



Crude Reckoning:

The Impact of Petroleum on California's Public Health and Environment

Introduction

The production, refining, distribution and use of gasoline and petroleum fuels has long degraded California's environment. These activities contaminate coastal waters, foul our air, surface and ground water, pollute our cities, endanger public health, and cast a dark cloud over our economic future. Our persistent reliance on gasoline and petroleum fuels for transportation represents one of the greatest threats to California's environment and health. This report both confirms and illustrates our concerns.

At this time, we did not plan to conduct original research exploring the severe impact of gasoline and petroleum fuels on California's environment, public health and economy. Instead, this report lays out – in graphic detail – the footprint of the oil and gasoline industry's impact on California, providing a roadmap for our future work. Our methodology includes assembling case studies, summarizing reports, and surveying the literature in this field.

The first step in solving a problem is accepting that a problem exists. That's why we've produced this report. It's a wake up call to the public – and to California's elected and appointed decision-makers.





About CEERT:

CEERT is a nonprofit public-benefit organization founded in 1990 in Sacramento to bring together concerned scientists, environmentalists, public interest advocates, and innovative energy technology companies – all of whom share a vision to benefit the environment with sustainable solutions to California’s growing appetite for energy. This productive collaboration of public and private interests has helped foster an emerging consensus for applying clean technologies to longstanding economic, political, and environmental problems. This report is the first product of a new project for CEERT, with the goal of building evidentiary and public support for the application of new, non-polluting technology solutions in the transportation sector.

CEERT is governed by a 13-member board of directors composed of representatives for leading environmental, public interest, and renewable energy companies and groups. Its executive director is V. John White. For more information about CEERT or its staff, board, funders, or projects, visit our website at www.cleanpower.org, or call us toll free at (877) 758-4462.

Who we are:

This report is the debut effort by *California Gasoline Accountability Project*, a project of the nonprofit *Center for Energy Efficiency and Renewable Technologies* (CEERT). The Project is dedicated to educating the public about the dangers, and environmental and public health costs stemming from our addiction to gasoline and other petroleum products. Public awareness efforts will continue through public testimony, our web site (www.cleanpower.org), and additional educational materials and events.

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Summary

Consumers and motorists can easily see the price of gasoline on the pump at the gas station. What is not quite so apparent to most Californians is the enormous costs they pay in other ways... such as increased food costs because of damage to our commercial fisheries, or increased insurance premiums to cover treating asthma due to diesel combustion particulates. Many of these externalized costs – like the loss of blue skies to smog — may be hard to put in dollar terms.

In this report, we examined the many ways that production of petroleum-based fuels causes significant environmental and health damage at every step – despoiling coastal waters and beaches during oil extraction, contaminating soil and groundwater during shipping of crude oil, causing injuries, deaths and air pollution during refining, creating more hazards and water pollution while distributing to local markets, and air pollution from engines that burn these fuels.

The last stage of the marketing and production chain – burning petroleum fuels in internal combustion engines – is a 19th Century Victorian technology. This aging fuel strategy is still the foundation of our transportation system. The hazards we illustrate in this report compellingly argue that California must develop new technologies to carry people and goods – and immediately begin the long process of weaning our state and economy from their dependence on this harmful fuel.

Gasoline: Hazardous to our Health and Environs

Gasoline is one of the greatest environmental hazards in California, creating risks to public health, causing serious economic losses, and enduring environmental damage.

Consider just one example of the economic losses passed along to citizens of our state: Pollution from smog associated with cars and trucks causes an estimated \$300 million in annual losses to California agriculture. ¹ The free market often fails to attach these costs to oil and gas prices. We intend, as a future project, to estimate the overall external costs related to petroleum fuel usage in California.

This report outlines many of the hazards posed by gasoline and petroleum fuels. At every step, they cause significant environmental damage: drilling, transportation, refining, consumption, and waste disposal:

- The probability of one or more major spills occurring from all off shore oil drilling is 99+% (page 13).
- One spill from an onshore Unocal oil field has created a disaster bigger than the *Exxon Valdez*, leaking more than 9 million gallons of oil and chemicals into the Guadalupe-Nipomo Dunes System and resulting in a \$43.8 million legal settlement (page 14).
- Oil and gasoline pipeline accidents account for nearly 8 times as many major accidents per mile of pipeline as pipelines that transport natural gas to homes and businesses (page 18).
- The Chevron refinery at Richmond, responsible for deaths, injuries and releases of hazardous air contaminants into the surrounding community, is also, according to the EPA, the California facility with the highest rate of leaking pipes. Though the refinery reported leaks at only 179 of 7,694 valves at the plant (2.3%), when the EPA checked, it found leaks in 354 valves of 3,363 tested – a rate of 10.5% (page 26).



- Another Bay Area refinery, TOSCO, was charged with 16 willful violations after a 1999 explosion that killed four workers, the most violations ever alleged against a single California employer. This followed six other major TOSCO accidents (page 26).
- A Chevron plant in El Segundo, next to LAX, has leaked hundred of millions of gallons of crude oil and refined products into groundwater since the 1960s, creating one of the world's worst oil spills. In 1988, Chevron estimated that 252 million gallons were floating on top of the groundwater (page 28).
- A Congressional Investigation found that oil refineries are one of the top sources of air pollution in the US: The single largest stationary sources of volatile organic compounds, the primary component of urban smog. The same report identified refineries as the fourth largest industrial source of toxic emissions and the single largest source of benzene emissions, linked with aplastic anemia and cancer (page 29).
- California is also cited by the same report as ranked third in the country for most affected by unreported fugitive emissions (page 29). In 1997, the last year for which data is available, oil refineries released over 58 million pounds of assorted toxic air pollutants, continuing to be some of the worst offenders in the state (page 30).
- 85% of all petroleum fuel storage facilities, excluding retail gas stations, are known to be polluting groundwater, a number one report expects is low (page 33).
- One leaking storage facility leaked 384,000 gallons of crude oil, resulting in the excavation and reconstruction of the entire downtown of the community Avila Beach. The full extent of the contamination is not yet publicly known (page 34).
- 90% of all of California's leaking underground tanks contain petroleum products. By 1998, some 3,486 groundwater sites had been identified as contaminated with the gasoline additive MTBE. MTBE, unlike many other petroleum contaminants, dissolves easily in water, travels at the same speed through aquifers, and doesn't degrade (page 37).
- 230 pounds per day, or almost 43 tons of MTBE per year, discharge from oil refineries into San Francisco Bay, and almost 600 pounds per day, or 110 tons, are discharged from refineries into Santa Monica Bay (page 38).
- Air pollution caused by cars, trucks and other vehicles burning petroleum fuels is one of the most harmful and ubiquitous environmental problems in the state. Passenger vehicles are the largest source of carbon monoxide, and the second largest source of hydrocarbons and nitrogen oxides. California had the highest number of smog days in 1999 of all states in the United States (pages 39 and 40).
- Scientists estimate that the number of US deaths associated with air pollution range from 50,000 to 100,000 per year. For comparison: The total number of US combat dead and missing in the Viet Nam war is estimated at 55,000 (page 40).
- A 1997 study estimates that smog pollution was responsible for more than 6 million asthma attacks, 159,000 emergency room visits and 53,000 hospitalizations nationally. 14 California counties are ranked in the top 25 smoggiest in the United States (pages 40 and 42).
- Childhood cancers and childhood leukemia rates are highest in the highest traffic density corridors. (page 42).
- Diesel exhaust is a major contributor to particulate matter concentrations in the United States. In 1995, the California Air Resources Board determined that 58% of all diesel particulates came from on-road sources, 37% from other mobile sources and only 5% from stationary sources. (page 43).
- According to the Natural Resources Defense Council, 64,000 people die prematurely from cardiopulmonary causes linked to particulate air pollution, and in the most populated cities, lives are shortened by an average of one to two years. Los Angeles tops the list, with an estimated 5,873 early deaths each year (page 44).
- Most experts agree that greenhouse gases, including CO₂ from auto and truck emissions, are causing a significant increase in temperatures, and changing weather patterns. Scientists predict a rise in sea level, major increases in plant and animal extinctions, more common and severe winter floods and summer droughts and an increase in the spread of infectious diseases (page 46).





The Oil Industry Fights to Maintain its Market: California Suffers the Consequences

In the 1980s, California took aggressive steps to mandate the introduction of cleaner burning fuels, such as methanol and natural gas. The oil companies responded with reformulated gasoline, removing some harmful components and replacing them with MTBE.

The oil companies waged an aggressive campaign, arguing that alternative fuels weren't needed, and that the best solution was cleaner burning gasoline² with MTBE – thus ensuring that California transportation remained heavily reliant on fossil-based fuels.

At the same time, oil and gasoline companies knowingly failed to clearly inform policy-makers about the hazards of MTBE – which, while making gasoline cleaner burning – poses significant likelihood of groundwater contamination. Reacting to this groundwater contamination, the Governor and Legislature recently banned MTBE (beginning in 2002), replacing it with ethanol. Ethanol use can result in higher evaporative emissions, reduced gasoline supplies, and increased pump prices for consumers. But the oil companies, along with the auto industry, still argue against efforts to mandate or provide incentives for alternative fuels and zero-emission vehicles.

The oil industry didn't just seek to pass some of their costs along to the public. Oil and gasoline companies have also sought subsidies and cash – directly from the public till. Amazingly, while the top 10 California oil producers enjoyed over *\$20 billion* in profits in 1996, these same oil companies also received direct subsidies totaling *\$129 million* in 1997.³

As with tobacco, the solution is to quit.

As any longtime smoker will attest, that is not a simple solution. Quitting can take time and involve interim steps that are, at best, half measures.

Weaning California from its dependence on gasoline and diesel will take considerable time. While we are doing so, oil companies must make these fuels less polluting. Cleaner burning fuels will help... but oil companies must also address the damage caused by the other stages of the petroleum fuel cycle. Moreover, the Governor and the Legislature should hold the industry accountable.



So, we must insist on measurable progress towards cutting our addiction. Californians can simultaneously improve their health, cut global warming, and save millions of dollars at the pump – only if we reduce our reliance on petroleum fuels. As with quitting cigarettes, we *can* make the change.

Solutions

1. Expand Use of Zero Emissions Vehicles

Over the long term, we must acquire new means to power transportation – and move away from our heavy reliance on gasoline. We must move aggressively to promote the production, marketing, and use of Zero Emissions Vehicles (ZEV), hydrogen/methanol fuel cell vehicles, and fuel-efficient hybrids.

- The California Air Resources Board (CARB) should officially recognize the full benefits of ZEV, hybrid and hydrogen/methanol fuel cell programs.
- CARB should begin to articulate the necessity for California to move away from petroleum dependence in transportation.
- Strong ZEV, hybrid and fuel cell programs are a first and necessary step on the path to sustainable mobility. Current requirements are only the beginning. Diesel hybrids, however, should not be accorded any enhanced air quality credits offered to gasoline hybrids. The program must expand over time, to reach 100% zero emissions transportation.
- Begin the true market launch now. We must ramp up to meet the current goals by 2003, by providing a variety of products for a variety of applications, including full size vehicles. Auto distributors and dealers must market ZEV and hybrids in good faith, at competitive prices, with consumer support.
- The State of California should financially support construction of infrastructure and purchasing of ZEV.
- CARB should establish an industry government education campaign to actively promote ZEV, hybrids, fuel cell vehicles, and their benefits to public health, the environment and the economy.

2. Continue to Increase Transit Opportunities

This year – after years of neglect – our new Governor and the Legislature made a sizable investment in transportation infrastructure. Their budget appropriations included hundreds of millions for mass transit. We think this is a good thing, and we applaud them. At the same time, we encourage them to go further. California's population will climb to an estimated 80 million by the middle of the next century. Turning over our aging auto and truck fleets will take almost as long. In the interim, Californians need transit to reliably travel to their jobs, schools, and entertainment. Mass transportation must play a greater role, and therefore we must invest now. We must also promote land-use patterns that complement our transit investments.

3. Label New Cars with Automobile Health Warnings

In automobile retail showrooms, vehicles display window stickers with information about many purchase considerations, including relative fuel efficiency. To help consumers understand the many other hazards of internal combustion engines, this information must be expanded to include warnings about the impact of petrochemicals, similar to tobacco product hazard warnings (refer to the cover of this report).



4. Increase the Corporate Average Fuel Economy (CAFE) standards

The Federal government hasn't significantly raised fuel economy standards since 1975, when Congress responded to a fuel crisis by instituting the CAFE standards. By requiring auto makers to double the average fuel economy of cars between the mid 70s and 80s, Congress led the US to save 3 billion barrels of oil per day, dramatically slowing the rate of growth in US oil consumption. By increasing fuel efficiency by just 6% per year, new CAFE standards could easily reach 45 miles per gallon for cars in the next decade, saving more than \$3.2 billion. This represents more oil than we import from Saudi Arabia, Kuwait, Qatar, Bahrain, the United Arab Emirates, national offshore oil production, and estimated production from the Arctic combined. CAFE standards of 45 miles per gallon for cars, and 34 mpg for SUVs and light trucks, are easily achievable. Ford's recent announcement that they will move quickly to increase fuel efficiency by 25% in their line of SUVs is ample evidence that the technology is available. GM, within days of Ford's announcement, launched competitive plans to increase fuel efficiency in their trucks and buses.⁴

5. Oppose "Fuel Neutrality"

According to the *Wall Street Journal*, "Diesel's supporters want the state to adopt a 'fuel-neutral' approach in deciding who can participate — meaning approving any fuel that meets what they call a 'reasonable' emissions standard. They have lobbied aggressively, once demonstrating the use of green-diesel buses outside the Capitol."⁵ Diesel is responsible for much of the cancer risk in the smoggy L.A. Basin, and experts argue that so-called "clean diesel" is not nearly as environmentally beneficial as another equally feasible alternative, natural gas.

Natural gas is often found in the same fields as crude oil – but is transported in separate pipelines. In the long run we must cut our use of all fossil fuels, including natural gas. But, while there are hazards associated with natural gas, this fossil fuel is dramatically cleaner, more efficient, and less hazardous to the environment in most phases of production and use than gasoline and diesel. In the short term, natural gas is an appropriate alternative to gasoline and diesel.

6. Establish a Statewide Interagency Gasoline Impact Task Force

This report is a topical survey, revealing only the tip of the iceberg. We encourage the California Environmental Protection Agency to form a special Gasoline Impact Task Force to examine and publicly list all costs and damages associated with gasoline production, transportation, and use. The Task Force should include the Air Resources Board, the State and Regional Water Quality Control Boards, the Department of Industrial Relations, the Department of Fish and Game, the Department of Conservation Division of Oil and Gas, the California Department of Health, and others.

We encourage strong regulatory efforts to clean up gasoline and diesel fuel production and distribution – but state air regulators often overlook the overall environmental damage caused by the petroleum fuel cycle. To effectively protect the public from hazards posed by the petrochemical industry as a whole, they must begin to close the loop.

7. Improve Refinery Safety

Proper maintenance is one of many critical factors involved in reducing the number of accidents at oil refineries. The most important element to improve maintenance is an adequate, well-educated, well-trained, and



motivated workforce that is intimately familiar with all aspects of the facility. Workers can reduce refinery accidents and emissions, and suggest cleaner and more efficient production solutions. In addition, a well-trained work force, with a clear understanding of plant operations, can help prevent many mistakes made by outside contractors – a common source of emergency releases, fires, and explosions.

8. Improve storage tank protections:

Gasoline and petroleum fuels will not disappear overnight. The Governor and the Legislature must improve programs that protect soil, air and groundwater from leaking storage tanks – both above and below ground. The State Water Resources Control Board and the Regional Boards must seek additional funding for inspection of tanks and enforcement of state laws. They must work more closely with local agencies at the City and County level, to ensure that our frontline permit and inspection agencies are serving effectively to protect against leaks in local gasoline stations.

