exceeded, a health risk assessment should be conducted to evaluate the impact of site contamination on construction workers, off-site receptors, and future site occupants.

V.C.2. Construction Monitoring Program

A construction monitoring program should be required to help identify undiscovered contamination during construction. This program would include continuous visual surveillance and monitoring by a trained professional of soils and gases during any construction activities that disturbed soil, e.g., grading, excavating. 5-191

The program should require that a registered (REA II) Environmental Professional ("EP") or comparably qualified and registered individual use both a handheld photoionization detector ("PID") and a flame ionization detector ("FID") to monitor gases emitted by each load of excavated soil. A minimum of one sample should be collected from every 1,000 yd^3 of excavated soil and analyzed on-site using a mobile lab, or sent off-site for analysis on an expedited schedule (24 hr turnaround) for all contaminants identified during the Phase II Site Assessment.

[85] San Francisco Public Works Code, Article 20, Sec. 1000 *et seq.*, "Analyzing the Soil for Hazardous Waste."

In addition, perimeter monitoring should be conducted throughout excavation and grading for PM_{10} and all of the contaminants identified during the Phase II. Thresholds of concern should be established and reporting procedures should be developed to determine when a problem has been identified and how to report and investigate it. 5-192

If any evidence of contamination is identified, this mitigation measure should explicitly require that all construction be immediately suspended until the finding is thoroughly investigated and remediated to the satisfaction of the responsible regulatory agency. The EP should be empowered to shutdown the project and assure that it remain shutdown until any identified problem is fully investigated and remediated to the satisfaction of the EP and oversight agencies. 5-193

The EP should be continuously on-site during all earth moving activities and must personally inspect unearthed soils. The EP must be independent of the Construction Manager, whose goal is to complete the project on time and within budget, not protect construction workers. The EP should work under the direction of the local oversight agency.

Other agencies have required similar mitigation measures in EIRs to protect construction workers when building projects on formerly contaminated sites. These include redevelopment of the Southern Pacific Railyard (City of Sacramento 12/93, 10/94.[86]), the new federal courthouse in Sacramento (City of Sacramento 1994[87]), and the Padres Ballpark in San Diego. (City of San Diego 10/99 and CCRP 7/99.[88]) 5-194

The Southern Pacific Railyard site, a 265-acre former railyard located in Sacramento, was used from the 1860s until the 1990s for locomotive maintenance and refurbishing. The EIR to redevelop the site required that contamination be remediated prior to construction. It further acknowledged that "previously unidentified pockets of contamination could be discovered during construction"

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[86] City of Sacramento, Final Environmental Impact Report, Railyards Specific Plan and Richards Boulevard Area Plan, Prepared by EIP Associates, December 1993; City of Sacramento, Final Supplemental Environmental Impact Report, Railyards Specific Plan and Richards Boulevard Area Plan, Prepared by EIP Associates, October 1994.

[87] City of Sacramento, Final Environmental Impact Statement/Environmental Impact Report, Sacramento Federal Building, United States Courthouse, City of Sacramento, California, June 10, 1994.

[88] City of San Diego, Master Workplan, Portion of the East Village Redevelopment Area Environmental Remediation, Volume I, Prepared by Centre City Development Corporation on Behalf of the Redevelopment Agency of San Diego, July 230, 1999, Appendix C and Centre City Development Corporation (CCRP), Final Subsequent Environmental Impact Report, Ballpark and Ancillary Development Projects, and Associated Plan Amendments, October 1999.

and required the following mitigation measures to protect construction workers (City of Sacramento 12/93,[89] pp. 4.13-61/62):

- Each parcel had to be cleaned up at the time of development to protect construction workers;
- A Health and Safety Plan had to be prepared prior to construction that included personal protective equipment and on-site continuous air quality monitoring during construction; 5-194 cont'd
- Reconnaissance sampling was required during construction in all areas where excavation would occur, unless covered by a final Remedial Action Plan;

An environmental site inspector, reporting to the City and oversight agency, had to be present during construction to detect previously undiscovered contamination.

V.C.3 Other Mitigation Measures

In addition to the two measures recommended above, other mitigation measures that have been required as CEQA mitigation to address construction in potentially contaminated properties include:

- All utility and construction workers should receive 40 hrs of OSHA health and safety training. The Hazardous Waste Operations and Emergency Response ("HAZWOPER") regulations at 29 CFR §1910.120 and Title 8 CCR § 5192 (FSA 10/14/99, p. 6) specifically cover workers at hazardous waste sites. However, these regulations would not normally apply to routine construction activities. 5-195
- Deed restrictions should be used to limit future property uses for all properties that are not remediated to single-family residential use standards. 5-196
- Perimeter air monitoring coupled with periodic risk assessments should be required throughout remediation and construction to assure that the public and workers are not adversely exposed. 5-197

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[89] City of Sacramento, Final Environmental Impact Report, Railyards Specific Plan and Richards Boulevard Area Plan, Prepared by EIP Associates, December 1993.