9. Oppose False Solutions:

Many of our proposed strategies are close at hand. Some will take longer. The most challenging obstacles to overcome will be auto manufacturer and oil industry resistance – and a lack of public information on what demands to make of our public decision-makers.

At the same time, some industry forces have begun campaigning to reverse environmental and public health protections. *Californians must resist these efforts.*

- a. Reformulated gas was required for all areas that failed to attain federal health-based pollution standards under authority created by the 1990 Clean Air Act. While MTBE and clean gas are weak long-term solutions, these measures provide short-term relief from deadly air pollution.
- b. Drilling the Arctic National Wildlife Refuge (ANWR) would be as shortsighted as burning the Mona Lisa to ward off a chill. The ANWR is an untamed wilderness and a priceless natural treasure. 95% of Alaska's North Slope has already been tapped. We shouldn't drill for oil in the ANWR – we should drill for oil under Detroit by raising CAFE standards.





The Five Stages of Making and Marketing Gasoline

There are six stages in the process of making and marketing gasoline. Each poses serious environmental and health hazards. At each stage, the oil industry has attempted to put safety measures and standards in place to lessen its impact on the environment and public health. Despite multimillion-dollar public relation campaigns, the industry has failed to address core issues or prevent environmental damage.

1: Field production: On and offshore

The first stage in making gasoline is the extraction of crude oil from the earth or below the ocean floor. The process causes pollution of both land and oceans, fouls pristine beaches and oceanfront communities, and pollutes the air with toxic emissions. Plants and wildlife are killed. Living systems that evolved over millions of years are destroyed.

Drilling offshore is itself a five-phase cycle. The first step involves leasing the area. This process goes through several steps but, in the end, is decided by the Secretary of Interior, who has the final say on where oil drilling is permitted. Once a lease is approved, the exploration phase begins. At this point, the oil companies dispatch geologists, who use acoustic pulses to map the ocean bottom in search of hidden oil reservoirs. When the reservoirs are detected, exploratory wells are drilled to test and retrieve samplings. The development phase starts when platforms are finally erected atop the fields. Between fifty and eighty oil and gas wells can be drilled from a single platform. The next phase is the production phase where the actual drilling is done. The average oil platform has a ten to twenty-year life span, and, when it is no longer profitable, it is shut down. Under current law, the platforms must be removed within one year after production. ⁶

2: Shipping and Storing Crude Oil

Once extracted from the earth or the ocean, oil is then shipped, stored and transported by pipeline or tanker. Processed oil moves via pipelines to storage facilities and then is directed into overland pipeline systems or to a marine terminal for sea transport by tanker. In both cases the risk of explosions, leaks or other types of accidents are inevitable.



Pipelines are connected to the actual platforms and subsea wells, which are tied in with a larger pipe connected to the shore. The marine terminals used to load the crude oil off and onto vessels for the journey to refineries also have pipeline systems connecting the berth to the shore. Once on the tanker, the tanker transports the crude between the producing areas and refineries.

3: The Refinery

The third stage in making gasoline occurs at the refinery. Petroleum contains hydrocarbon compounds with a range of boiling points and varying amounts of oxygen, sulfur, nitrogen, salt, water and trace minerals. At the refinery, the crude is separated into natural components and blended into such marketable products as diesel fuel, lubricating oil, fuel oil or gasoline.

An average size refinery releases over 10,000 gallons of oil waste to the air, water and land each day. Pollutants include such carcinogens as benzene, mercury, lead, chromium, xylene and toluene, as well as other toxic chemicals. ⁷

After the oil has been refined, it is stored in giant tank arrays before moving to market. These storage tanks are referred to as tank farms and hold billions of gallons of crude oil, gasoline, jet fuel, diesel and other petroleum products.

The typical refinery contains processing areas, storage facilities, auxiliary buildings, a dispensary and transportation system. ⁸

4: Shipping to market... and marketing

Once the oil has been refined, it once again is transported and then marketed to a variety of consumers. This process involves trucking and piping gasoline to storage facilities before reaching the public. These storage facilities also contribute to the amount of pollution caused by the oil industry at large, as, almost without fail, these tanks leak chemicals into the groundwater. Once the gasoline is at the service station, hazards result from leaks from underground storage tanks, or from air pollution from the pump and nozzle itself.

5: Combustion in vehicles

The last stage is the ultimate consumption of this product in the internal combustion engine, a 19th century Victorian invention that is still the foundation of our transportation system today. The oil and auto companies have colluded in furthering this aging technology.



With the use of this technology, eventually, every drop of gasoline ends up in the environment in the form of carbon dioxide (CO₂) or one of the more toxic pollutants such as nitrogen oxides (NO_x), sulfur oxides (SO_x), carbon monoxide (CO), volatile organic compounds (VOCs) and particulate matter (PM).

Toxic air pollutants emitted by gasoline engines include:

- Acetaldehyde
- Acrolein
- Arsenic & compounds
- 1,3-Butadiene
- Chromium & compounds
- Dioxins & Furans
- Ethylbenzene
- Formaldehyde
- n-Hexane
- Lead & compounds
- Manganese & compounds
- Methyl tert-butyl ether
- Nickel & compounds
- Polycyclic organic matter
- Propionaldehyde
- Styrene
- Toluene
- Xylenes

In cities, automobiles can cause as much as 95% of all CO₂ emissions.⁹

Over its lifetime, the average car on the road today will spew out 50 tons of CO₂ pollution into the air. CO₂ is the most significant greenhouse gas, and transportation is the largest source of CO₂ in the US, accounting for 60% of all of the country's CO₂ emissions.

Diesel engines account for nearly 20 % of the total NO_x in outdoor air and 26% of total NO_x from on-road sources. NO_x is a major contributor to ozone production and smog.¹⁰





Chapter 1

Drilling and Oil Extraction: Offshore, Onshore and Out-of-State

Since the first time the oil companies began drilling for oil in the 1860s onshore in California, and offshore in 1890s, the search for oil has not slowed. In fact, it has increased to the point where 15% of US oil production takes place in California.

Where does our oil come from?

California's oil comes from several sources. We drill the bottom of the ocean off our coasts, particularly off the coast of Santa Barbara and Long Beach. We pump it from the ground onshore as we have done at the Guadalupe oil fields. We bring it in from other states such as Alaska or other countries such as Venezuela and Columbia.

Regardless of the source, oil causes pollution and devastation to the environment and our public health. Each step of offshore or onshore development exposes the land, air and water to a myriad of dangerous pollutants. As stated in *Coastal Alert*, "The destructive legacy of offshore drilling will be with us long after the final drop of oil is drained and consumed."¹¹ This is, of course, true for onshore drilling as well.

Despite years of legislation seeking to ensure the protection of coastal waters and shorelines, serious loopholes remain in state and federal laws. For example, while on the state level, the legislature banned more leasing, it did not prohibit more drilling in existing leases. In addition, the poor regulation and oversight of operations leaves damage that usually goes undetected until after operations are terminated.

Further, in spite of insufficient scientific information regarding environmental and socioeconomic impacts, the Department of Interior still proceeds with offshore oil drilling leases. A major concern is that there is no separation of leasing from development and production during the lease sale process.

In the pre-sale process, the exact location of the oil is unknown, making it impossible to know the exact location of future facilities and to predict specific environmental impacts of development. By the time



producing reservoirs are identified, the oil companies typically have committed enormous amounts of money to the lease. The DOI has never cancelled a lease.

According to a Department of Interior study, new oil drilling off the coast of Southern California would increase the chance of a large oil spill in the region appreciably and make a major oil spill almost certain within the next 31 years. The study found one chance in seven of a “large” spill of 1,000 barrels. The probability of one or more major spills occurring from all OCS activities off Southern California is 99+%.¹²

Offshore drilling is a risky business

During offshore drilling, spills can come from many sources, including a well blowout, pipeline leaks and spills off the actual platform or rig.

A well “blowout” is probably the most damaging and threatening of all the types of spills occurring from offshore oil exploration. A well blowout is the uncontrollable discharge of oil from the drill hole, the most famous of which occurred in 1969: a ten-day oil well blowout offshore Santa Barbara. Located in Federal waters, the blowout released an estimated 80,000 barrels of oil (42 gallons per barrel). Blowouts can occur because of equipment failure or human error, or if because of unpredictable geological conditions, the pressure in the underground oil reservoir cannot be contained.¹³

The Santa Barbara spill is acknowledged as one of the events that led to the citizens’ ballot initiative Prop 20, bringing about the Coastal Commission and the beginning of comprehensive coastal planning and regulation in California. The resulting public anger also fueled the expansion of the environmental regulatory movement in the United States.

In addition to an actual blowout, wells also spill oil and discharge oily waste amounting to hundreds of thousands of gallons a year. Holding tanks on board the platforms often leak. Earthquakes, structural failures, human error and mechanical defects can rupture these on-site storage tanks.

These platform spills, while they have not been as dramatic as the 1969 well blowout, have contributed to the deteriorating condition of the waters off the shores of California. Such spills include:

- In 1991, in Ventura County, Platform Gina spilled 1,050 gallons of oil.
- In 1994, Exxon Platform Hondo spilled 2,000 gallons of oil.
- In 1995, Chevron Platform Hogan spilled 600 gallons of oil.
- In 1996, Exxon Heritage Platform spilled 10,500 gallons of oil.
- In 1997, Torch Irene Platform spilled 20,000 gallons of oil.¹⁴

Offshore drilling impacts wildlife

In addition to polluting coastal waters, offshore oil drilling has contributed to environmental damage to the shoreline and decline in wildlife populations including birds and waterfowl, fish, and mammals. Fish and shellfish larvae, and other microorganisms like plankton are extremely sensitive to even small amounts of oil and other petroleum products. One gallon of used oil spilled in one million gallons of water will kill half of all exposed Dungeness crab larvae.¹⁵



When coated with oil, sea otters and other mammals lose their insulation and suffer hypothermia, and can sustain lung, liver, and kidney damage. In fact, California's southern sea otter population is in decline. As of the summer of 1997, there were only about 2,200 otters, down four% from 1995. Birds impacted by oil spills may show effects over the long term, as well, such as breeding problems.¹⁶

Oil drilling on and offshore contributes to air pollution

Oil drilling, on and offshore, contributes significantly to air pollution. According to the Air Pollution Control District in Santa Barbara County, the total daily emission inventory for both mobile and stationary sources was 32 tons of smog producing reactive organic gases (ROGs) and 35 tons of NO_x per day in 1999. Of that, 4 tons per day of ROGs and 6 tons per day of NO_x are from the offshore oil rigs. Stationary sources produce 2,475 tons of NO_x annually – fully a quarter of that (642 tons per year) comes from just 314 engines running in the oil fields located in the northern part of the county.

Onshore oil drilling causes a disaster bigger than the Exxon Valdez spill

Background on the Guadalupe Spill:

The Guadalupe Oil Field site, located on the central coast of California approximately 15 miles south of San Luis Obispo, severely contaminated the environment in its vicinity. The Guadalupe-Nipomo Dunes system is one of the largest dune systems along the California coast. It stretches for 18 miles along the coast, from Pismo Beach to Point Sal. The area has been designated as a National Natural Landmark by the US Secretary of the Interior because of the presence of extensive sand dunes, dune uplands, lakes, and wetlands. The coastal area is also a popular recreation destination.

As the *Los Angeles Times* reported at the time of the discovery of the spill, “below this plethora of animal and plant life is a huge layer of refined oil moving steadily toward the sea. Used for 40 years by Unocal Corp. to thin tar-like Santa Maria crude, the refined oil is spread out under the former Guadalupe Oil Field in one of the biggest spills in US history.”¹⁷

Unocal acquired the field in the early 1950s and continued to operate it until March 1990. At its peak in 1988, there were 215 potential producing wells, and oil production rates for the field were approximately 4,500 barrels per day (bpd). As many as 23 wells remained in operation until April 1994. In addition, the Guadalupe Oil Field had 170 miles of pipelines used to distribute crude oil, diluent, water, chemicals and fuel gas throughout the site.

EIR Report Findings:

According to the *Environmental Impact Report* from the County of San Luis Obispo, the crude oil produced from the site was extremely viscous, with a density that caused the crude oil to behave like asphalt at ambient conditions. Unocal used several methods to enhance recovery of this heavy crude, including diluent mixing. The diluent used mostly at the Guadalupe field was a refined hydrocarbon blend that was piped into the field from the Santa Maria Refinery on the Nipomo Mesa.¹⁸ Diluent contains toxins such as benzene, toluene, ethyl-benzene and xylene (BTEX) compounds.

During the time that diluent was used at the site, numerous leaks developed in the tanks and pipelines used to distribute it around the field. Over time, these leaks led to serious contamination of the ground water below the site. Diluent accumulated in plumes at the water table in the dune sand aquifer (about 10



to 130 feet down, depending on the location). As the ground water passed through these areas, some of the diluent dissolved into the water and moved downstream with the ground water flow. This resulted in ground water contamination beneath much of the site, with a flux towards the ocean and the Santa Maria River.¹⁹ Further releases of diluent occurred between 1992 and 1994.

Covered with sage and rising as high as 90 feet, the sand dunes at the mouth of the Santa Maria River are home to bobcats, mule deer and endangered snowy plovers that nest on the beach. The thinning agent was pumped through 158 miles of pipe to 220 wells at the Guadalupe field. Unocal officials conceded that as much as 9 million gallons of oil leaked at various spots over the years.

Regulatory agencies determined that remediation of the beach site was required. Contaminated sand in the beach area was excavated to a depth of about 20 feet and removed from the beach to a treatment area. About 136,000 cubic yards of contaminated sand was treated using thermal desorption units, which vaporized the diluent and incinerated the vapors.²⁰

Legal Consequences:

This enormous environmental contamination led to the largest environmental settlement in California. On July 21, 1998, the state's lawsuit against Unocal came to a close when Unocal agreed to pay \$43.8 million in penalties. The actual cleanup of the 2,300-acre property in the southwest corner of San Luis Obispo County will take decades and cost hundreds of millions more.

The settlement included a \$1.3 million credit to Unocal for money paid in 1994 to settle related criminal charges brought by the San Luis Obispo County District Attorney's Office against several Unocal employees for concealing the fact that oil had been leaked at the field.

Ironically, this announcement came just five weeks after Unocal agreed to pay \$18 million to settle a similar lawsuit over spills in Avila Beach.²¹

Cleanup Process:

The fragile environment that surrounds the oil fields made the cleanup project difficult. The company was mandated to tread lightly as it cleaned out the Guadalupe field because of the 57 rare, threatened, or endangered species at the 3,000-acre site. The clean up force can only work in winter on the beach because of the plovers, and they cannot work at all at night because the California red-legged frog is nocturnal.

Source removal alone is expected take 10 years. According to the *Environmental Impact Report*, "This does not imply that the site would be 'clean' after ten years, rather that the sources of diluent contamination to ground water would be removed or significantly reduced. Neither does this mean that the time frame to achieve cleanup has to be ten years or less."²²

"Unocal never met a beach it didn't destroy," said Mark Massara, a Sierra Club attorney. "Unocal officials ignored oil leaks into the ocean at Guadalupe for years while surfers and fishermen were exposed to contamination." Further he said, "Why should we trust these guys? The wetlands and the estuary in Guadalupe will only have a chance of recovering after Unocal finally leaves."²³

In response to the spill, Mike Ryan, Chairman, San Luis Obispo Supervisors said, "Ongoing oil spills have contaminated the ocean, our rivers and the groundwater, as well as private properties. Offshore development presents an unacceptable risk to the valuable resources we seek to protect."²⁴



Alaska and other oil rich regions:

California imports oil from outside its borders, contributing to environmental and health hazards elsewhere.

Currently, British Petroleum Amoco is the largest oil company in Alaska, producing 43% of the oil from Alaska's North slope²⁵ and, as the largest oil producer in Alaska, BP is also the largest violator of environmental laws. In 1999, it was reported that, at BP's Endicott Oil field, it paid \$6.5 million to settle civil claims related to illegal dumping and the maximum \$500,000 criminal fine for violating federal safe drinking water laws. In 1995, BP's subcontractor was found guilty of illegally injecting hazardous waste back into the ground water. The subcontractor paid a \$15 million fine for violating the Clean Water Act.²⁶ The Endicott field was touted as an environmentally friendly field and was to be a model for future oil exploration in the Arctic. Instead, Endicott is just another example of oil industry pollution.²⁷

In its mission to extract as much oil as possible from Alaska and other parts of the Arctic frontier, the company has already developed the first offshore oil project in the Arctic Ocean and constructed the first ever subsea pipeline for the new Northstar Oil Field.²⁸ The Army Core of Engineers estimates that there is almost a one in four chance of a large oil spill from Northstar.²⁹

The Arctic National Wildlife Refuge: In danger of being destroyed

BP's next step is to drill in the Arctic National Wildlife Refuge (ANWR).

Congress created ANWR in 1980. Under the tussocks and the bogs of the ANWR lie between 3.2 billion to 16 billion barrels of crude oil. Of its 19 million acres, 8 million are designated "wilderness" which means no development of any kind. Of the 125 mile coastal plain, only 30 miles are designated wilderness.

The oil industry is now pushing hard for access to ANWR. Drilling would most threaten the giant free-ranging caribou herds. Scientists fear that erecting the infrastructure of an oil field in this area would scare the herd into abandoning its traditional calving grounds. Some scientists worry that the yearly addition of 35,000 or so newborns will be severely reduced. The arctic refuge is also home to wolverines, polar bears and hundreds of species of birds – it is the feeding ground for birds fueling up for their migration south.

"If you separate the coastal plain from the rest of the refuge [by oil drilling], you would lose significant numbers of some species...If you drill there, you're fragmenting the ecosystem" said biologist David Klein of the University of Alaska.³⁰ The giant oil production facilities at Prudhoe Bay offer one example of an already fragmented ecosystem. "With hundreds of miles of pipelines, roads and drilling pads, it has become a sprawling tragedy," said Melinda Pierce of the Sierra Club.

The US Geological Survey pegs the amount of recoverable oil under the ANWR coastal plain at 5.7 billion to 16 billion barrels. According to *Newsweek*, that's enough to supply American's oil needs for up to 30 months. Environmentalists (also using USGS numbers) argue that only 3.2 billion barrels are economically recoverable.³¹

BP themselves have admitted to the environmentally sensitive nature of the ANWR.



BP responds to critics, “The world will continue to require new energy supplies, which will inevitably lead to new oil and gas development...in areas with high environmental sensitivity. We believe it is constructive to ...undertake such development. We believe we could leave (the coastal plain of the Arctic National Wildlife Refuge) unaffected whilst harnessing the economic benefit of local hydrocarbon reserves.”³²

Drilling in the ANWR will do little to ease our energy problems, while disturbing the native caribou and the home of the Gwich'in people, an ethnic group that has lived in the area around the Refuge for almost 20,000 years.

Occidental Petroleum drills on sacred land

In 1992 the Colombian government signed a contract with Occidental Petroleum – the company responsible for the “Love Canal” toxic waste disaster – for oil exploration on another native people’s land – land which is traditionally claimed by an indigenous group, the U’wa. Occidental claims the region contains approximately 1.5 billion barrels of oil –the equivalent of only three months worth of oil for the United States.

The U’wa vowed to commit collective suicide if the project goes forward. In September, 1999 the Colombian Ministry of the Environment approved Occidental’s drilling license for the project, giving Occidental the go ahead to begin drilling its first well site on the U’wa’s traditional land.³³

Late in 1999, protestors surrounded the first test drill site, on the edge of Samore to prevent the drilling of oil which they believe to be the “life blood of Mother Earth.”³⁴

In March of this year, a Colombian court put the Occidental project on hold, saying the U’wa should have been consulted before the government gave the company a license to drill. Occidental is appealing the decision.³⁵

In June, however, riot police in Columbia broke up a demonstration by the Indians in which two U’wa were claimed to be shot by the police. According to the *Associated Press*, “The Indians were trying to prevent trucks from reaching the constructions site where US-based Occidental Petroleum Corp is preparing to drill...”³⁶





Chapter 2

Transportation of Oil: Pipelines, Tankers and Trucks

Once extracted from environmentally and socially sensitive areas in California, Alaska and South America, the oil is transported to refineries in order to make it usable. The transportation modes include pipelines, tankers and trucks.

Pipelines

Pipelines carry about 65% of the crude oil and refined oil products produced in the United States. These pipelines transport crude oil to refineries and continue to transport the refined oil product, such as gasoline, to product terminals and airports. Primarily interstate, these pipelines stretch about 156,000 miles in length.

The Office of Pipeline Safety enforces pipeline safety regulations. In May 2000, the Government Accounting Office (GAO) reviewed the Department of Transportation Office of Pipeline Safety's (OPS) performance in regulating pipeline safety.

According to the GAO report, "The total number of major pipeline accidents, those resulting in a fatality, an injury, or property damage of \$50,000 or more, increased by about 4% annually from 1989 through 1998." During that period, pipeline accidents killed 226 people and incurred approximately \$700 million in property damage. The GAO report also stated, "pipelines that transport hazardous liquid account for nearly eight times as many major accidents per mile of pipeline as pipelines that transport natural gas to homes and businesses."³⁷

The Environmental Defense Fund compiled a chart which tracked the average reported size of hazardous liquid released from a pipeline from 1990-1999.³⁸



Release Record by mode (AOPL Table)

Year	Barrels	Gallons Released (Millions)	# Reports	Average Release Per Report (Gallons)
90	124,277	5.22	180	28998
91	200,567	8.42	216	38999
92	136,922	5.75	211	27255
93	116,802	4.91	229	21422
94	162,777	6.84	245	27905
95	110,237	4.63	188	24627
96	154,960	6.51	193	33722
97	186,338	7.83	171	45767
98	149,245	6.27	154	40703
99	154,980	6.51	159	40938
Average	149710.5	6.29	194.6	33034
<1995		31.14		
1995 on		31.75		
Av. <1995			216.2	
Av. 1995 on			173	

There are numerous examples of pipeline breaks and leaks throughout the state of California, as well as in other parts of the country. These accidents lead to environmental damage and have also caused serious damage to developed properties as well (including an entire central city in the Avila Beach disaster).

- The recent Bellingham, Washington pipeline accident resulted in a spill of about 250,000 gallons of gasoline. The gasoline entered the Hannah Creek and Whatcom Creek where the fuel was ignited resulting in three fatalities and eight injuries. In addition, the banks were destroyed over a 1.5 mile section, and several buildings adjacent to the creek were damaged.
- In 1998, a landslide broke a Texaco crude oil pipeline in the hills above Ventura, causing a maximum spill of 8,400 gallons of oil. The impact on the environment is not yet known.
- In 1997, a pipeline broke offshore from Point Arguello, producing an ocean slick of thousands of gallons of oil. The rupture occurred in a pipeline that ran from Platform Irene to an onshore processing facility near Vandenberg Air Force Base in northern Santa Barbara County. Revised estimates put the spill at up to 1,000 barrels of heavy crude oil, or 42,000 gallons.
- In 1997, a Santa Fe Pacific pipeline in Donner Pass in the Sierras broke and spilled an unknown amount of gasoline, diesel and jet fuel.
- On January 1, 1994, a pipeline break spilled 50,400 gallons of diesel fuel at the Shell complex in Contra Costa County.



- In January 1994, in the aftermath of the Northridge earthquake, an Arco facility spilled 193,494 gallons of crude oil into the Santa Clara River.
- On December 25, 1993 in Ventura County at McGrath Lake, 84,000 gallons of crude oil spilled from a pipeline, killing at least 250 water birds.
- In 1991 a Mobile pipeline broke and spilled 74,634 gallons of crude oil into the Santa Clara River, killing an estimated 200 birds and damaging 15 miles of riverside habitat.³⁹

Pipeline leak causes spill at Avila

In August of 1992 Unocal Oil spilled 150 barrels of oil, or 88,200 gallons (Unocal insists that the company only spilled 25,200 gallons) while transporting it by underground pipe from the San Joaquin Valley to its tank farm above Avila Beach.

Although the crude oil spill was considered relatively small by industry standards, its cleanup took more than three weeks. The accident, which covered a 1 1/2-mile area in San Luis Bay, was unusual because the oil leaked from land into the ocean, rather than from an offshore site into the sea and onto the coastline, which is more common. The spill occurred after a 20-year old underground pipeline sprung a leak about six inches in diameter. Oil gurgled up through the ground, flowed over the bluffs and trickled down to the rocky crags and tide pools below.

The cleanup was further complicated by the fact that the spill occurred on sacred Chumash Indian grounds. At the time of the accident, a group of tribal elders were planning to perform a religious ceremony at the site.

“I’ll tell you, it will blow your mind to understand what we’ve been doing in the last few weeks,” said William Gengler, spokesman for the Office of Oil Spill Prevention and Response in the California Department of Fish and Game. More than 60 birds died as a result of the spill. Another 21 oiled birds have survived. Six dead sea otters were found.

Because the accident occurred at sunset when visibility was low, Unocal didn’t immediately send cleanup equipment to the site. By the next day, the oil had started collecting in huge fields of kelp that lap the shoreline. In time, the oil had coated otters and brown pelicans — both listed as endangered species — as well as sea gulls, cormorants and murre.

The cleaning equipment brought into San Luis Bay shortly after the spill sucked up as much as 90 barrels of oil from the water’s surface offshore. However, the equipment couldn’t reach oil that had collected near the shallow shoreline, where depths measure 16 feet and less. Every time the surf broke, the beds of kelp dispersed more oil. The San Luis Obispo County Health Department closed the beach for 10 days. At the height of the operation, 445 people worked alongside 55 boats and skiffs.⁴⁰

The Pacific Pipeline

In 1993, Pacific Pipeline Systems proposed building a 20-inch, 132-mile pipeline which would run from Emidio in the Bakersfield area and wind through the Santa Clara River Valley to Santa Clarita and south to Wilmington and El Segundo. The pipeline would enter the San Fernando Valley through Granada Hills,



and following the San Fernando Road, run through the cities of San Fernando, Burbank and Glendale before hitting downtown Los Angeles and continuing to the South Bay refineries.⁴¹

Low-income area gets its very own pipeline

The major concern, at the time of the proposal and up to the time of city council approval, was the issue of a major earthquake as well as problems of air pollution in a highly residential low-income area. The battle played out in the Los Angeles City Council and the state courts, where the pipeline plan stewed for seven years before it was approved.

In 1996, the state superior court barred the company from using the power of eminent domain to acquire 26 miles of property through the San Fernando Valley and Los Angeles to build the pipeline. At the same time the Los Angeles City Council rejected the pipeline company's request for a franchise permit to build the 26 miles of pipeline that would pass through the city.⁴²

Lobbyists and pipelines: Money changes everything

By 1997, lobbyists were paid \$5.6 million to influence the City Council members on various issues. Of that \$5.6 million, Pacific Pipeline Systems paid \$204,713 to lobbyists to fight for the Pacific Pipeline project (the forth-highest amount spent on lobbying⁴³). By April 23, 1997, the Los Angeles City Council voted to allow the pipeline to be built. The 9-2 vote upset many San Fernando Valley residents who had fought to keep the pipeline out of their neighborhoods. Under the terms of the settlement, the city dropped all pending legal challenges blocking the \$170 million construction project.⁴⁴

Two council members voted against the settlement, citing reasons that the company did not consider alternative routes that would run through less-residential areas. In addition, the pipeline was to run through some of the poorest areas in the San Fernando Valley. They also had concerns of safety in the event of an earthquake. The company assured residents that the pipeline would feature special valves in 44 different places that would enable crews to shut down specific segments if there were a rupture.⁴⁵

Further concerns centered around the fact the pipeline was being built near water supplies that contained 75% of Los Angeles' water supply.⁴⁶

In September, 1998, Arco Pipeline Co. and Pacific Pipeline System agreed to merge their Southern California operations, combining Arco's 118-mile pipeline, which runs from Kern County to Carson with the 132-mile line that Pacific was still building from Kern County to Wilmington and El Segundo. The combined pipeline is capable moving 235,000 barrels of oil a day.⁴⁷

Tanker spills: A little goes a long way

Millions of barrels of oil are transported to refineries by tanker every year. According to the Coast Guard, human error is responsible for most of the accidents. Though spills do result from negligence by intoxicated crewmembers (as in the case of the notorious *Exxon Valdez* disaster), well-trained seamen cause most accidents.

Between 1978 and 1992, there were 17 tanker spills of more than ten million gallons each worldwide. From 1984 to 1990, all types of vessels including tankers, tank barges, freighters and others spilled an



average of six million gallons of oil per year.⁴⁸ The most recent U.S. Coast Guard data revealed the following statistics regarding the number and quantity of oil spilled in California waters includes the following:

Year of Spill	Number of Spills in California Waters	Spill Volume (Gallons)
1998	667	56,790
1997	733	31,808
1996	784	51,263
1995	957	20,252
1994	971	140,670

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The Exxon Valdez spill would have covered 2/3 of the California coast

The *Exxon Valdez* spill, which occurred in 1989, is still on the public’s mind to this day. Not only did it demonstrate how deadly an oil spill can be to marine life, killing an estimated 1,000 sea otters, the disaster also proved how difficult an oil spill is to clean up.

The slick from the *Valdez* spilled the equivalent of 257,000 barrels of oil, or the equivalent of 10.8 million gallons and it contaminated 1,244 miles of shoreline. The cleanup effort lasted six months and involved 11,000 people, 1,000 vessels and more than 70 aircraft at a cost of more than \$1.9 billion. Little of the oil was removed and only 32,500 barrels of oil were recovered and possibly 77,100 barrels evaporated. That means more than 147,000 barrels or 6.17 million gallons, remain in the environment.

If that spill were to happen in California it would cover 2/3 of the coast.

The *Exxon Valdez* spill was the impetus for Congress to pass the Oil Pollution Act of 1990. Since then, vessels that carry oil cargo in US waters have been decreased in size by 5.25 million gallons.

Spills much smaller than the *Valdez* spill are also resistant to cleanup efforts. For example, when the tanker *Puerto Rican* exploded outside San Francisco’s Golden Gate Bridge in 1984, spilling an estimated 400,000 gallons of oil, less than 5% of the spill was contained. The slick drifted northward towards the Gulf of Farallones National Marine Sanctuary, the largest seabird rookery in the continental United States, killing thousands of seabirds.

Spills in California: Smaller (so far), but devastating

A few weeks after the *Exxon Valdez* accident, a barge with 4,500 barrels of oil-water mixture drifted out of control for 16 hours in high seas and strong winds in the Santa Barbara Channel before it was secured and brought under control. No oil was spilled.

On April 9, 1984, the *Sealift*, a 587 tanker, was southbound off the Monterey Coast, carrying six million gallons of diesel oil, when it lost power. When the ship was a mile and a half offshore in 240 feet of water, one anchor was dropped, stopping the vessel just short of grounding on the only range of the southern sea otter.



In 1971, two Standard oil tankers, the *Arizona Standard* and the *Oregon Standard*, rammed each other just off San Francisco Bay and spread a heavy layer of crude on the water.

Other freak accidents have occurred and will continue to occur. In November, 1988, the propeller of the tanker *Chevron Mississippi* clipped an underwater hose carrying crude oil to a pipeline off Morro Bay. The hose was capped after about one hundred gallons spilled.

On February 7, 1990, the crew of the tanker *American Trader* guessed wrong about water depth while mooring off Huntington Beach. The ship's hull was punctured as it ran over its own anchor in shallow water. Nearly, 400,000 gallons of crude poured out, at least 1,000 seabirds were known dead, and Orange County closed its beaches for five weeks. The jury verdict cost shipowner Attransco \$18.1 million in costs and penalties.