- Site Health and Safety Plans and Risk Management Plans should be required for all construction sites that establish policies and procedures to protect workers and the public from unanticipated potential hazards. These may include, for example, the use of monitoring equipment during construction, emergency response procedures, personal protection equipment, and provisions for odor control. 5-198

- All utility corridors should be remediated to standards protective of utility (pipeline) workers before infrastructure improvements are made. 5-199

- Buffer zones should be required between active remediation sites and adjacent construction sites and/or occupied properties. 5-200

- Where migration of contaminated soil gases and groundwater in porous trench backfills is a potential hazard, impermeable barriers should be used to limit migration. These may include plugs of clay, cement, or a cement/bentonite mixture or use of in-pace barrier collars around pipes. 5-201

- Sump pumps should preferentially be used for localized dewatering of shallow groundwaters to avoid widespread effects on groundwater flow patterns and distribution of contaminants in adjacent groundwaters. Deeper excavations should be encircled with interlocked sheetpiles to limit groundwater flow into the excavation. 5-202

WATER QUALITY IMPACTS

VI. WATER QUALITY IMPACTS ARE POTENTIALLY SIGNIFICANT

The DEIR concluded that the removal of MTBE from gasoline would provide a water quality benefit because gasoline releases containing MTBE are more difficult and costly to remediate than gasoline releases that do not contain MTBE. The DEIR also concluded that "ethanol will likely preferentially biodegrade in ground water compared with other gasoline components. As a result, the levels of other gasoline components in water may decline more slowly and the gasoline plumes may extend further than they would have without ethanol present." (DEIR, p. 4-39.) The DEIR does not explain the basis of its claims, which are at odds with authoritative sources. 5-203

The DEIR's conclusions disagree with studies conducted for the California Environmental Policy Council ("EPC Report")[90] and summarized in a refereed journal article.[91] The EPC Ethanol Report concluded that in areas with existing hydrocarbon contamination, ethanol could increase the concentration of hydrophobic compounds such as benzene in groundwater and increase the distance that they would travel from a contaminated site, the exact opposite of the DEIR's conclusion.

Compounds in standard gasoline are relatively immiscible in water, and, thus, benzene and other similar compounds tend to remain in the hydrocarbon phase which can be removed by pump and treat systems. However, ethanol is highly soluble and could leach benzene and other contaminants from the hydrocarbon phase, from which they can be readily recovered, into the aqueous groundwater phase, from which they cannot be readily recovered. 5-204

These findings are particularly important to this project because hydrocarbon contamination currently exists in groundwater in the vicinity of the offsite blending terminals. Ethanol would be stored and distributed out of the GATX Terminal in Carson. In addition, Ultramar currently uses third-party terminals located in Carson, Colton, Orange, and Wilmington. (DEIR, p. 2-14.)

Large areas of the GATX Terminal are underlain by light nonaqueous phase liquids ("LNAPL") consisting of petroleum hydrocarbons containing very high concentrations of benzene, toluene, ethylbenzene. A product recovery system is in operation, and over 700,000 gallons have been recovered.[92] Groundwater contamination is also present at the nearby Arco Carson Terminal. 5-205 Diesel, gasoline, benzene, toluene, ethylbenzene, xylenes, and chlorinated organics have been detection in groundwater.[93] It is likely that similar contamination also exists at the other off-site distribution terminals as tank and pipeline leaks at marketing terminals are common. A 1994 American Petroleum Institute survey found that 85% of monitored aboveground storage tanks reported groundwater contamination.[94]

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[90] Health and Environmental Assessment of the Use of Ethanol as a Fuel Oxygenate, Report to the California Environmental Policy Council in Response to Executive Order D-5-99, December 1999.

[91] S.E. Powers, D. Rice, B. Dooher, and P.J.J. Alvarez, Will Ethanol-Blended Gasoline Affect Groundwater Quality?" Environmental Science & Technology, v. 35, no. 1, 2001, pp. 24A - 30A.

[92] KOMEX-H2O Science, Semiannual Progress Report, January Through June 1998, GATX Carson Terminal, 2000 Sepulveda Boulevard, Carson, California, July 31, 1998.

[93] Montgomery Watson, Quarterly Groundwater Monitoring Report, Carson Terminal, Facility 37T, 2149 Sepulveda Boulevard, Carson, California, June 19, 1995.

[94] Health and Environmental Assessment of the Use of Ethanol as a Fuel Oxygenate, Report to the California Environmental Policy Council in Response to Executive Order D-5-99, December 1999.

Thus, leaks of ethanol at off-site distribution terminals and elsewhere could aggravate existing groundwater contamination problems, increasing the concentrations of benzene and other toxic substances in local groundwaters and complicating on-going remediation efforts. The DEIR should be revised to review the contamination present at off-site distribution terminals and to evaluate the impact of potential ethanol leakage on this contamination. Mitigation should be imposed to assure that ethanol tanks do not leak, such as requiring double-bottom tanks.