The following year, the 610 foot tanker *OMI Dynachem* snagged its anchor on an underwater pipeline off El Segundo in the Santa Monica Bay while backing into a berth at the mooring to unload its cargo, toluene, which is used in gasoline. About 21,000 gallons of petroleum distillate escaped. Strong winds and high tides nudged some of the slick onto Topanga and Malibu beaches. The slick also created sheen of 11 square miles in the bay and closed the bustling Marina del Rey harbor, drifting within one mile of the Chevron USA Inc. refinery in El Segundo.⁵⁰ Thirteen skimmers and boom-towing boats were sent to contain the spill, along with 400 workers to sop up the oil that washed ashore.⁵¹

Trucks: Hazardous and dirty

The EPA estimated that pipeline spills are 10 to 20 times greater than from tanker trucks spills.⁵² However, truck accidents are 300 times more likely to kill people than pipeline accidents.⁵³

The San Diego Union Tribune cited such examples as a February, 2000 incident, when a tanker truck carrying crude oil plunged off a mountain road killing the driver north of Santa Paula. The tanker was carrying 8,000 gallons of diesel and light crude. The oil spilled into Santa Paula Creek reached the Santa Clara River.

Other examples:

- On September 25, 1999, a tanker truck overturned on the Ventura Freeway spilling 850 gallons of oil.
- On November 25, 1999 a tanker truck exploded on Highway 17 in Santa Cruz County, leaking an estimated 4,000 gallons of fuel.
- On January 19, 1998, the San Gabriel Freeway in East Los Angeles was closed for 34 hours when a tanker truck spilled 3,200 gallons of fuel on the road.

One especially damaging aspect of tanker trucks is the air pollution they cause. They belch out millions of tons of microscopic soot and smog-causing chemicals such as oxides of sulfur and nitrogen and volatile organic compounds and, yet, face far weaker environmental control than cars.

Diesel trucks emit three times more soot and smog forming pollutants than a coal-fired power plant, for every unit of energy they burn. Diesel exhaust contributes to ambient sulfur oxides, ozone precursors, and aerosols, seems to contribute to chronic respiratory morbidity and mortality, and the cancer risk of urban



air pollution. Mutagenic and carcinogenic compounds such as polycyclic aromatic hydrocarbons (PAHs) are adsorbed to diesel soot.⁵⁴ PAHs have been listed as a carcinogen under California's Safe Drinking Water and Toxic Act (Prop. 65) since 1990. Yet, until recently, the EPA has not proposed new standards. On May 17, 2000, the EPA proposed standards for clean diesel engines. These standards would force the oil industry to reduce the sulfur in diesel fuel. The proposal would reduce emissions from diesel vehicles as much as 90% by 2010. Under the proposal, oil companies would have to significantly lower the sulfur content in diesel fuel by 2006. Requirements for engine makers would be phased in over four years. The oil companies said that the proposal would cost far more than the 4.5 cents a gallon estimated by the EPA. They said they can lower the sulfur content of diesel but not as much as the agency proposes.⁵⁵

According to the report, *Exhausted by Diesel*, the VOCs and nitrogen oxides emitted by diesel engines form ground-level ozone, or smog, in the presence of sunlight. This smog causes serious health threats to children and the elderly in particular. Diesel engines produce nearly 20% of the total nitrogen oxides in outdoor air and 26% of the total NOx from on-road sources.

Diesel exhaust also contains more than 40 compounds linked to cancer. Diesel soot has recently been singled out as the predominant cancer threat in urban air. In Los Angeles, for example, diesel soot accounts for an estimated 71% of cancer risk from air pollution. According to an expert estimate, lifetime exposure to diesel exhaust at the outdoor average concentration (2.2 micrograms per cubic meter may result in about one in every 2000 people developing cancer).

While trucks (and buses) make up less than 2% of highway vehicles, and they travel less than 6% of the total miles driven each year, they are the source of 25% of the smog-forming pollutants from highway vehicles and over 50% of the soot.⁵⁶





Chapter 3

Refineries: A Very Dirty Business

Refining oil to make gasoline and related fuel products is a very dirty business, requiring high temperatures and pressures and use of extremely hazardous materials to produce highly flammable and explosive substances. Refining causes air and water pollution and produces hazardous wastes, and oil refineries use and release toxic chemicals into the environment.

In 1998, there were 164 petroleum refineries in operation in the United States, and 27 of these refineries are located in California. These refineries use physical, thermal, and chemical separation techniques to separate crude oil into several components, including fuel, non-fuel products such as solvents and asphalt, and chemical industry feedstock, such as benzene and propane. Approximately 90% of the petroleum products produced in the United States are fuels. Motor vehicle gasoline accounts for about 43% of the total output from refineries.⁵⁷ An average-size refinery releases over 10,000 gallons of oily waste daily to air, water and land.⁵⁸

Refinery accidents are dangerous to workers, communities, and the environment

Refinery accidents not only seem to be more common than a blowout on a rig or, for that matter, tanker accidents, they are also more dangerous to those working on the site and to surrounding residents.

Recent accidents involving refineries in Contra Costa County include the following:

- **April 1, 1996:** A ruptured pipe caused an explosion and fire at the Shell refinery in Martinez, sending smoke hundreds of feet into the air. No one was injured.
- **Feb. 1, 1996:** A hydrogen unit at the Shell refinery exploded, igniting a fire and causing minor injuries to two workers.
- **Aug. 22, 1994:** Unocal's Rodeo refinery started releasing Catacarb, a toxic catalyst that can cause skin burning, shortness of breath and headaches. The leak continued for 16 days before the company



told state and federal authorities. Almost 600 residents and 75 employees reported symptoms in the days following the company's disclosure. Unocal later pleaded no contest to 12 criminal counts by the state and agreed to pay a \$3 million fine.

- **July 26, 1993:** A cloud of sulfuric acid billowed from a railroad tank car at the General Chemical plant in North Richmond, forcing thousands to flee their homes and seek medical attention. The incident led to a \$ 4.8 million expansion of the Community Action Network, funded largely by local industry, to improve telephone notification of residents and add sirens.
- **Sept. 5, 1989:** A Shell Oil refinery was shaken by a series of explosions caused when a pipe carrying hot hydrogen and hydrocarbon vapors ruptured. Two workers were seriously burned.
- **April 10, 1989:** Three workers were burned in a fire and explosion at the Chevron refinery in Richmond.
- **April 23, 1988:** An open valve and broken pipe at the Shell refinery resulted in 365,000 gallons of oil spilling into the Carquinez Strait, killing hundreds of birds, muskrats, turtles and other animals.⁵⁹ Shell agreed to pay a \$22 million settlement for damage claims and \$10 million to restore several hundred acres at the "Shell Marsh."

Chevron refinery in Richmond: "Toxic Soup"

In March 1999, when the Chevron refinery in Richmond caught fire, an environmental group, Communities for a Better Environment (CBE), took one air sample. CBE found a "toxic soup" of chemicals, although in levels below what the government considers dangerous. Among the chemicals detected were carbon disulfide, which can cause reproductive problems, respiratory irritations and nervous system problems. The 18,000-pound plume also contained what the group called "significant" levels of the air pollutant 1,2,4 trimethylbenzene, 4-ethyltoluene and carbonyl sulfide, according to samples CBE sent to a state-approved laboratory in Folsom.

Chevron's preliminary report said the smoke contained sulfur dioxide, a corrosive chemical that can cause eye and skin damage in significant amounts. However, the company said no significant amounts of pollution had been found at ground level. Despite these assurances, more than 1,000 people went to hospitals complaining of eye and throat irritation, breathing trouble, dizziness and nausea.⁶⁰

According to an EPA investigation, the Chevron refinery in Richmond had the highest leak rate of all the refineries assayed. The refinery reported detecting leaks at only 179 out of 7,694 valves at the facility – a leak rate of only 2.3%. When EPA monitored 3,363 valves at the facility it found leaks in 354 valves – a leak rate of 10.5%. Chevron is not alone in under-reporting its leaks. In another study conducted by the South Coast Air Quality Management District, the actual leak rates were three times higher than the average leak rates reported by the refineries.⁶¹

Accidents at Tosco refineries have killed and injured dozens of workers

On November 9, 1999, an explosion at the Tosco Avon Refinery, near Martinez, touched off a huge fire, sending a pall of black smoke thousands of feet into the air. A Tosco fire brigade and city firefighters battled the massive fire fed by hydrocarbon by-products contained within a 150-foot-diameter tank.⁶²



On February 23, 1999, the state slapped Tosco with a \$810,000 penalty for safety violations at its Avon Refinery. The state charged the company with violating basic safety rules. A flash fire that ignited on February 23 1999 killed four refinery workers. Investigators with the state Division of Occupational Safety and Health imposed the agency's largest fine ever after a five-month inquiry concluded that Tosco supervisors knowingly exposed workers to extreme danger. They cited the refinery for 33 alleged violations of workplace rules leading to the February 23 fire. "We feel very strongly that each one of these is a very valid and sustainable allegation," said Deputy Cal OSHA chief Mark Carleson.

In 1997, a \$277,000 fine was announced against Tosco for another fatal accident at Avon that killed one worker and injured 46 others. Tosco appealed that fine — at the time a record penalty against an oil refinery — and paid \$136,000 in a settlement agreement. That fee was the highest fine ever paid by an employer in California. "

The company had 15 days to appeal. Larry Ziembra, general manager of Tosco's Bay Area refinery, which included the Avon plant, said the accident did not reflect the prevailing safety practices. A team of Contra Costa County investigators said in a report that the maintenance foreman and other supervisors knew of the leaks, plugged valves and other problems that plagued the repair effort. But, upper-level managers told the county experts that they had not been informed.

Ziembra said everyone involved in the doomed operation bears some responsibility for the tragedy because all employees were allowed to shut down the work process if they believed that it was unsafe. "We would expect anyone, whether it be contractors or employees, that they would stop the job," Ziembra said.

Carleson said contract workers, brought in to erect scaffolding and to operate a crane for the repairs, were not briefed by Tosco employees on the hazards of the job. That lack of warning formed the basis for one of the "willful-serious" violations alleged against Tosco carrying a \$70,000 fine. Two scaffolding workers, Roland Blue, 36, and Ricardo Enriquez, 37, and crane company foreman Tom Rodacker, 49, were fatally burned on the tower. Tosco maintenance worker Ernie Pofahl, 48, died in a hospital several days later. A second Tosco repair worker, Steve Duncan, suffered severe burns and fractures when he dived from the burning tower.

Cal OSHA investigator Bill Krycia said the February accident could have been avoided if the company had shut down its 133-foot distillation tower for 24 hours to repair a pipe leaking naphtha, a product of crude oil refining that has the flammability of lighter fluid. Instead, Tosco kept the unit running and sliced into the pipe at a point within three feet of the high-temperature unit. Naphtha spewed from the cut pipe, doused workers with fuel and erupted in a fireball.

Tosco was charged with 16 willful violations — the most ever alleged against a single California employer — 13 serious violations and four general violations. Cal OSHA levied the maximum civil penalty of \$70,000 for 10 of the "willful-serious" violations, which included not preparing the pipe for repairs, not following safe work practices and running the crude oil distillation tower above its recommended temperature.

Denny Larson of the refinery watchdog group CBE praised Cal OSHA. But, he said the record fine was still not enough to deter companies like Tosco from unsafe practices. "They're getting a slap on the wrist," Larson said. According to Tosco's second-quarter report, a five-month voluntary shutdown of the refinery for maintenance and safety training after the accident caused an after-tax expense of \$23 million. Tosco has more than \$13 billion in annual revenues.



In addition to the fines related to the February 1999 accident and in 1997 for fatal accidents, Cal OSHA cited Tosco for several other minor and major incidents during the past 10 years, including:

- **January 21, 1997:** A blast at the plant's hydrocracker unit killed operator Michael Glanzman and injured 46 workers. Cal OSHA issued a \$227,000 citation and settled for \$136,000.
- **August 1994:** A fire in a vacuum unit caused an injury. Cal OSHA proposed a \$20,125 fine but settled for \$3,750.
- **August 1992:** An explosion in a hydrotreater caused an injury. Cal OSHA did not issue any citations.
- **March 25, 1989:** One man was killed and another injured by an explosion at the plant. Cal OSHA had been abolished, so no state citations were issued.
- **April 7, 1983:** A catalytic unit explodes, killing one worker and injuring two. Cal OSHA did not issue any citations.⁶³

Tosco, which covers 2,300 acres, has been plagued more than the other four East Bay refineries by accidents, lawsuits and public policy wrangling over the past several years.⁶⁴

Chevron plant in El Segundo: The single largest oil plume in history

Adjacent to the Pacific Ocean near the Los Angeles International Airport, sits the largest refinery in California. The Chevron refinery in El Segundo covers 960 acres, with numerous pipes, ponds and more than 270 storage tanks.

In 1985, this refinery created California's largest underground leak of poisonous materials. The refinery had been spilling crude oil and other petroleum products since the 1960s, generating a huge plume of oil floating atop the groundwater in the Old Dune Sand Aquifer, 20 to 100 feet below the refinery.

According to *The Los Angeles Times*, the plume stretched beyond Chevron property to an industrial area and the ocean front community of El Porto. In 1988, Chevron estimated that as much as 252 million gallons was floating on the groundwater. In some places, the plume was 12 feet thick.⁶⁵

Luckily for Chevron and the rest of the community, the plume did not contaminate the Silverado Aquifer, the coastal area's major drinking water basin, which is about 40 feet below the Gage basin and less than 200 feet below ground level.

At the time of the report, Chevron was already two years into a program to recover leaked fuel and to make sure no undetected leaks occurred in the future. All of the refinery's 270 storage tanks had been checked for soundness, and double-lined bottoms would be installed on all tanks that contained toxic materials by the end of 1988.

Under orders from the local Regional Water Quality Control Board, the company will operate a minimum of 52 wells to extract the fuel, plus 35 more wells to inject water back into the polluted water basin. Numerous wells to monitor water quality in each of the three underlying aquifers were also required.

The pool refinery provides Chevron 5,000 barrels of petroleum a month.⁶⁶



Refineries are notorious polluters

In addition to the accidents that occur at refineries, ongoing water and air pollution from daily operations are also a significant threat to public health and the environment in California.

Water Pollution at Refineries:

- Shell, Unocal and Exxon have discharged poisonous levels of selenium into San Francisco Bay, causing the EPA to label it a “toxic hot spot” and to issue an advisory against eating fish from the Bay.
- Texaco spilled 370,000 gallons of oil into the Ventura River in 1993.
- Mobil’s refinery in Torrance leaked 2.4 million gallons of gasoline into shallow groundwater pockets and a regional aquifer throughout the 1980s.
- ARCO spilled 170,000 gallons of oil into the Santa Clara River in 1994.⁶⁷

Air Pollution at Refineries:

“Oil refineries are one of the largest sources of air pollution in the United States. Refineries are the single largest stationary sources of volatile organic compounds (VOCs), the primary precursor of urban smog. Refineries are also the fourth largest industrial source of toxic emissions and the single largest industrial source of benzene emissions.”⁶⁸

High levels of fugitive emissions are one of the major causes of air pollution at oil refineries. Fugitive emissions are the product of leaks from valves, storage tanks, and other industrial equipment.

A report prepared for Los Angeles Representative Henry Waxman estimates annual unreported VOC emissions from oil refineries of 80 million pounds, including over 1 million pounds of benzene. This makes oil refineries the largest stationary source of VOC emissions in the United States.⁶⁹

Figure 1: Emissions of VOCs for Selected Industries

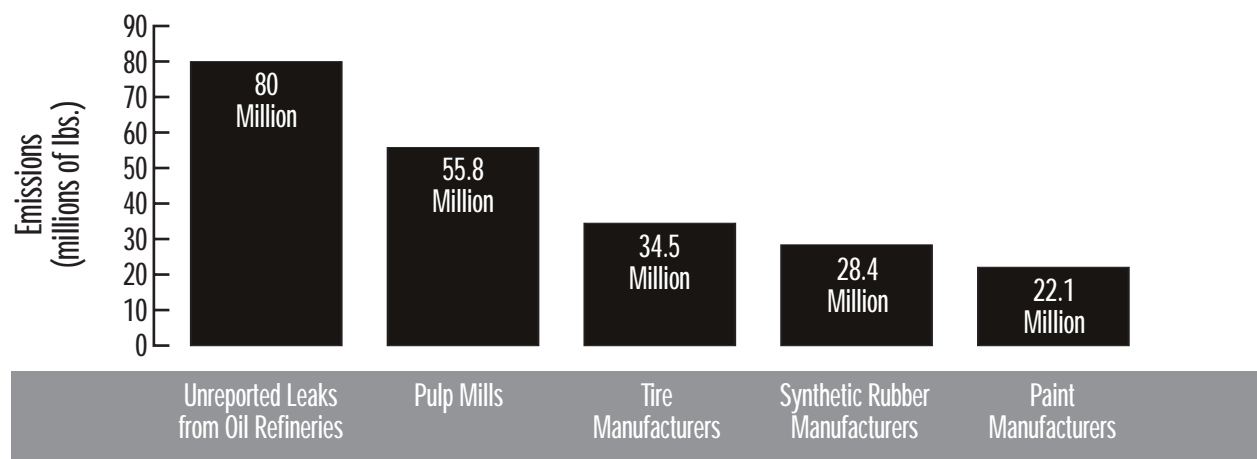
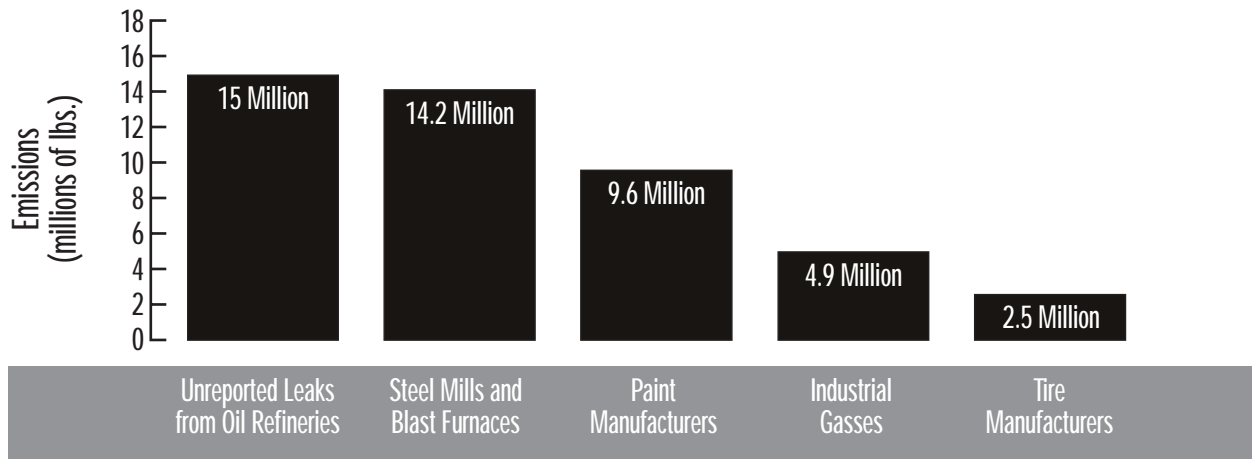


Figure 2: Emissions of Toxics for Selected Industries



The Waxman report also said, “The total amount of unreported VOC emissions from oil refineries may be substantially higher than the 80 million pounds estimated by the EPA. The EPA’s estimate is based solely on unreported leaks from valves. It does not take into account any unreported leaks from other sources, such as pumps or compressor seals. Moreover, the EPA’s estimate only includes unreported fugitive emissions from dozens of small refineries.”⁷⁰

According to the Aerometric Information Retrieval System (AIRS) database, the reported emissions from refineries are greater than the reported VOC emissions from most other industrial sources in the United States. They exceed the VOC emissions from pulp mills and are more than twice the VOC emissions from tire manufacturers.

California is ranked third in the country for states most damaged by unreported fugitive VOC emissions

If Federal Clean Air Act requirements were met, the emissions reductions from oil refineries would be equivalent to removing the VOC exhaust emissions from five million new cars or eliminating the VOC emissions from 27,500 print shops. VOCs react with oxides of nitrogen (NOx) in the presence of sunlight to form ground-level ozone, an invisible toxic gas that is the primary ingredient of smog.⁷¹

In 1996, the Environmental Defense Fund ranked facilities around the state for emissions of criteria air pollutants for NOx, VOCs, oxides of sulfur (SOx) and PM-10. This study confirms EPA findings that refineries are the leading source of NOx, SOx and VOCs in California. The tables below show the amount of toxins released from oil companies around the state and ranks the facility among all facilities in the state also producing these emissions. The facilities were ranked from 1 to 25, 1 being the worst offender. (The numbering does not read in a sequential order; we have only included oil industry based polluters.)



1. Nitrogen Oxides Emissions

Facility	County	Rank	Tons
Chevron U.S.A., Inc.	Contra Costa County	1	4,734
Shell Oil Company	Contra Costa County	2	4,403
Chevron U.S.A. Inc.	Kern	3	4,093
Chevron U.S.A. Inc.	Los Angeles	7	3,465
Arco	Kern	9	3,402
Exxon Corp.	Solano	12	2,975
Tosco Corp, Avon	Contra Costa	13	2,952
Arco	Los Angeles	23	2,102

2. Volatile Organic Compound Emissions:

Facility	County	Rank	Tons
Chevron U.S.A.	Contra Costa	1	2,554
Shell Oil Company	Contra Costa	3	1,896
Mobile Exploration and Production US Inc.	Kern	5	1,788
Chevron U.S.A.	Los Angeles	8	1,415
Shell Chemical	Los Angeles	9	1,329
ARCO	Los Angeles	10	1,223
Tosco Corp, Avon Refinery	Contra Costa	11	1,178
Exxon Corp.	Solano	13	882
Union Oil Co. of Cal	Los Angeles	14	808
Shell Ca. Production	Orange	15	700

3. Sulfur Dioxide Emissions:

Facility	County	Rank	Tons
Tosco Corp, Avon	Contra Costa	1	7,660
Exxon Corporation	Solano	2	4,922
Unocal-Carbon Plant	San Luis Obispo	3	3,034
Shell Oil Company	Contra Costa	4	2,790
ARCO	Los Angeles	5	1,919
Chevron U.S.A.	Contra Costa	9	1,291
Chevron U.S.A.	Los Angeles	11	833
Chevron U.S.A.	Fresno	12	809
Texaco	Los Angeles	18	548

2. PM-10 Emissions:

Facility	County	Rank	Tons
Chevron U.S.A.	Los Angeles	5	614
ARCO	Los Angeles	7	501
Shell Oil	Contra Costa	15	295
Chevron U.S.A.	Contra Costa	17	281

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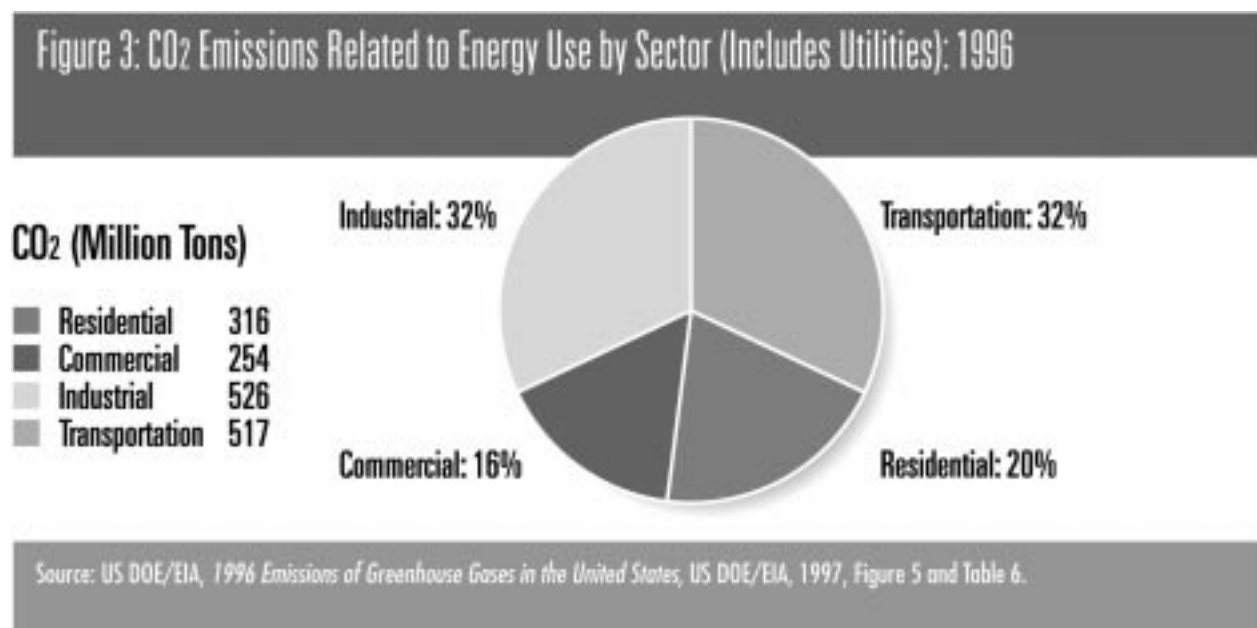
Oil refineries rank in the top five of all types of facilities when it comes to emitting sulfur dioxide, which leads to the formation of acid rain. They rank in the top three worst of all facilities when it comes to emitting NOx and in the top five of the worst emitters of volatile organic compounds. NOx contributes to the formation of acid rain and combines with VOCs in the presence of sunlight to form ozone. Refineries are the fourth largest industry sector source of primary particulate matter (PM) emissions.⁷³

All four of these pollutants are associated with numerous adverse health effects, including premature death, increased respiratory symptoms and disease, and decreased lung function. (These pollutants are covered in greater detail in Chapter VI.)

In 1997 oil refineries reported releasing over 58 million pounds of toxic air pollutants, continuing to be some of worst offenders in the state. Overall, according to the Toxic Release Inventory (TRI), oil refineries were the fourth largest industrial source of toxic air pollutants. Specifically, refineries were the largest industrial source of air emission of benzene (emitting over 2.9 million pounds), the second largest of xylene (4.2 million pounds) and methyl ethyl ketone (4.1 million pounds), and third largest industrial source of air emissions of toluene (7 million pounds).⁷⁴

In 1995, EPA estimated that 4.5 million individuals living within 30 miles of oil refineries were exposed to benzene at concentrations that posed cancer risks that were higher than the Clean Air Act’s acceptable risk threshold.⁷⁵

According to the EPA *Inventory of US Greenhouse Gas Emissions and Sinks: 1990-1997*, 2-30, Table 2-27, oil refineries also emit almost 35 million pounds of methane each year. Methane is a potent greenhouse gas that has a global warming potential 21 times that of carbon dioxide (CO₂).





Chapter 4

Storage Tanks Leak

Once oil is refined, it must be stored before distribution. Storage tanks at oil refineries, marketing facilities and oil transportation facilities all run the risk of leaking and causing ground water contamination. Proper maintenance to prevent leaks is not done until after leaks occur, and regulatory agencies do not fulfill all their oversight responsibilities. Earthquakes, structural failure, human and operational errors, and mechanical defects can rupture storage tanks.

Above-ground Storage Tanks

The Environmental Defense Fund did a critical analysis of the American Petroleum Institute's (API) 1994 survey of aboveground storage tank facilities. The survey collected data on the three types of API petroleum storage facilities: oil refineries, oil marketing facilities (which store and distribute refined petroleum products, though not including retail service stations), and oil transportation facilities (tank facilities associated with pipelines).

According to the survey report, the percentage of petroleum storage facilities with confirmed groundwater contamination is very high: 85% of all refineries have known groundwater contamination. Because only 80% of the marketing and 18% of the transportation facilities monitor for subsurface contamination, the reported percentages of these types of facilities with known groundwater contamination were likely to be low.

Additionally, the analysis stated, non-API member facilities might have a higher rate of contamination because they might not comply with API's technical standard and advisories.

The critique, by Lois Epstein of the Environmental Defense Fund, stated, "Of the facilities with groundwater contamination, a high percentage had off-site contamination: 44% of refineries, at least 35% of marketing facilities (another 20% answered "Don't Know"), and 27% of transportation facilities."⁷⁶



Avila Beach storage tank leak: How to ruin a whole town

The most historic and disastrous of storage tank facility accidents occurred at Avila Beach. In 1989, it was discovered that Unocal had leaked at least 384,000 gallons of crude oil, gasoline, and diesel products contaminating ground water under the entire beach and town.

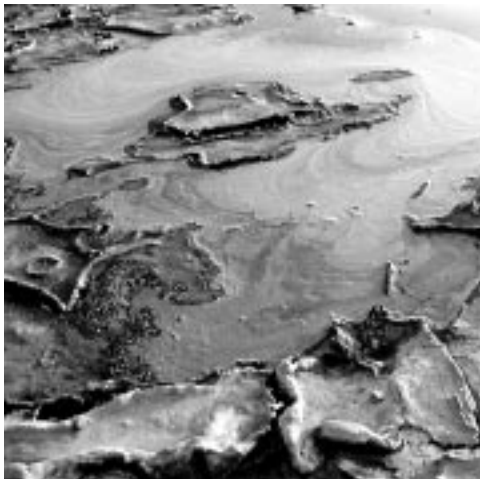
Unocal, operating in 1906 as Union Oil Company of California, built a pipeline to carry crude oil from fields in northern Santa Barbara County and constructed a tank farm onshore close to the end of Avila Pier, where it filled tankers carrying oil to Los Angeles and the San Francisco Bay Area. In 1909, Union Oil participated in the construction of a 245-mile pipeline from San Joaquin Valley. Later, the company built a new pier just west of downtown, and expanded the tank farm to accommodate oil coming in from the Guadalupe Oil Fields, to be processed at Union's Santa Maria refinery. Through the 1980s Union Oil continued to operate underground pipelines moving oil from tank farm to tanker ships.

The first indication of underground pollution was discovered in 1977 when a leaking oil fuel line caused an explosion on Front Street at Chief's Galley Restaurant. The business was forced to temporarily close, but there was no oil cleanup or outside investigation.

As it turned out, more than 300,000 gallons of crude oil, diesel fuel and gasoline had quietly contaminated the soil and ground water beneath the business district of Avila beach, eight miles south of San Luis Obispo. "They knew oil was seeping down here and they didn't say anything to anybody," said Mike Rudd, a local business owner.⁷⁷

The Central Coast Regional Water Quality Order required Unocal to investigate. The company found the contamination followed the alignment of pipes between the tank farm and both piers. Unocal maintained that the threats to the environment and public health were minimal because the underground contamination was inert, "asphalt-like." Neither the public nor the government agreed.

Further analysis by the company confirmed large-scale contamination under most of Front Street and under the beach sands in front of downtown. After further assessments by a toxicologist and public health specialist, the conclusion was the same: There were no immediate health risks. Community pressure, however, led the Regional Water Quality Board to direct Unocal to clean it up.



The task was gigantic. Unocal bought up properties on Front Street, demolished some and moved others. Part of the public pier was demolished; the beach was fenced, and contaminated sand –100,000 cubic yards— hauled to a landfill. To date, Unocal has paid \$20 million to acquire property, in addition to cleanup costs, plus an \$18 million settlement to the government. During the past five years, Unocal paid the \$90,000 annual charge for State Water Project Water. In the future, the local Community Service District will have to foot the bill.⁷⁸

The question still remains: When the cleanup project is complete, will Avila be free of oil contamination? The subtidal area immediately below the pier is still being studied, and the soil at and around the now closed tank farm has not been examined.

The dangerous history of oil in Avila

Year	Event
1920	The Avila Refinery explodes, burning to the ground.
1926	Lightning strike ignites fire at Union Oil tank farm south of San Luis Obispo. The subsequent explosions release more than 150 million gallons of burning oil, a portion of which flows down San Luis Creek entering San Luis Bay at Avila Beach. Union Oil drains pipelines to the ocean coating the Avila and Pismo beaches with oil.
1942	Union Oil pipeline bursts on hillside above Avila, sending diesel fuel down streets and through yards. Crews collect oil in buckets and cover oiled streets with sand.
1954	Santa Lucia, a 100-ton oil tanker burns while moored at Avila.
1977	A leaking Union Oil fuel line causes an explosion on Front Street.
1983	Winter storm destroys Union Oil pier, and an unknown quantity of oil spills in San Luis Bay.
1989	Oil in soil discovered during routine test for construction project on Front Street.
1992	Unocal pipeline along Cave Landing Road ruptures, sending an estimated 600 barrels of oil into San Luis Bay. Ocean clean-up recovers about one-third of spilled oil. ⁷⁹

Underground storage tanks: A legacy of failure

Underground storage tanks have been leaking (sometimes shortened to LUFTs or LUSTs, for leaking underground fuel or storage tanks) since gas was first stored underground at the turn of the century. Nationally, by the mid-1990s, there were an estimated 1.7 million commercial petroleum storage tanks buried in the ground. They hold gasoline, used-oil, and other petroleum products. While all of these tanks pose threats to the environment and human health, the roughly 800,000 underground tanks found at the nation's 200,000 or more gasoline stations have serious leakage problems. Of these, an estimated 25%, or 200,000 tanks have leaked.

The petroleum products leaking from these tanks are a major source of groundwater contamination. These LUFTs hold a high volume of petroleum products, subject to high turnover. In addition, they are found in every community, and they often hold gasoline, an especially problematic water pollutant.

Gasoline is a toxic substance, and, depending on the blend, it can contain up to 225 chemical components and additives, including known carcinogens such as leukemia-causing benzene. Such warnings and knowledge about gasoline have not been a strong enough deterrent for service station owners and oil companies to comply with state and federal regulation to keep their tanks from leaking. It is often only



after the fact that state and federal authorities learn of the leaks. Even when they do discover the leaks, companies frequently delay cleanup and tank replacement by fighting proposed fines and cleanup orders resulting in further contamination of water supplies.

In 1981 in Santa Clara County, tanks containing solvents at Fairchild Camera had leaked into several drinking water wells. At the time, Santa Clara County leaders were worried that thousands of other aging steel tanks — some dating to the 1920s and most containing gasoline — would poison the county's water supply.⁸⁰

In 1983, Santa Clara County and its cities passed a landmark fuel tank law, later copied by the State Legislature. A similar federal law was passed in 1988. The laws required gas stations to dig up their tanks and replace them with double-walled models.⁸¹

In March of 1990, the California Regional Water Quality Control Board notified Conoco of its failure to cleanup LUFTs at a gas station in Sacramento County. These tanks were leaking benzene, toluene, and xylene into the groundwater. Conoco repeatedly appealed the Board's initial fine of \$252,000, reducing it to \$125,000. Conoco was then further fined for failure to begin work at the polluted site.

In July 1991, EPA fined 10 oil companies a total of \$836,761 for discharging contaminated fluids from service stations into or above drinking water sources, in violation of the underground injection provisions of the Safe Drinking Water Act.⁸²

Regulators do not enforce orders

Current state and federal regulations require that underground storage tanks to be double-walled and that leak detection devices be installed, among other safeguards.

South Lake Tahoe: Station leaks poison ground water

A leak at a South Lake Tahoe service station caused gasoline to contaminate the surrounding groundwater. The business owner was repeatedly unresponsive to orders from the Lahontan Regional Water Quality Control Board, and the Lahontan Board did not enforce them. In 1985, the Lahontan Board issued a cleanup and abatement order directing the owner to characterize the extent of the contamination by installing monitoring wells and testing all storage tank leaks. The business owner conducted cleanup of the site and continued monitoring and submitting reports until December 1986.

From December 1986 to May 1989, the business owner failed to submit the required progress reports, and Lahontan staff failed to request them. Because the Lahontan Water Board did not monitor the site for nearly four years, the contamination persisted and eventually spread off-site. At one point a local public drinking well was temporarily shut down to prevent the contamination from seeping in.⁸³

Atlantic Richfield and Arco: Violating mandated LUST Regulations

In 1999, the San Joaquin County District Attorney's office filed a \$10 million lawsuit against Atlantic Richfield Co. and several of its local gas stations, claiming underground fuel tanks were not upgraded as required by law.⁸⁴



According to the complaint, filed on March 13, 1999, six gas station owners, Atlantic Richfield Company and Arco Products Company which leased property to other operators and were owners of property containing UST's used at gasoline stations located in the San Joaquin County, were committing daily violations of Health and Safety Codes. These violations included operating underground tank systems which had not been issued a permit, violation of applicable requirements of the permit issued for the operation of the underground tank system, failure to maintain records, failure to report an unauthorized release and failure to properly close an underground storage tank.⁸⁵

In addition, the complaint charged these gasoline station owners, Atlantic Richfield and Arco with failing to repair or upgrade LUSTs. Atlantic Richfield and Arco were charged with supplying petroleum fuel to a facility while the facility did not have a valid permit from PHS-EHD, each delivery to each tank constituted an unlawful and/or unfair business practice.⁸⁶

BP investigated for their LUST safety status

Most recently, in May of this year, BP Amoco temporarily closed 19 Arco service stations in Los Angeles County because of concerns about their underground storage tanks. Although the tanks were said not to be leaking, the issue of whether BP Amoco falsified public records to conceal that required safety improvements were not performed on some of the tanks was under investigation.⁸⁷

A report generated from California Assemblyman Scott Wildman's office, called *California's Latest Water Crisis*, estimated that as of 1999, approximately 31,000 of the 65,000 California underground storage tank sites had been identified as leaking. Only 14,000 of these sites have been cleaned, leaving 17,000 cases still open and requiring intervention.⁸⁸

Other sources estimate that, as of 1998, California had over 50,000 underground storage tanks, about 6% of the nation's total. As of June 1998, at least 32,779 sites in California were identified as leaking chemical compounds. Ninety% – more than 29,000 leaking California tanks – held petroleum products. In December 1998, more stringent federal underground storage tanks requirements took effect, requiring old and deteriorated tanks to be replaced. The worst were removed, but of thousands of corroded tanks which contaminated soil nearby, only a small percentage were actively treated to remove contaminants.⁸⁹

Leaking tanks: MTBE contamination

MTBE (Methyl Tertiary Butyl Ether) is just another example of the oil industry's failed attempts at trying to clean up one problem, air pollution, while creating another one, water pollution. MTBE is a fuel oxygenate added to gasoline to reduce air pollution and increase octane ratings. The leading culprit of this mess is leaking underground fuel storage tanks.

Regulators and promoters of MTBE underestimated the scope of the problem of the additive. MTBE, which is easily detectable, was added to gasoline to make it cleaner burning. MTBE's primary drawback was that, if it escapes into the environment before combustion, it mixes with groundwater more readily than other constituents of gasoline.

Were the gasoline distribution system reasonably free of leaks, adding MTBE to gasoline would have made sense. But, it turned out that the distribution system leaks like a sieve. Wherever MTBE had escaped, it was accompanied by all of the other constituents of gas which are nearly all toxic. For example, benzene is both a major constituent of gasoline, and one of the most potent carcinogens.⁹⁰



According to the report, *California's Latest Water Crisis: Toxic Contamination in our Drinking Water*, MTBE was detected in drinking water supplies as far back as 1990 when its concentration levels reached 500 parts per billion (PPB) – nearly 15 times the State's 1991 "action level" of 35 PPB – in two drinking water wells at the Presidio in San Francisco.

By 1995, MTBE had contaminated the drinking water in Santa Monica. As a result, the city shut down the contaminated wells which amounted to losing 71% of its available ground water supply. By the end of fiscal year 1995-96, the State Water Resources Control Board reported that they had identified approximately 7,200 sites where underground storage tanks had leaked petroleum – and MTBE – into the groundwater.

In 1999, The *Contra Costa Times* reported that more than 230 pounds of MTBE were pouring into the San Francisco Bay from refineries that lined the bay. A spokesman for the California Environmental Protection Agency said that amounted to about 43 tons per year.⁹¹





Chapter 5

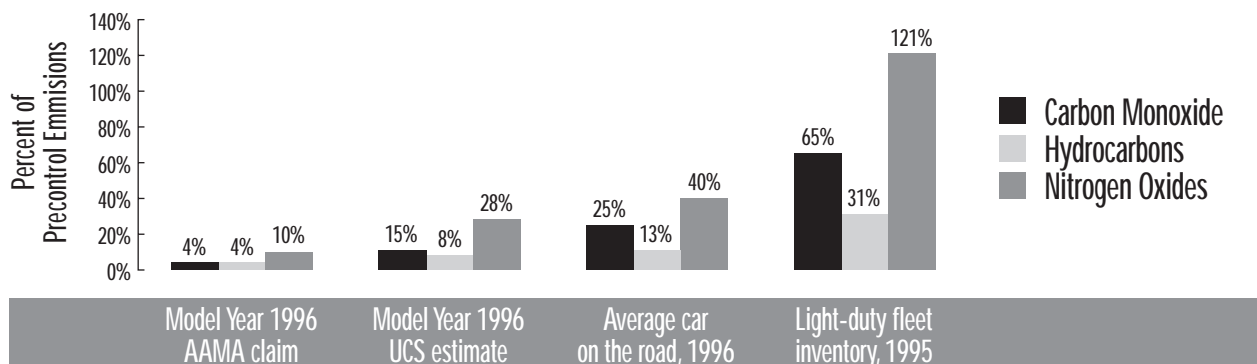
Air Pollution is Not an Incurable Disease

Air pollution is similar to tobacco smoke in that it can be a silent killer, causing diseases whose symptoms do not develop until after years of exposure. It injures humans, destroying their health and well-being. But, it is not an incurable disease.⁹²

Air pollution caused by cars, trucks and other transportation is one of the most harmful and ubiquitous results from our dependence on oil. The documented effects of ambient air pollution include reduced lung function in children and adults; lung airway inflammation; asthma exacerbations; increased incidence of death — hardly mere “irritation.” Air pollution not only issues from the tail pipe of automobiles, but is produced at every step of the entire fuel cycle, including the use of diesel by trucks, and oceangoing oil tankers.

The Union of Concerned Scientists’ (UCS) report, *Are Cars Still A Problem?* found that passenger vehicles were still the largest single source of carbon monoxide and the second largest single source of hydrocarbons and nitrogen oxides. They account for 56, 23 and 24% of the 1995 national emissions inventory for carbon monoxide, hydrocarbons, and nitrogen oxides, respectively.

Figure 3: Are Cars Still a Problem?
Summary of Real-World Progress in Reducing Emissions Over the Past 30 Years



UCS estimates were based on data from the US Environmental Protection Agency and the U.S. Department of Transportation. The graph on the previous page compares the two findings.

The UCS report finds that, over its lifetime, the average emission rate for a car is much higher than its emission standard. A modern car will likely emit 4 times more carbon monoxide, 2 times more hydrocarbons, and 3 times more nitrogen oxides. The report states, “passenger vehicles are still a major contributor to our air pollution emissions and more must be done to reduce their emissions in the real world. Past control strategies that have primarily emphasized lowering the certification emission levels of gasoline vehicles have not resulted in commensurate reductions in the real world. By focusing on emission standards, regulators have inadvertently allowed automobile manufacturers to exploit loopholes in the regulations, such as ‘off-cycle’ emissions and lower quality control systems.”⁹³

As a result, “For every 75 deaths per year due to air pollution, there are 265 hospital admissions for asthma and 240 non-asthma respiratory admissions; 3,500 respiratory emergency doctor visits; 180,000 asthma attacks; 930 restricted activity days; and 2,000,000 acute respiratory symptom days.”⁹⁴ Scientists have estimated that the number of deaths in the United States associated with air pollution range from 50,000 to 100,000 per year.⁹⁵

California, with 1,217 declared smog days, had the highest number in the nation during 1999.⁹⁶

A study done by the Department of Preventive Medicine, at USC’s School of Medicine in Los Angeles, tracking 3,676 fourth, seventh, and tenth graders from classrooms in 12 communities, found that children with a prior diagnosis of asthma are more likely to develop persistent lower respiratory tract symptoms when exposed to air pollution in Southern California. In particular, the report stated, “as PM 10 increased across communities, there was a corresponding increase in the risk per interquartile range of bronchitis...Increased prevalence of phlegm was significantly associated with increasing exposure to all ambient pollutants except ozone. The strongest association was for NO₂, based on relative risk per interquartile range in 12 communities.”⁹⁷

The most insidious component is the collection of gases known as oxides of nitrogen, or NO_x. NO_x is formed when the nitrogen gas that is 80% of the air we breathe is superheated and compressed in the fiery interior of a gasoline engine or a diesel engine.. Human exposure to high levels of NO_x outdoors had more colds that settled in their chests, chronic wheezing and cough, bronchitis, chest cough with phlegm and episodes of respiratory illness.⁹⁸

Oxides of nitrogen react in the air with hydrocarbons such as unburned gasoline and diesel fuel to form ozone as well as acidic fine particles. These particles, together with other particulate pollutants, account for up to 50,000 deaths per year in the United States. In areas such as Los Angeles these oxides of nitrogen account for roughly one-third of the fine particles.

According to the American Lung Association’s report, *State of the Air: 2000*, the most recent ozone monitoring data collected by the U.S. Environmental Protection Agency demonstrated that not only is air pollution a continuing and major threat to the public health in many major metropolitan areas, but it seems to be actually worsening in some.

Ozone levels continue to violate the health-based standard of the Clean Air Act in major cities. Historically, Los Angeles has had the highest ozone concentration in the country. In 1997, Houston exceeded Los Angeles in ozone levels. However, California continues to place the largest number of counties among State of the Air’s 25 worst, with 14 in descending order of their air pollution: San Bernardino, Riverside,



Kern, Fresno, Los Angeles, Tulare, Ventura, Kings, Imperial, San Diego, Merced, El Dorado, Sacramento and Shasta.⁹⁹

Health effects on adults and children:

Children are not little adults.

The elegance and delicacy of the development of a human being, from conception through adolescence, affords particular windows of vulnerability to environmental hazards. Exposure at those moments of vulnerability can lead to permanent and irreversible damage. Children are more vulnerable than adults.¹⁰⁰

Air pollution affects children more than adults because of their narrow airways, more rapid rate of respiration, and the fact that they inhale more pollutants per pound of body weight.¹⁰¹

Ozone, the most pervasive air pollutant in the United States, is produced when hydrocarbons and nitrogen oxides emitted from motor vehicles and other sources react in the presence of sunlight.¹⁰² Exposure to ozone has been associated with increased asthma rates in children,¹⁰³ as well as a reduction in lung function, and exercise-related wheezing, coughing and chest tightness.¹⁰⁴

A University of Southern California children's health study conducted to determine whether chronic respiratory effects are produced by air pollution, found that school absences increased by 83% with a 20 parts per billion increase in ozone.¹⁰⁵

In 1997, a report released by the Environmental Working Group revealed that 109,000 children in California attended one of 147 schools in the state located in areas with high pollution levels. The schools cited were within one mile of areas where monitored air pollution levels exceeded the U.S. Environmental Protection Agency's proposed new standards for microscopic airborne particles.

Asthma in children

Children with asthma experience a diminished quality of life. Asthma impacts a child's play, school and home life. Asthma is a leading cause of absences from school. This pervasive disease affects both a family of an asthmatic and society at large. In California, hospitalization costs for asthma alone amount to over \$350 million each year.¹⁰⁶



Between 1982 and 1994, the prevalence of asthma increased by 61% with the greatest increases occurring for children.¹⁰⁷ California leads the nation with over 2 million people diagnosed with asthma and an increased prevalence rate of 75% in the last 15 years. This disease hits children especially hard. Over four million children suffer from asthma in the United States, including 500,000 in California.¹⁰⁸

A study of hospital emergency room visits for 609 children from June 1, 1990 to August 31, 1990, showed a 37% increase in asthma related visits the day after maximum ozone levels equaled or exceeded 0.11ppm.¹⁰⁹ A 1997 study estimated that smog pollution was responsible for more than 6 million asthma attacks, 159,000 emergency room visits and 53,000 hospitalizations.¹¹⁰ In 1998, the number of asthma sufferers more than doubled to an estimated 17.3 million from 6.7 million in 1980.¹¹¹

Leukemia, lung cancer, and other cancers

According to a recent report entitled “*Distance-Weighted Traffic Density in Proximity to a Home is a Risk Factor for Leukemia and Other Childhood Cancers,*” children living on streets with traffic counts of more than 10,000 VPD (vehicles per day) are 3-5 times more likely to contract cancer than are children who live on streets with fewer than 500 VPD.¹¹²

The report also states that the largest excesses of cancer associated with traffic were found 1 km or less from motorways, concluding that childhood cancers are geographically associated with two main types of industrial atmospheric effluents, namely: 1) petroleum-derived volatiles and, 2) kiln and furnace smoke and gases and effluent from internal combustion engines.

Occupational exposure to elevated concentrations of benzene is known to cause leukemia in adults and children: The EPA believes chronic exposure to ambient air concentrations of benzene, well below occupational exposure levels normally considered leukemogenic, may pose a risk for leukemia or cancer in general.

Toxic cancer-causing chemicals can be inhaled directly or carried by small particles into the lungs. Millions of pounds of these chemicals are emitted into the air every year by motor vehicles.¹¹³

The most important data on life expectancy and lung cancer come from two prospective cohort studies in the United States. Both the Harvard study¹¹⁴ and the American Cancer Society¹¹⁵ found higher community exposures to fine particulate air pollution to be associated with premature mortality and increased lung cancer incidence after adjusting for cigarette smoking and other risk factors. The premature mortality findings are consistent with studies using cross sectional, time series, and case control methodologies,¹¹⁶ and with the several meta-analyses of the time series studies.¹¹⁷ The lung cancer findings are not surprising in light of the recent data which have elucidated a mechanism by which polycyclic aromatic hydrocarbons (commonly adsorbed on particulate air pollution) cause lung cancer.¹¹⁸

Acute Bronchitis in children

It was estimated that 365,000 cases of acute bronchitis in children would be prevented if PM10 concentrations were reduced to 12mg/m³; an estimated 169,000 if the levels were reduced to 15mg/m³; and an estimated 24,100 cases of acute bronchitis would be prevented if PM10 concentrations were reduced to an annual average concentration equivalent to 20mg/m³.¹¹⁹



Effects of PM10

According to epidemiologic studies, chronic particulate pollution is positively correlated with bronchitis, chronic cough, respiratory illness, COPD and asthma exacerbations, decreased longevity, and lung cancer.¹²⁰

Particulate matter (PM) exposure has been linked with increased prevalence and severity of asthma and allergic rhinitis (hay fever) and greater risk of hospital admissions for heart and lung disease.¹²¹ The inflammatory damage to the lungs that results from exposure to fine particulate matter may be responsible for the observed increased risk of hospitalization or premature death.¹²²

Particulate matter is categorized according to size. Coarse size particles, or PM10, are generally considered to consist of all particles less than 10 microns in aeronautical diameter. Fine size particles, or PM2.5, are those particles equal to or less than 2.5 microns in diameter (equal in size to 1/8th of the diameter of human hair follicle). Fine particles are derived primarily from fossil fuel combustion, but coarse particles (2.5 and 10 microns) are derived from crustal material, or dust. Both PM 10 and PM2.5 are small enough to penetrate deeply into the lungs.¹²³ PM2.5, however are considered to be more dangerous than coarser PM10 because they are small enough to evade the body's respiratory defense mechanisms and lodge deep into lung tissue.¹²⁴

Increased deaths have been directly linked to daily fluctuations in particulate matter concentrations.¹²⁵ The World Health Organization has estimated that half a million premature mortalities each year may be associated with PM pollution.¹²⁶

One study followed more than 8,000 persons over a 15-year period and found that the risk of premature death in areas with high PM2.5 pollution was 26% greater than in less polluted areas.¹²⁷ In another study that involved 6,338 nonsmoking Californians from 1977-1992, PM10 was strongly associated with mortality, as well as with lung cancer deaths in males.¹²⁸

In a study spanning 151 areas within the United States on over half a million people, fine particulate air pollution at levels commonly seen within our cities was associated with elevated levels of cardiopulmonary and lung cancer mortalities.¹²⁹

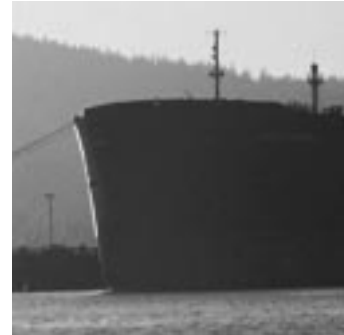
In a national study that spanned six US cities, exposure to fine particulate matter was significantly correlated with increased acute mortality for both PM10 and PM2.5, but the strongest association seems to lie with PM2.5.¹³⁰ Even a small increase in PM2.5 can cause a significant increase in mortality. Other studies have shown that the association with premature death with PM exposure grows stronger as particle size decreases from PM10 to PM2.5.¹³¹

Diesel: Culprit for PM exposure

Diesel exhaust is a major contributor to particulate matter concentrations in the United States. The particulate matter component of diesel exhaust is responsible for a significant portion of its toxicity, and the overall carcinogenic potential of air pollution is believed to be associated with its particulate matter. In 1995, the California Air Resources Board. Emission Inventory determined that, in California, 58% of diesel particulate matter came from "On Road" sources; 37% came from "Other Mobile" sources and 5% from "Stationary" sources.¹³²



According to a Natural Resources Defense Council report, every year 64,000 people may die prematurely from cardiopulmonary causes linked to particulate air pollution.” The report went on to say that in the most populated cities, lives are shortened by an average of one to two years. Los Angeles tops the list, with an estimated 5,873 early deaths. ¹³³





Chapter 6

Global Warming

Thus far, we have seen how the use of oil has effected our health, our land, our water, and the quality of the air we breathe. In recent years, evidence has shown that the production and use of petroleum-based products is also altering our atmosphere.

Scientists are reaching a consensus that global warming is caused by the increased concentration of greenhouse gases in the atmosphere. The problem was first projected by global climate computer modeling a few years ago. Melting polar ice caps, the retreat of alpine glaciers, and the spread of infectious disease provide tangible evidence that the climate is changing and those projections are correct. The report, *Taking Our Breath Away*, says, “In sum, there is an overwhelming body of scientific evidence that human activities are changing the global climate.”¹³⁴

Gas-guzzling cars and light trucks, such as mini-vans and sport utility vehicles, are major sources of this pollution. Over its lifetime, the average car on the road today will spew out 50 tons of carbon dioxide pollution into the air. Carbon dioxide (CO₂) is the most significant greenhouse gas, and transportation is the largest source of CO₂ in the US, accounting for 60% of all US CO₂ emissions.

CO₂ is estimated to be responsible for between half to two-thirds of the warming to date and is expected to account for about 80% of future warming if current greenhouse gas emission rates continue.

In addition to CO₂, automobile production and use is responsible for significant quantities of other greenhouse gas emissions. Fuel combustion contributed to 46% of all nitrogen oxides (NO_x) emissions, and transportation contributed 49%.¹³⁵

Global Warming: A pollution problem

Global warming is largely a pollution problem. The International Panel on Climate Change (IPCC), the world’s leading authority on global warming – made up of over 2,500 scientists – confirmed that the



buildup of CO₂ in the atmosphere is accentuating the greenhouse effect, trapping more heat and increasing the global warming change.

The current release of 6 billion tons of carbon through combustion adds approximately 2.2 billion tons of carbon dioxide to the atmosphere. This annual output of CO₂ emissions exceeds the capacity for absorption by plants and other natural sinks where carbon is stored. Carbon sinks (such as plants, soils and oceans) act as CO₂ reservoirs, each finding a natural balance between absorption and CO₂ release. The problem of overcapacity has intensified with widespread destruction of forests, pollution, and increased ultraviolet radiation – leading to a declining ocean plankton population.¹³⁶

According to the Sierra Club's report, "*Global Warming: The High Cost of Inaction*," computers have projected the results of global warming. Scientists are now becoming increasingly alarmed, as more evidence of these changes surfaces:

- **Major shifts in temperature and precipitation.** Some parts of the world have warmed by as much as 4.5 degrees Fahrenheit or more in the last 100 years. The average temperature of the planet has risen by about 1° Fahrenheit.
- **Shifting ranges of infectious disease; increasing cases of infection around the world.** Dengue fever infected victims in Texas in 1995, and in recent years, malaria infections have occurred as far north as New York, New Jersey, and Michigan.
- **Rising Sea levels.** Sea levels have risen by almost a foot in the last century, destroying beaches and wetlands around the world. Continued warming may mean an additional rise of 2 feet or more, and the flooding of huge portions of low-lying states such as Louisiana and Florida.
- **Glacier melt and snow-cover loss on 5 continents.** In 1994, a 48 by 22 mile chunk of the Larsen ice shelf in Antarctica broke off and melted. In 1997, huge crevasses were found, indicating that the rest of the ice shelf is likewise endangered.
- **Drastic habitat shifts for plants and animals.** Scientists have documented shifting populations and altered migration behavior, as animals attempt to adapt to a changing climate. Many species that cannot adapt are in decline.
- **El Niño.** There is growing evidence of a link between global warming and the recent pattern of more frequent and severe El Niño events.

The IPCC has concluded by consensus that "the balance of evidence suggests that there is a discernible human influence on global climate." The IPCC projects that global warming will have "a severe impact on human health, natural ecosystems, agriculture, and coastal communities."

One of the early effects of global warming that IPCC projects is more frequent and more severe heat waves. Events such as the deadly stretch of hot days and nights in the US during the summer of 1995 are likely to become more common. Scientists are already finding that the number and intensity of extreme weather events are increasing.



Infectious disease is the second major threat that global warming poses to human health. As temperatures rise, disease-carrying mosquitoes and rodents move into new areas, infecting people in their wake. Doctors at the Harvard Medical School have linked recent US outbreaks of dengue (“breakbone”) fever, malaria, hantavirus and other diseases to climate change.

Global warming could mean millions more around the world will become infected with malaria. Here in the United States, Houston has experienced a malaria outbreak in each of the last two years. In the 1990s, malaria cases have occurred as far north as New Jersey, Michigan and Queens, New York. IPCC scientists project that as warmer temperatures spread north and south from the tropics, and to higher elevations, malaria-carrying mosquitoes will spread with them. They conclude that global warming will likely put as much as 65% of the world’s population at risk of infection—an increase of 20%. In the future, killer heat-waves will likely increase deaths in Midwest cities.¹³⁷





Chapter 7

Fixing our petrochemical consumption addiction

True solutions to our gasoline addiction are not found simply by following the path of making gasoline and petroleum fuel products cleaner.

If we continue on our current course of oil consumption, we'll further damage our environment – while compounding health problems in the public at large. With continued offshore drilling and tanker spills, we further pollute our oceans and beaches. With more accidents from pipelines and storage tanks leaking and breaking, we continue to contaminate our beaches and soils. By increasing our demands on oil refineries, we further pollute our communities and endanger the lives of both workers and communities. By simply attempting to make gasoline cleaner, we increase the risk of infiltrating our water supplies with toxins.

We harm the earth's environment and the health of our society through the continued use of oil. Making the fuels we use cleaner does not address these other serious impacts. California must continue strong regulatory efforts to clean up gasoline and diesel fuel as a short-term response to the deadly health of smog and air pollution, but state air regulators don't often look at the rest of the environmental damage caused by the petroleum fuel cycle. To truly protect against the full range of hazards posed by the oil companies, the Governor and the Legislature must begin to close the loop.

The most complete solution is to replace gasoline and petroleum fuel products with new forms of propulsion and transit. By maintaining the requirement for zero emission vehicles (ZEVs), we can begin to solve many problems with one solution. Global warming, air pollution, damage to our coasts and wildlife, can all begin to be eliminated.

By maintaining the requirement for zero emission vehicles, we can begin a long-term program that will remove the offshore platforms off the coast of Santa Barbara and Long Beach. By replacing internal combustion over time through the use of ZEV's, we can dismantle the pipelines running under our oceans, beaches and into our cities; we can limit the amount of air pollution spewing from the oil refineries polluting our communities up and down the state from El Segundo to Richmond, and we can diminish the



tailpipe pollutants from which increase the risk of asthma and other lung disease to ourselves and to our children.

This is a long term effort, and free markets demand free flow of information: Technology market forcing must be accompanied both by education on the hazards of gasoline and petroleum and on the benefits of ZEVs.

We can immediately begin to transition to a post-oil era, and away from our dependence on oil, by increasing Corporate Average Fuel Economy (CAFE) standards for cars and light trucks and strengthening the California Air Resources Board's Zero Emission Vehicles (ZEV) program. While these market based strategies move us away from the use of oil for vehicle propulsion, we can take advantage of other short-term opportunities to target and coordinate enforcement on oil company environmental and health hazards, and to improve refinery safety. Certainly, we should not be stampeded into reducing our protections or harming sensitive natural areas by new oil drilling.

Solutions

Promote Zero Emissions Vehicles

We must move away from use of gasoline to power vehicles and find new means of propulsion for the long-term. We must move aggressively now to kick off the production, marketing, and use of Zero Emission Vehicles (ZEVs), fuel efficient hybrids and hydrogen/methanol fuel cell vehicles.

The California Air Resources Board (CARB) should officially recognize the full benefits of these alternative programs. CARB should begin to articulate clearly and in every regulatory forum the necessity for California to move away from petroleum dependence in transportation. Strong ZEV, hybrid and fuel cell vehicle programs are a first and necessary step on the path to sustainable mobility, and current requirements are only the beginning. The program must expand over time to reach 100% zero emissions transportation. Diesel hybrid vehicles should not be afforded the same air quality credits as these cleaner vehicles.

Begin the true market launch now. We must ramp up to meet the current goals by 2003 by providing a variety of products for a variety of applications, including full size vehicles. Auto distributors and dealers must market ZEVs, hybrids and fuels cell vehicles in good faith at competitive prices with consumer support. The State of California should provide funding for construction of ZEV infrastructure and for the purchase of ZEVs. CARB should establish an industry government education campaign to actively promote ZEVs, hybrids and fuel cell vehicles and their benefits to public health, the environment and the economy.

Raise CAFE Standards

The last time fuel economy was raised significantly was 1975, when Congress responded to an oil crisis by instituting CAFE standards. The result was the most successful energy savings measure ever adopted.

By requiring auto makers to double the average fuel economy of cars between the mid-1970s through the mid-1980s, Congress led the US to save 3 million barrels of oil every day. CAFE not only slowed the



growth in America's oil consumption, but even eliminated it for a time, as the following chart shows.

After Congress instituted CAFE in 1975, fuel economy doubled; at the same time, safety technology halved the highway fatality rate. However, as the auto industry sits on its tailpipe, the nation's fuel economy has slid back to the level it was at in 1980. Meanwhile, increases in oil consumption are returning to per capita levels higher than those experienced in the 1970s:

Gas Consumption Estimates in Transportation Sector

- 1970:** 2,040 million barrels of oil consumed
- 1975:** 2,377 million barrels — 337 million barrel increase
- 1980:** 2,357 million barrels — 20 million barrel decrease
- 1985:** 2,434 million barrels — 77 million barrel increase
- 1990:** 2,584 million barrels — 150 million barrel increase
- 1995:** 2,801 million barrels — 217 million barrel increase

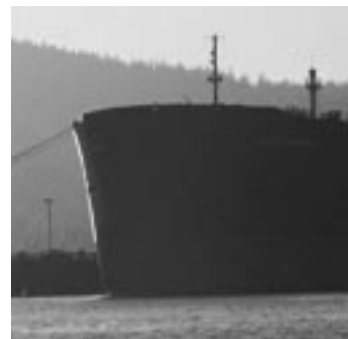
Source: Energy Information Administration State Energy Data Report, 1997

Because CAFE standards have not been increased while the miles driven has skyrocketed, demand for gasoline is at an all-time high today, and growing. In large part, this increase in demand is due to the auto industry's marketing of SUVs and light trucks as passenger vehicles. When Congress passed CAFE, auto makers were not required to steadily improve light truck fuel economy because these vehicles comprised only 20% of the fleet and were mainly work vehicles.

Today, light trucks and sport utility vehicles (SUVs), nearly 50% of new vehicles sold, have driven fuel economy to its lowest level since 1980. Nobody would have dreamt of using a pickup truck to drive kids to school or themselves to work, yet today's SUV is far more likely to be hauling lattes from Starbucks than grain to market.

America can achieve energy independence, curb global warming and save millions of dollars at the pump.

Some have proposed increased drilling in our most pristine places and making our cities dirtier as the answer. However, the facts show that abandoning clean fuels and drilling are not the solutions for America's families. We shouldn't drill for oil under the Arctic National Wildlife Refuge; we should drill for oil under Detroit by raising CAFE standards.



Fuel Economy Standards

The US Senate recently jump-started the process of making cars go further on a gallon of gas by agreeing to commission a study to be completed by July, 2001 that allows the Department of Transportation to make a recommendation to raise CAFE standards.

However, without the political will to raise standards, Americans will grow more dependent on foreign oil. A Congressional rider has frozen standards since 1994 at 27.5 miles per gallon for cars and 20.7 miles per gallon for SUVs and light trucks.

By increasing fuel economy by just 6% each year, CAFE standards could reach 45 miles per gallon for cars and 34 miles per gallon for light trucks in a decade. Benefits would be felt long before we could use oil from the Arctic. This would save 3.2 billion barrels of oil annually: more oil than we import from Saudi Arabia, Kuwait, Qatar, Bahrain, United Arab Emirates, estimates of oil in the Arctic, and national offshore oil combined.

By achieving CAFE standards of 45 miles per gallon for cars and 34 miles per gallon for SUVs and light trucks, fuel savings would reach over one trillion gallons of gas by 2030.

CAFE standards of 45mpg for cars and 34mpg for SUVs and light trucks aren't a pie-in-the-sky idea. The technology exists today, but auto makers are keeping much of it on the shelves; they won't revamp their assembly lines to incorporate this technology until required to by law. Improved technology— more efficient engines, transmissions, better aerodynamics— was and is the key to achieving improved efficiency.

Most of the existing technology is already on America's roads. Honda is already selling the *Insight*, which gets 70 miles per gallon, and Toyota's *Prius* goes on sale this summer, getting 55 miles per gallon. These cars are hybrids that use a combination gas-electric engine. A zero-emission clean electric motor powers the vehicle assisted by a highly efficient super-low emission gasoline engine, refillable at any gas station. The energy typically lost to braking is captured, directing it to recharge the batteries. Unlike purely electric vehicles, a hybrid does not need to be plugged in.

False Solution: Drilling the Arctic National Wildlife Refuge

The coastal plain of the Arctic National Wildlife Refuge is America's "Serengeti." Nestled between the towering mountains of the Brooks Range and the Beaufort Sea in northeast Alaska, the narrow 1.5 million acre coastal plain is the biological heart of this untamed wilderness. It is home to unique and abundant wildlife: wolves, polar bear, musk ox and wolverine. Myriad bird species rely on the coastal plain for breeding, nesting and migratory stopovers on trips as far away as the Baja peninsula, the Chesapeake Bay, and even Antarctica.

Drilling the Arctic Refuge would be as shortsighted as damming the Grand Canyon for hydroelectric power or tapping Old Faithful for geothermal energy. It would be as foolhardy as burning the Mona Lisa to keep you warm. We are losing spectacular landscapes at an alarming rate. We must have the foresight to protect one of America's most beautiful natural treasures— not sacrifice it for a minimal amount of oil.



Alaska's North Slope has already been almost completely drilled

- 95% of Alaska's vast North Slope is already available for oil and gas exploration and leasing.
- The coastal plain of the Arctic Refuge is the last 5% off-limits to drilling.

Big oil's allies want big profits

• Although Senator Frank Murkowski (R-AK), who is leading the fight to drill the Arctic Refuge, portrays himself as fighting for lower oil prices, he has worked to increase oil prices. For example, in 1995, Murkowski led the Senate fight to end a ban on exporting Alaskan oil. According to the Anchorage Daily News, "For British Petroleum, the North Slope's largest producer, lifting the oil-export ban is a piece of a larger market strategy to drive up prices."

False Solution: Eliminating reformulated gas

Reformulated gas was required under authority created by the 1990 Clean Air Act in cities with high carbon monoxide pollution. Oxygenates increase the combustion efficiency of gasoline, thereby reducing vehicle emissions of carbon monoxide. While cleaner gas is not the long-term solution to public health and pollution concerns, we believe that it is an important interim step for many consumers who cannot make an abrupt shift to alternative modes of travel, or to alternative modes of propulsion.

We oppose strongly, however, the concept of fuel neutrality. According to the Wall Street Journal, "Diesel's supporters want the state to adopt a 'fuel-neutral' approach in deciding who can participate — meaning approving any fuel that meets what they call a 'reasonable' emissions standard. They have lobbied aggressively, once demonstrating the use of green-diesel buses outside the Capitol."¹³⁹ Diesel is responsible for much of the cancer risk in the smoggy L.A. Basin, and experts argue that so-called "clean diesel" is not nearly as environmentally beneficial as another equally feasible alternative, natural gas.

The Federal government estimates that reformulated gas only adds between 5-7 cents per gallon, which does not account for the inflated prices in the Midwest, where prices have skyrocketed recently. Most opponents of reformulated gas also opposed the Clean Air Act of 1990, and are using consumer dissatisfaction with high prices as an opportunity to renew their fight against strong federal clean air protections. Their arguments fall flat for two reasons:

Abnormal price fluctuations

- The Federal Trade Commission (FTC) is currently looking into price gouging.
- While prices jumped unusually fast on June 1 when new gas rules went into effect, they went down just as quickly once the FTC began investigating the matter.
- According to the Associated Press, while wholesale prices in Chicago dropped from \$1.60 a gallon on June 15 to \$1.31 by June 17, retail prices at the pump increased by two pennies to \$2.13 during the same week.



Record Quarterly Profits for Big Oil

- The 15 largest petroleum companies saw profits more than triple from the first quarter of 1999 to the first quarter of 2000 to \$9.4 billion.
- The bulk of the profits came from oil and gas production, where profits rose 511% to \$3.88 billion in the first quarter of 2000 from \$636 million in the first quarter of 1999.
- Profits for independent petroleum companies increased 350% from the first quarter of 1999 to the first quarter of 2000.

Source: US Energy Information Administration

Rather than searching for a Band-Aid for high gas prices, the time has come to apply the cure: Make America's cars and SUVs go farther on a gallon of gas.

Every public crisis presents opportunities for advancing false solutions that serve a hidden agenda. Advocates for oil companies are using gas price rage as a mask for weakening or eliminating popular clean air laws. Some Senators are even attempting to revive dead efforts to drill national treasures. Furthermore, conservatives are looking to cut gas taxes to benefit the oil companies.

As a natural resource commodity, in a free market, petroleum prices would be subject to the classic discipline of the supply and demand equation. Unfortunately, supply is finite and mostly in the hands of a cartel of foreign nations, which stifles competition in ways which would clearly be illegal if attempted by individuals or companies. In spite of this, and unlike most other developed countries, we have made little attempt to limit our demand for oil and thus put ourselves at the mercy of the OPEC cartel. As we have seen recently, OPEC and Saudi Arabia in particular, uses its stranglehold over supply to "regulate" the price we pay for oil. Pillaging pristine ecosystems for a quick fix of oil won't significantly affect that fundamental relationship, and it won't lower gas prices. Only by using existing technology to improve the efficiency of cars, light trucks and SUVs, to affect the demand side, can we weaken OPEC's power and cut prices for American drivers.

In a recent statement, Exxon Mobil summed up the oil industry's philosophy: "Here's the challenge. Find enough new oil and gas each year to replace all that you produce, and more, handle it safely in increasingly difficult locations — and keep costs down."¹⁴⁰

But, Californians must be told that this is not their only option. More oil also brings more environmental and more public health damage. We can employ a variety of strategies to take back control of our economy and environment from the addiction to oil. Let's not lose the opportunity at hand; raise the CAFE standard, move towards more efficient and cleaner modes of transportation and maintain the requirement for zero emission vehicles.

Label New Cars With Automobile Health Warnings:

Consumers should understand not just the relative fuel efficiency of their cars, but the reasons why they should seek out cars that use less gasoline. As in the case of tobacco product hazard warnings, we believe that consumers need to be warned about the hazards of the internal combustion engine in order to make informed decisions affecting their health and well-being. We urge federal agencies to require warning labels be placed on the windows of all cars and trucks for sale and in all automobile advertising.





WARNING!

This vehicle requires toxic and extremely hazardous fuel and lubricants. The use of these substances as intended poses serious long term environmental and health risks. The manufacture and use of these substances releases Particulate Matter (PM) pollution, which has been linked with respiratory and cardiac disease, lung cancer and other cancers, fetal damage, and premature death.

New car dealers post a variety of consumer information on car windows, including fuel economy estimates for a particular model. We strongly believe that, like cigarettes and alcohol, cars and trucks should warn of the environmental hazards posed by gasoline and petroleum fuel product consumption. This is a simple requirement – but in the case of cigarettes and alcohol, social marketing worked. We think that this information is important enough to consumers that it should be applied to cars, as well.

Keep The Pressure on Diesel

The diesel industry is also fighting to keep its hold on California's transportation industry. Diesel-exhaust fumes are the single biggest contributor to dirty air around the state, especially in the pollution-plagued Los Angeles basin and, increasingly, in the Central Valley. Diesel vehicles account for only about 2% of the total number of cars, trucks and buses in California but generate 30% of nitrogen oxides — compounds that form unhealthy, ground-level ozone — and 65% of tiny airborne soot particles. State officials in 1998 identified these particulates in exhaust as a carcinogen. A recent study commissioned by the South Coast Air Quality District linked diesel exhaust to 70% of all airborne cancer risks in the Los Angeles area.

For diesel's critics, natural gas is the most desirable alternative, since the exhaust it generates contains far lower levels of both nitrogen oxides and particulates. But, diesel industry advocates are seeking legislative language for "fuel neutrality," which would allow diesel technologies that meet a "reasonable standard" to pass regulatory muster. But, no diesel technology available now has nearly the advantages of natural gas. Policy decision makers should not cave in to diesel interests and allow a phony "fuel neutrality."

Establish A Statewide Gasoline Impact Task Force

Our report is a topical survey of public information sources, and reveals only the tip of the iceberg. We encourage the California Environmental Protection Agency (CalEPA) to form a special Gasoline Impact Task Force to examine and list publicly in one place all the costs and damages associated with gasoline production, transportation and use. The Task Force should include the Air Resources Board, the State and



Regional Water Quality Control Boards, the Department of Industrial Relations' Department of Occupational Safety and Health (CalOSHA), the Department of Fish and Game, the Department of Conservation's Division of Oil and Gas, the California Department of Health and others. CalEPA must take the lead in an interagency task force because of the multimedia problems. An oil refinery can simultaneously pollute the air, the water and soil. But CalEPA must also include departments such as the Department of Fish and Game and CalOSHA in order to both register and take steps to protect workers and wildlife from refinery spills and explosions.

We want to continue strong regulatory efforts to clean up gasoline and diesel fuel, but state air regulators don't often look at the rest of the environmental damage caused by the petroleum fuel cycle. To truly protect us against the hazards posed by the industry as a whole, they must close the loop.

Increase Storage Tank Protections, Inspections and Enforcement:

Since gasoline and petroleum fuels will not disappear overnight, the Governor and Legislature must continue to improve programs that protect soil, air and groundwater from leaking storage tanks, above and below ground. The State Water Resources Control Board and the Regional Board must seek additional funding for inspection and enforcement of the state's laws. They must work more closely with local agencies at the City and County levels to ensure that our frontline permit and inspection agencies are serving effectively to protect against leaks in local gasoline stations.

Improve Refinery Safety:

One critical means of reducing the number of incidents at oil refineries is to properly maintain them. The most important variable in maintenance is a highly trained workforce, in sufficient numbers and intimately familiar with the facility. Refinery workers can reduce emissions and reduce explosions by keeping valves tight and inspecting gaskets for replacements. A working knowledge of the plant's operations prevents mistakes by contractors, a common source of emergency releases, fires and explosions.

Increase Mass Transit Opportunities

Others have written incisively and elsewhere about mass transit. New technologies like ZEVs and hydrogen/methanol fuel cell vehicles won't replace internal combustion overnight. In a market environment, decades will pass as owners replace aging cars and trucks with these newer and better technologies. In the meantime, California's population will grow. Some demographers estimate that the number of state residents will increase to 80 million by the year 2050.

Recently, the Governor and Legislature adopted budget appropriations that included funding for our aging transportation infrastructure, the first such financial commitment in years. They included hundreds of millions for mass transit projects. More is needed, but we applaud them for their efforts. We must start now to meet current and future needs.



Appendix 1

In 1996, the Environmental Defense Fund *Score Card* ranked 25 counties in California for the number of tons of volatile organic compound emissions, nitrogen oxides emissions, PM-10 emissions, sulfur dioxide emissions and carbon monoxide emissions. These emissions were tracked from all sources as well as from just mobile sources. The table below shows the results for the top five counties in California with the worst score card for the various emissions:

1a. Volatile Organic Compound emissions from all sources:

County	Tons
Los Angeles	415,073
Orange	124,616
San Diego	113,722
Santa Clara	87,964
San Bernardino	79,080

1b. Volatile Organic Compound emissions from mobile sources:

County	Tons
Los Angeles	184,203
Orange	57,063
San Diego	54,973
San Bernardino	35,780
Santa Clara	35,057

2a. Nitrogen Oxides Emissions from all sources:

County	Tons
Los Angeles	328,379
San Diego	92,144
San Bernardino	85,355
Orange	83,355
Kern	80,785

2b. Nitrogen Oxides Emissions from mobile sources:

County	Tons
Los Angeles	267,321
San Diego	83,344
Orange	73,123
San Bernardino	50,634
Santa Clara	43,085

3a. PM-10 Emissions form all sources:

County	Tons
Los Angeles	105,182
San Diego	88,533
Santa Clara	55,890
Alameda	46,945
Fresno	43,982



3b. PM-10 Emissions from mobile sources:

County	Tons
Los Angeles	38,274
San Diego	30,530
Santa Clara	15,210
Riverside	12,154
Sonoma	10,947

4a. Sulfur Dioxide Emissions from all sources:

County	Tons
Los Angeles	27,046
Contra Costa County	18,293
Kern	8,505
Santa Barbara	7,629
Ventura	7,325

4b. Sulfur Dioxide Emissions from mobile sources:

County	Tons
Los Angeles	17,165
Ventura	7,172
Santa Barbara	6,950
San Diego	4,546
Orange	3,796

5a. Carbon Monoxide Emissions from all sources:

County	Tons
Los Angeles	1,726,307
Orange	539,891
San Diego	497,026
Santa Clara	345,260
San Bernardino	343,194

5b. Carbon Monoxide from mobile sources:

County	Tons
Los Angeles	1,668,522
Orange	527,487
San Diego	465,168
Santa Clara	335,444
San Bernardino	315,583



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Notes:

