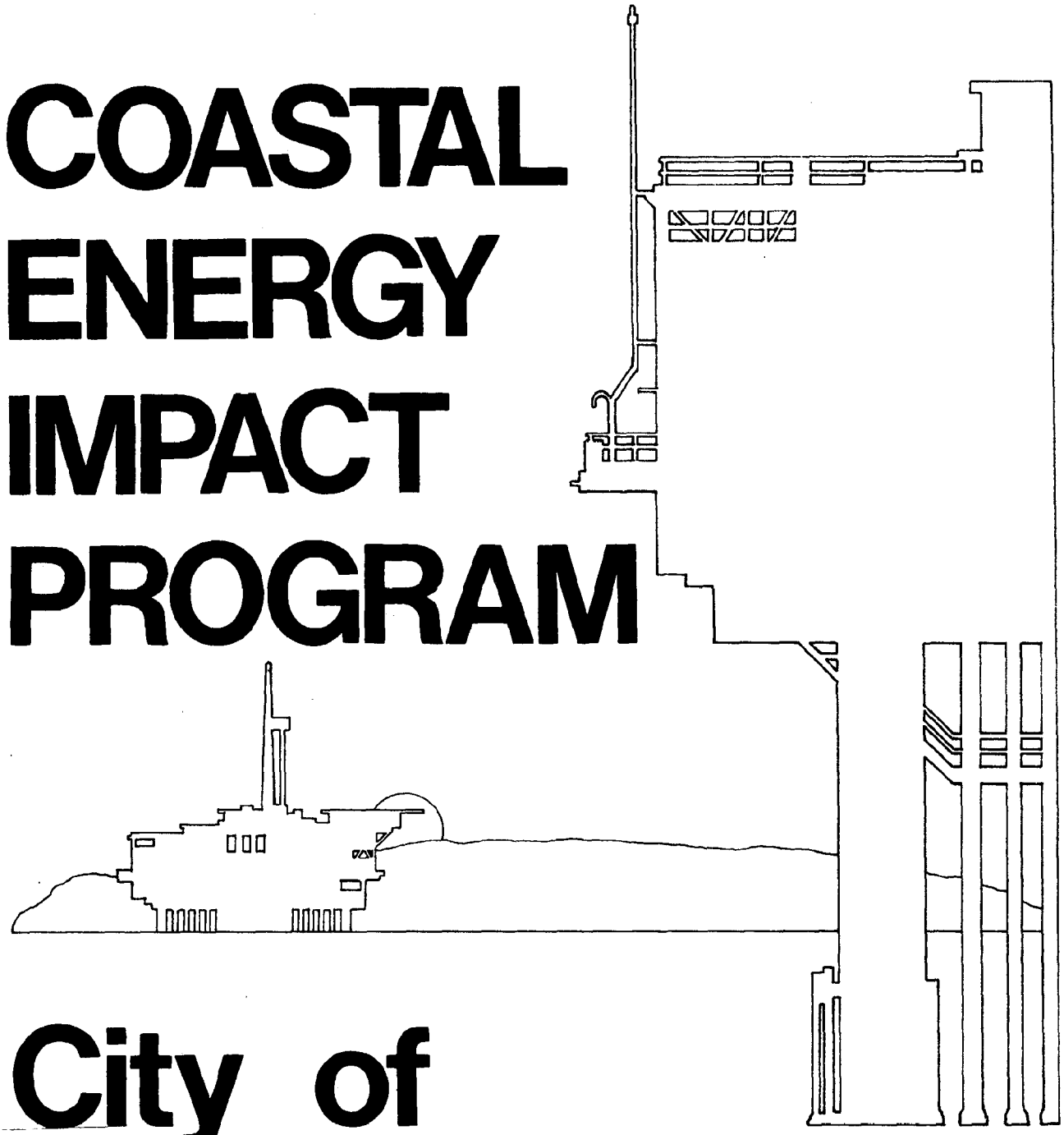
COASTAL ENERGY IMPACT PROGRAM



City of Huntington Beach

february 1980

CITY OF HUNTINGTON BEACH

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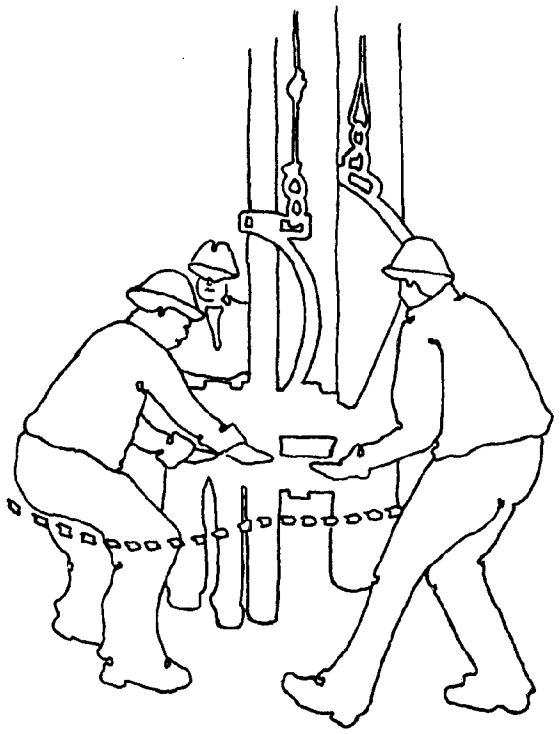


Part A

A.1.0 INTRODUCTION

This report is funded through the Coastal Energy Impact Program (CEIP). CEIP was established by the 1976 amendments to the federal Coastal Zone Management Act and allows state and local governments to focus on coastal energy issues - an aspect of coastal planning and management which is particularly important from a national perspective. CEIP has two principal objectives: 1) to help coastal states and their political subdivisions plan for the impacts from new energy facilities, and 2) to advance the national goal of encouraging development of domestic energy sources while protecting and managing all coastal resources.

Huntington Beach is a major center for energy-related activities in Orange County. The following facilities are located in the City:

1. A major electricity generating power plant
2. Extensive onshore oil extraction, treatment and storage facilities
3. An oil tanker unloading terminal
4. Two offshore oil platforms.

All of these are in or near the City's coastal zone; (See Figure A.1.1).

Additional offshore oil platforms will be installed in the Outer Continental Shelf (OCS) between Huntington Beach and Catalina Island during the 1980's.

In addition, a recently proposed residential development in the City will utilize solar energy for water heating. This project may indicate that Huntington Beach, long a center for conventional energy production, may now play a role in the development and use of new energy sources as well.

Recognizing the interrelation among uses in the coastal zone and the potential conflict of coastal planning goals, this CEIP report has been prepared in close conjunction with the City's Local Coastal Plan, and serves specifically as a background to the Industrial and Energy Task of that plan.

The report begins with a discussion of the regional and national importance of energy facilities. It then outlines the roles of the many public agencies which can affect energy issues. The next two sections discuss the power plant and the oil and gas activities. Each includes 1) an inventory of existing facilities, 2) analyses of the future of similar energy activities in the City, and 3) discussion of the impacts of these activities.

The staff has also added a brief section on solar energy and conservation. This section was not funded through the CEIP grant. However, the importance of these energy options, now and in the future, warrants their consideration in this report.

Finally, the report recommends policies and actions to mitigate undesirable impacts of energy activities and to promote their beneficial ones.

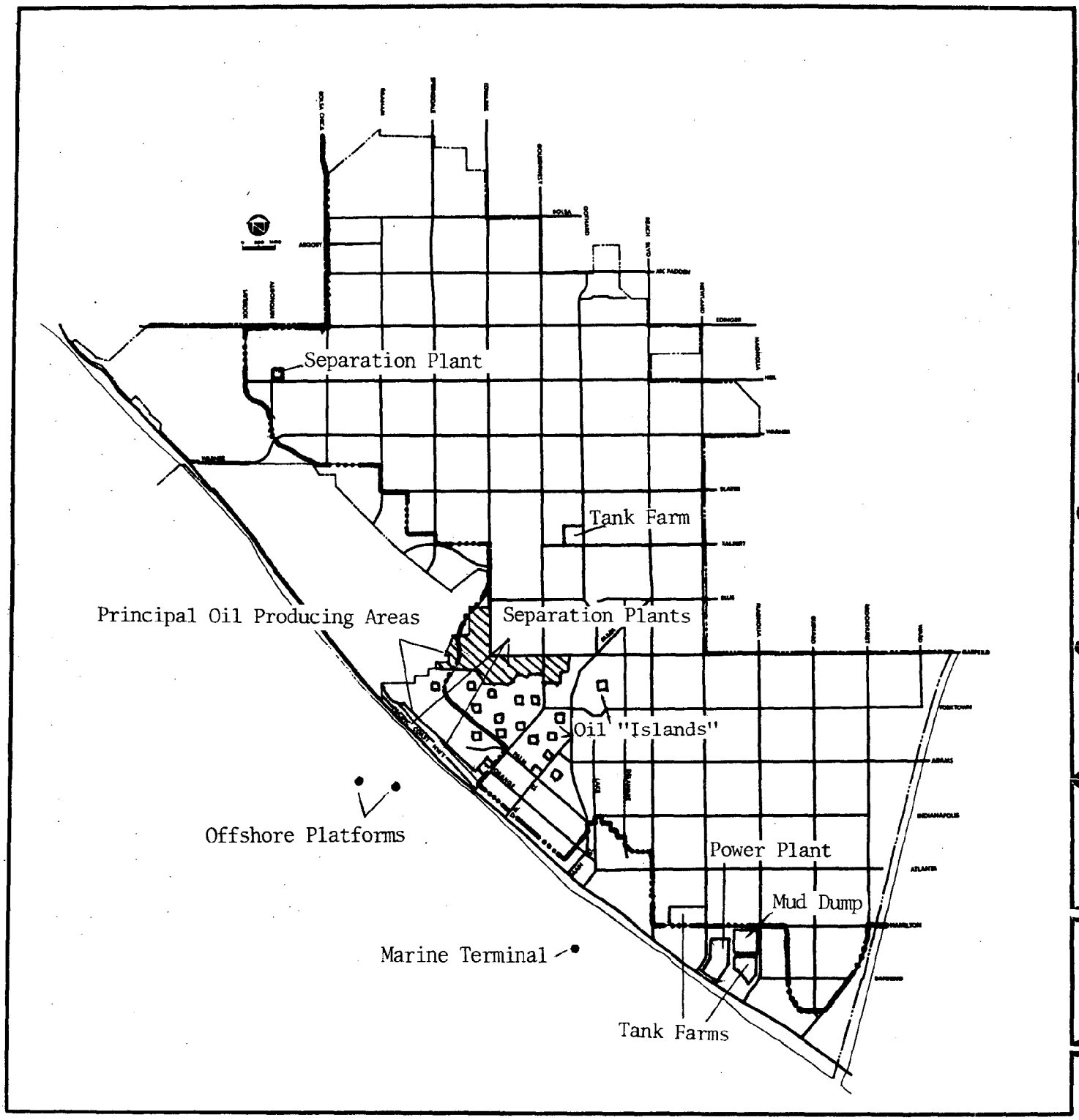


Figure A.1.1 Energy Facilities in Huntington Beach
Source: Huntington Beach Planning Division

huntington beach planning division

A.2.0 REGIONAL AND NATIONAL INTERESTS IN ENERGY FACILITY PLANNING

Regional and National Interests in Coastal Zone Management

Many coastal resources and coastal-dependent facilities have significant value not only for local areas but for the region, the State and even the nation. Such resources should be managed in a way that considers these greater-than-local interests. This is the rationale underlying efforts by the federal and State governments to promote coastal zone management. Through the Coastal Zone Management Act, the federal government has recognized that "there is a national interest in the effective management, beneficial use, protection and development of the coastal zone" and has provided funds to states and their political subdivisions to plan for and manage coastal resources in a way that promotes those national interests.[1] Similarly, the State has recognized through the California Coastal Act that the coastal zone is a resource which is important to the state and the nation and has established policies to ensure that greater-than-local interests are considered in the development of the coast.[2]

Despite the regional importance of coastal resources, the State relies heavily on local jurisdictions to manage the coastal zone. The legislature indicated that by allowing local governments to prepare and implement their own Local Coastal Plans (LCP's), the resulting regulatory system would be more responsive and accountable.[3] However, in their LCP's, local governments must accommodate the regional concerns reflected in the Coastal Act policies; if they do not, the State or regional commission can deny approval of the plan and can even assume the planning and management authority of the affected coastal zone.

Regional and National Interests in Energy-related Activities

Energy is obviously an essential resource; reliable energy sources are vital to the region, State and nation. Both the federal Coastal Zone Management Act and the California Coastal Act explicitly recognize the development of energy resources and the siting of energy-related facilities as especially important coastal activities affecting interests beyond local bounds. Energy facilities are considered so important in the state law that if an approved LCP precludes a needed energy facility which serves greater-than-local interests, the State Commission has the authority to amend the LCP to accommodate that facility.

This is very important to coastal planning in Huntington Beach because there are several energy facilities in the City's coastal zone which serve interests beyond the local community. First, the Southern California Edison power plant generates electricity for a large part of Orange County and is also part of a multi-state power grid. Second, foreign oil—an important and increasingly controversial energy source--is brought to this area by tanker and unloaded at a marine terminal in Huntington Beach. Third, Huntington Beach and adjacent onshore and offshore areas comprise an important oil producing field. There are facilities in the coastal zone to extract, treat, store and transport the resources of the field.

The production of domestic oil and gas supplies is especially important from a national perspective because it helps reduce the country's reliance on foreign sources. Importing large amounts of oil purchased at prices fixed by a cartel has hurt the U.S. "balance of trade" and has contributed to inflation and other economic problems. In addition to the economic effects, the nation incurs other important, though less tangible, costs from its reliance on foreign supplies. For example, the country's need for foreign oil may constrain its international political options; this kind of cost is not fully reflected in the price of the oil. Thus, the value of increasing domestic supply extends even beyond the direct economic benefits.

The contribution of the Huntington Beach field to the domestic supply is small but significant. The Huntington Beach field is the seventh largest in California; it produced about three percent of the State's oil in 1978.[4] Much of our domestic supply comes in small increments from fields like Huntington Beach's. Over 35 percent of California's production, for example, is from fields smaller than that in Huntington Beach.[5] The importance of these small increments will depend on the price of oil, the reliability of foreign supplies, and the development of alternative energy sources. Very likely, their importance will increase.

Other Interests in the Coastal Zone

The greater-than-local importance of energy facilities must be considered in coastal plans. However, there are several other important regional and national interests served by coastal resources which must also be weighed in the planning process. Several of these other interests are relevant to the Huntington Beach coastal zone. The City's nine miles of public beach, its pier and its waterways are used by people from throughout the region for swimming, surfing, boating, fishing and other activities and clearly comprise a greater-than-local recreation resource. The City's coastal zone also includes wetlands and endangered species habitats which have been recognized by the federal and State governments as resources of greater-than-local importance. Similarly, there is a regional and a national interest in protecting air and water resources.

Besides all of these regional interests, legitimate local concerns such as public health and safety, community housing needs, the local economy and the financial viability of the City must also be considered in coastal planning.

Clearly, there can be conflicts between energy facilities and other uses of regional importance, and between regional energy interests in the coastal zone and other local concerns. The purpose of coastal planning and management is to successfully accommodate the diverse interests in the coastal zone, and to promote the best possible solutions when conflicts among goals are inevitable.

Serving Greater-than-local Energy Needs

In light of the importance of energy-related activities, the policies recommended in this report are intended to support needed energy facilities and encourage the continued development of energy supplies. The policies also support the research and development of new energy technologies including solar and advanced oil extraction methods. They also accommodate the location of coastal-dependent energy facilities in the coastal zone.

However, the policies also recognize the other goals discussed above such as environmental protection, public health and safety, and recreation. The policies, consequently, protect these other interests by mitigating adverse impacts, limiting energy uses in certain areas, encouraging consolidation and unitization, and other means.

Thus, the recommendations in this report are intended to reflect a reasonable balance among energy development and other goals, a balance which serves the needs of the local community and meets the mandates of the Coastal Act.

A.3.0 PUBLIC AGENCIES INVOLVED WITH ENERGY FACILITY PLANNING AND REGULATIONS

This section summarizes very briefly the roles of the principal public agencies which are involved in the planning and regulation of energy facilities in and near Huntington Beach. As discussed in Section A.2.0, energy facilities have important greater-than-local impacts. In addition, many energy-related activities have highly technical aspects, which local governments generally cannot monitor or evaluate. For both of these reasons, many aspects of energy planning and regulation are carried out by the State and national governments.

This discussion is intended to be a first step in identifying the energy issues where the City has a strong role and the best "access points" for local input to the actions of other agencies with pre-emptive power.

Federal Agencies

Department of Energy Issues permits and licenses for power plants and major transmission routes. Plans for and implements pricing of oil and gas, and provides funding for research and development of energy.

Department of the Interior--Bureau of Land Management Conducts lease-sales of Outer Continental Shelf (OCS) tracts for oil and gas development, and makes preliminary tract selection for lease-sales.

U.S. Geological Survey Issues orders regulating oil and gas extraction and production in the OCS. Lead agency responding to oil spills within 500 yards of OCS platforms.

Fish and Wildlife Service Comments on permits issued by Army Corps of Engineers affecting wetlands and implements Endangered Species Act. Involved in energy (and other) proposals affecting wetlands or endangered species.

Environmental Protection Agency Sets minimum air and water pollution standards for energy facilities. (California's standards are more strict than these minimums and permit authority has been delegated to the State with periodic federal review.) Lead agency responding to oil spills threatening inland waterways and is responsible for regulation, control and clean-up of toxic material in the environment.

Department of Transportation--U.S. Coast Guard Responsible for clean up of oil spills in coastal waters. Has prepared an oil spill contingency plan for the San Pedro Bay area. Sets up local response teams to react quickly to oil spills.

Department of Commerce--National Marine Fisheries Comments on energy (and other) proposals affecting fish resources.

Office of Coastal Zone Management Administers federal Coastal Zone Management Act which requires federal activities be consistent with approved coastal plans. Funds coastal planning activities and management programs.

Department of Defense--Army Corps of Engineers Issues permits for energy facilities (and others) in wetlands and waterways.

State Agencies

Energy Commission Controls siting and licensing of power plants.

Public Utilities Commission Sets rates for utility companies, and reviews utility actions to ensure that they reflect the public interest.

State Lands Commission Regulates State-owned lands from the shoreline to the three mile limit. Leases these lands for oil and gas activities. Companies must apply to Commission before engaging in drilling or related activities.

Division of Oil and Gas Regulates drilling, redrillng, production and abandonment of oil and gas wells. Sets procedures to reduce the incidence of accidents like blowouts, to prevent subsidence and water contamination, and to increase efficiency of resource recovery. Keeps records of all oil and gas activities in the State.

Coastal Commission Implements California Coastal Act. Has jurisdiction over land uses in coastal zone until local plans are approved. Reviews and approves plans. Under certain conditions retains authority to amend local coastal plans after approval to accommodate needed energy facilities with greater-than-local benefits.

Department of Fish and Game The lead agency in State oil spill contingency plan. Comments on energy facilities affecting wetlands and other sensitive habitats, and monitors fish entrainment in power plant cooling system.

Regional Air Quality Board Sets pollution standards for and monitors emissions from energy facilities.

Regional Water Quality Board Issues discharge permits for energy facilities. Monitors and responds to oil spills threatening water resources.

Parks and Recreation Has jurisdiction over all State beaches. Arrangements with oil companies to allow oil extraction on Bolsa Chica State Beach were carried out by this agency. May clean-up small oil spills when spiller is unknown.

Office of Planning and Research Has conducted studies relevant to energy facilities in Huntington Beach.

County Agencies

Environmental Management Agency Involved with the planning and regulation of some energy facilities which affect County resources such as flood control channels or arterial highways.

Emergency Services: Has a spill contingency plan for the County.

Environmental Health Monitors water quality near outfalls from oil operations and the power plant.

Municipal Agencies

Development Services Responsible for general planning and zoning. Major oil facilities are accommodated in the General Plan by a resource production designation. Specific oil activities are allowed through special zoning suffixes and the City Oil Code. Reviews plans for energy facilities and issues permits allowing their construction, and reviews environmental impact reports regarding energy facilities in and near the City.

Fire Department Enforces City Oil Code. Inspects well sites annually and reviews plans of tank farms and major oil leases to reduce risks from fire or explosion.

Civil Defense In cooperation with Police and Fire Departments has prepared evacuation plans in case of serious accidents including those involving energy facilities.

Community Services-Harbors and Beaches Records oil spills on City beach, and may clean-up small oil spills when the spiller is unknown.

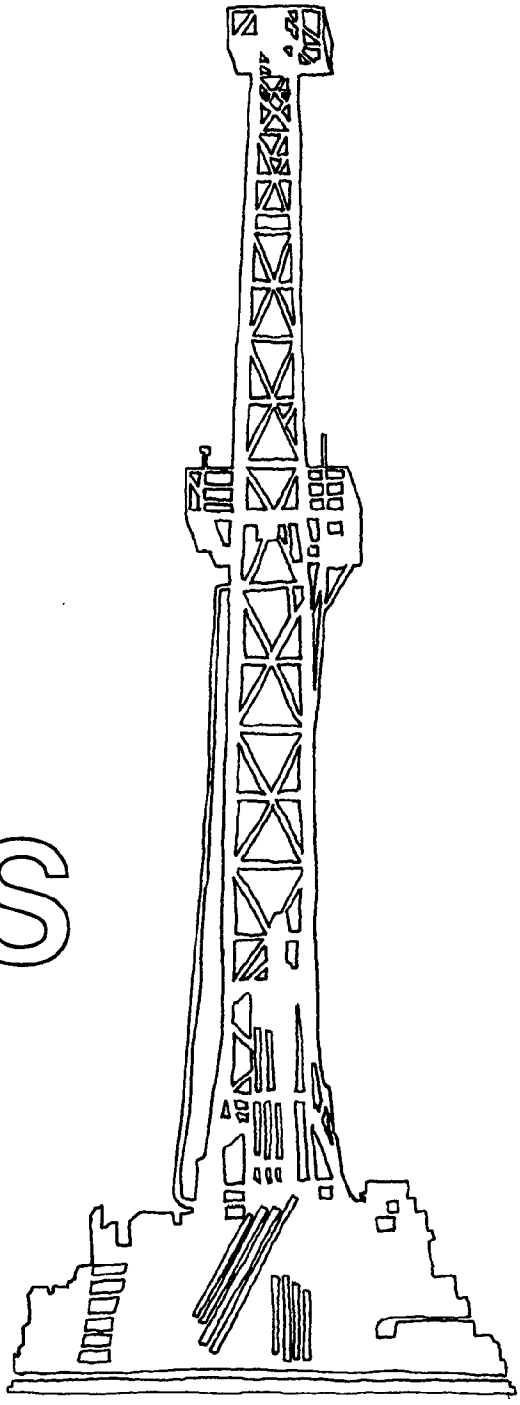
Administration Collects and records licenses, fees and franchises from oil production, pipelines and other energy facilities.

A.4.0 NOTES

1. Federal Coastal Zone Management Act; Section 302.a.
2. California Coastal Act; Sections 30001 and 30001.5.
3. Ibid, Section 30004.a.
4. California Division of Oil and Gas, Sixty-fourth Annual Report; Sacramento, 1978.
5. Ibid.

OIL AND GAS FACILITIES

Part B



OIL AND GAS FACILITIES

This part of the report is concerned with oil and gas facilities in and near the Huntington Beach coastal zone. It first discusses the processes through which oil and gas are typically extracted, and then describes the specific facilities and equipment located in Huntington Beach. Later sections investigate the future of oil-related activities in this area. In the last sections, the numerous impacts that present and future activities could generate are catalogued and discussed.

B.1.0 OIL AND OIL DEPOSITS

Oil is probably formed from the remnants of prehistoric marine plants and animals. Millions of years ago, the remains of these creatures settled on the bottoms of shallow seas and lagoons, where they mixed with other sediments like mud and sand. Sometimes, the build-up of these mixtures of mud, sand and organic matter became very thick. With the passage of time, and under the influence of heat and pressure in the earth's crust, the mud and sand hardened into rocks. The organic remains, also subject to heat and pressure, as well as to bacterial action, were transformed into oil and gas by a process which is not clearly understood. Thus, in these sediments-turned-to-rocks, tiny droplets of oil were interspersed between the grains of sand or mud. As the mud and sand further compacted under the pressure, these droplets were "squeezed" out. The oil and gas tended to "migrate" from rocks that were very tight into strata where the rocks are more porous, that is, those which have more space between the grains. The oil and gas also tended to rise upward through porous strata. The reasons for this are not fully understood, but the most important factor is that oil is lighter than water and thus tends to float up and on top of ground water which is also found in the rocks.[1]

Oil pools occur when high concentrations of oil accumulate in porous rocks. This accumulation can only occur when there are: 1) source beds which contain oil-forming matter; 2) porous strata called reservoirs, where the oil can be collected and 3) an impervious bed above the reservoir rock which keeps the oil in the porous rock.[2] An arrangement of strata in which an impervious bed seals a porous bed so oil can accumulate there is called a "trap". Traps can be formed in a number of ways; two kinds of traps which occur under Huntington Beach are illustrated in Figure B.1.0. In one case, beds are folded so that oil cannot escape. In the other, faulting has thrust impervious beds against porous rocks, thus sealing in the oil. In this area, sandstones and conglomerates are the most common reservoir rocks. Shales are the most common seals.[3]

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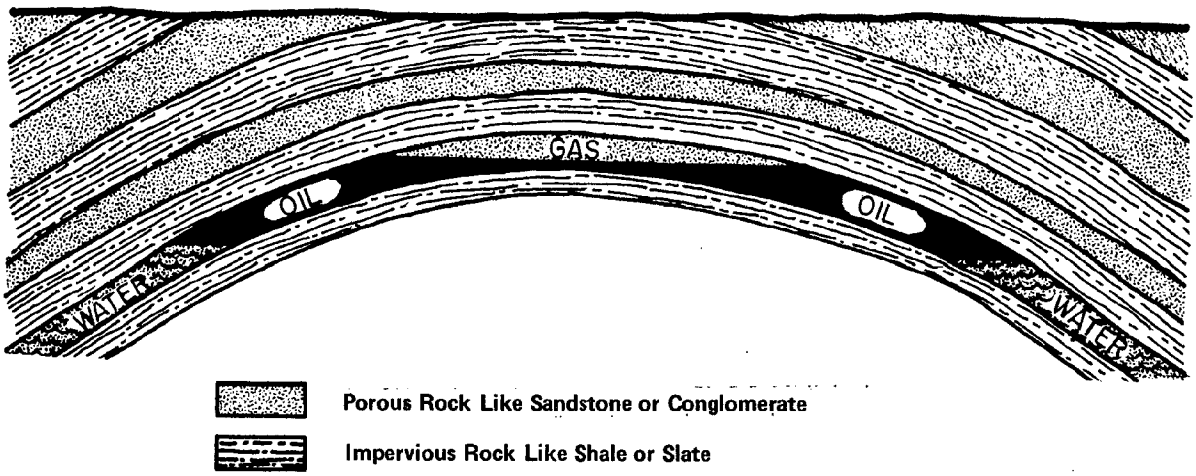


Porous Rock Like Sandstone or Conglomerate

Impervious Rock Like Shale or Slate

TRAP FORMED BY FAULTING

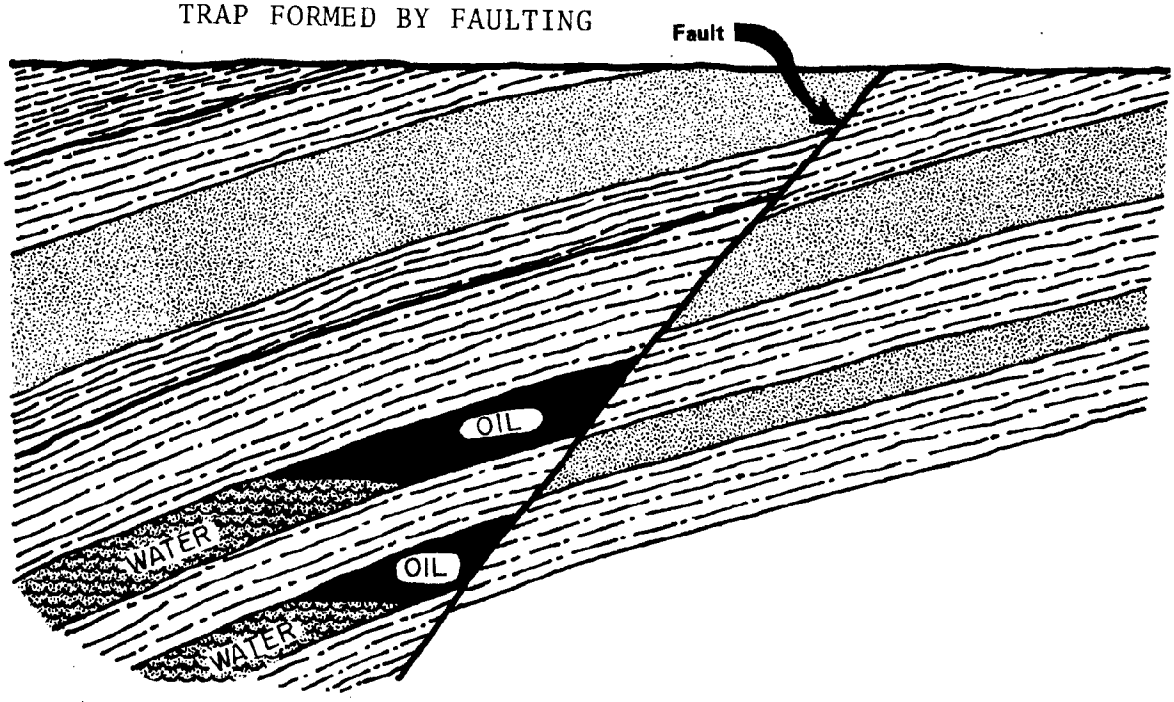


Figure B.1.0 Oil Traps in Huntington Beach
Source: Division of Oil and Gas, 44th Annual Report, 1958

huntington beach planning division

B.2.1 OIL EXTRACTION

B.2.1.1 OIL WELLS AND RECOVERY METHODS

Oil geologists use many exploration methods to try to locate underground oil pools. These methods include studying surface geology, core drillings and fossils, and using electronic, magnetic, gravitational or seismic data to interpret subsurface strata.

Oil is removed from the ground through wells. Today, virtually all oil wells are drilled using the rotary method. A large steel bit, attached to metal pipes, bores into the earth, much like a carpenter's drill bores into wood. (See figure B.2.1). A derrick is erected above the well to hold the lengths of pipe which will be lowered into the hole as the bit bores deeper. The pipe is, in effect, the drive shaft of the turning drill. A rotary table is placed in the center of the derrick floor and turns the pipes and the bit. An engine located nearby drives the rotary table.

During the drilling, special muds are pumped through the pipes and out holes in the bit. The pressurized mud picks up the rock cuttings chewed out by the bit and lifts these to the surface through the space between the pipes and the hole cut by the bit. The mud also becomes plastered against the walls of the hole and this helps keep the hole from caving in. The weight of the mud prevents fluids from bursting out of the hole if a region of high pressure gases or liquids is reached.

A casing is also lowered into the hole and is anchored in place with cement. How far down into the hole this casing is extended depends on considerations like the amount of pressure anticipated in a reservior and the depth of any fresh water aquifiers (which are protected by the casing). "Blowout prevention equipment" is then installed on the casing. These devices typically involve powerful hydraulic valves which can quickly seal the well if pressurized fluids jet up to the surface. Before the use of this equipment, "gushers" --- the uncontrolled escape of oil --- were much more common.

If oil is found, the casing is generally extended into the productive zone (or zones) and perforated to allow fluids to enter the well hole. Recall that oil pools occur when the fluids in porous rock are trapped and can no longer flow upward. The well is simply a hole in the trap through which the confined fluids can now escape. Tubing is then lowered into the casing to collect the oil and gas flowing through the perforated casing. (See figure B.2.2).

The fluids can be under so much pressure that they rise to the top of the well with their own energy. In these cases, pumps are not necessary and a system of valves called a "Christmas tree" is attached to the top of the well to regulate the flow.

If natural pressures are insufficient, pumps are lowered into the well to lift out the oil. These are operated by the familiar above-ground pumping units: metal beams which are lifted and dropped by motors. Metal rods connect the end of the beam and the underground pump. The bobbing beam moves the rods up and down and thus works the pump.

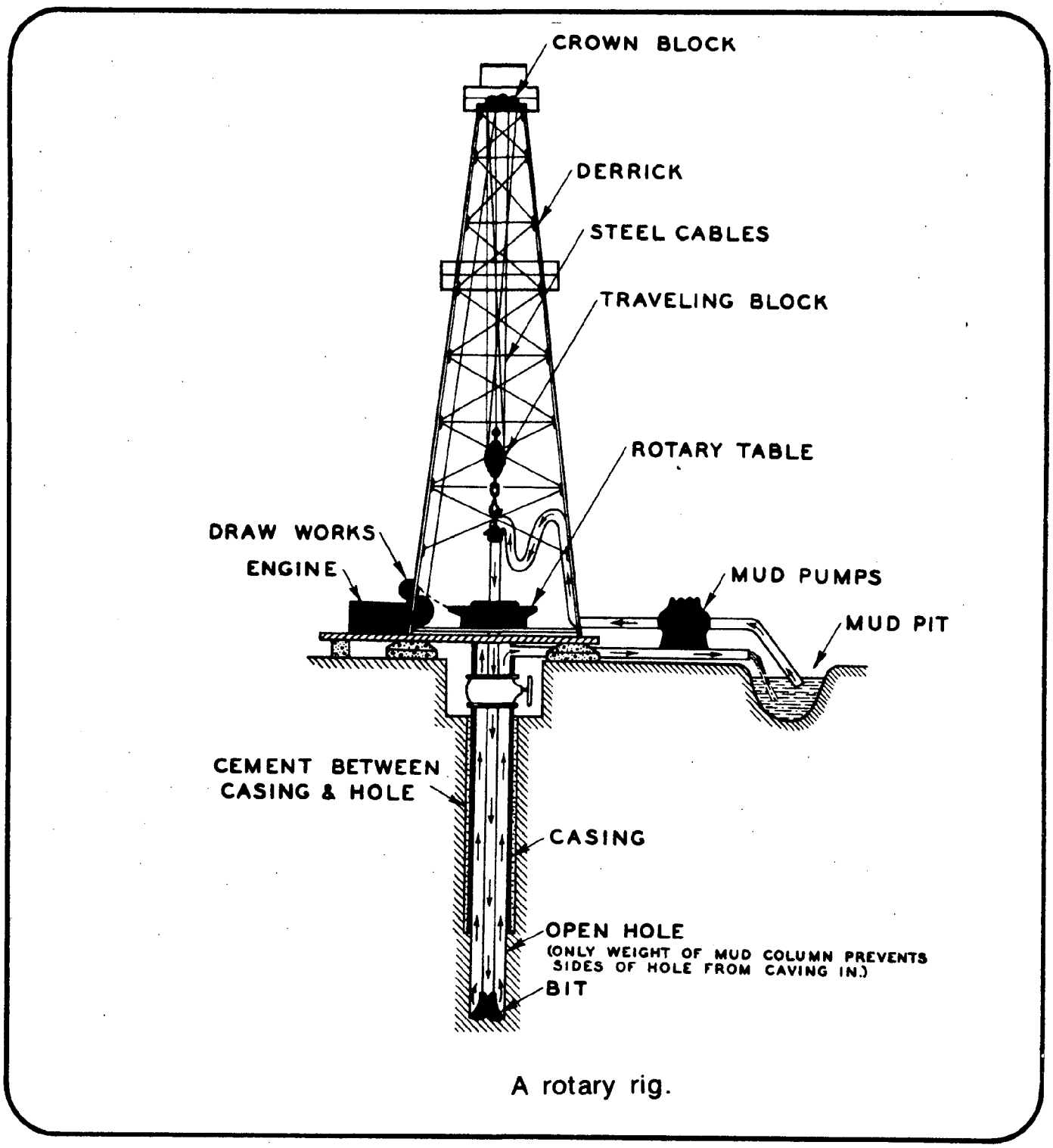
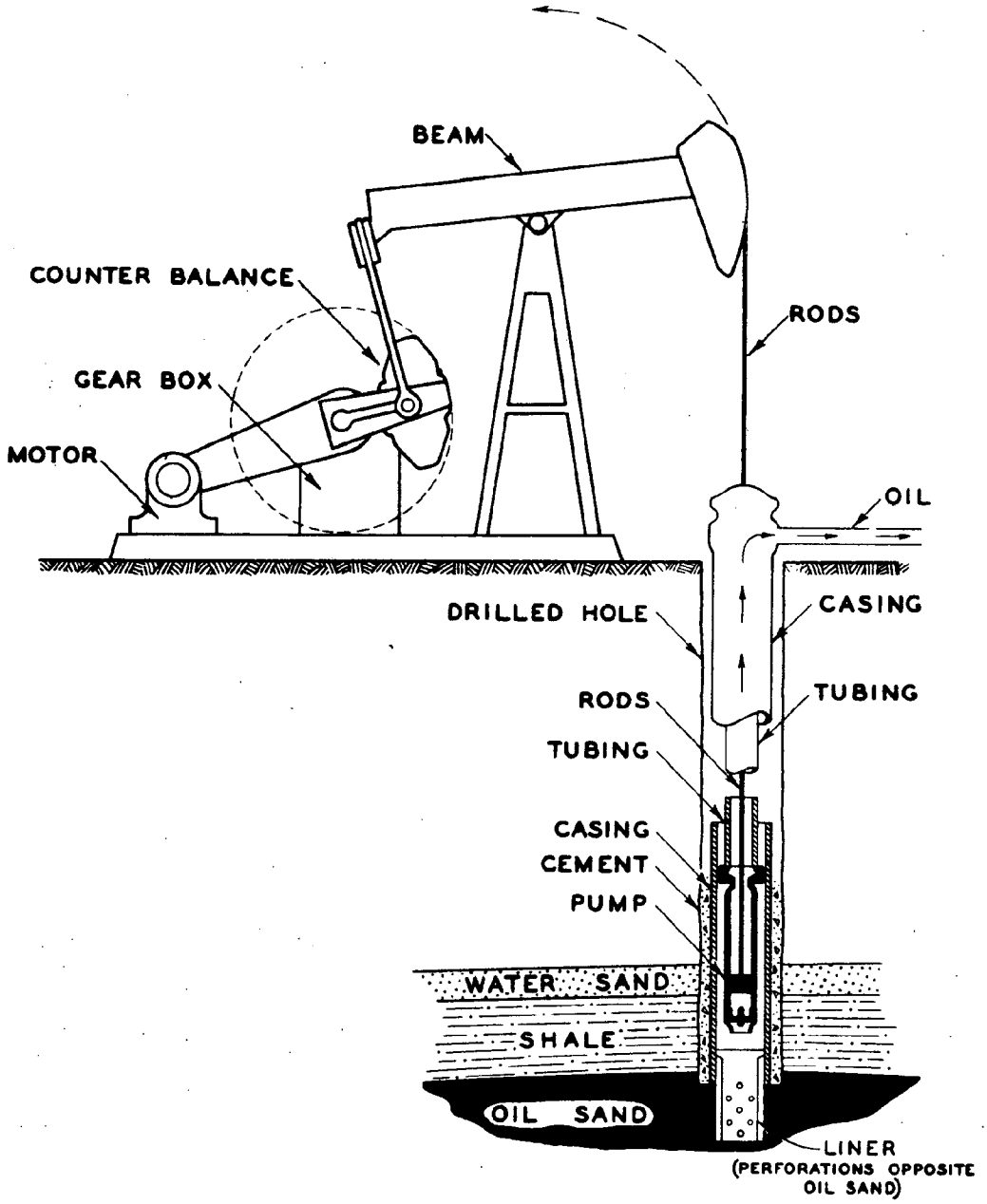


Figure B.2.1 Drilling Equipment
Source: Division of Oil and Gas, Introduction to California's Energy Resources, 1973



An oil well pumping unit.

Figure B.2.2 Pumping Equipment
Source: Division of Oil and Gas, Introduction to California's Energy Resources, 1973

Other kinds of pumps are occasionally used. If the volume of fluids extracted is quite large, for example, an electric pump may be lowered into the well.

Once the fluids (gas, oil, water) reach the surface they are separated, measured, and treated. These operations are described in a later section.

Often it is inconvenient to site a well directly above the productive strata to be tapped. In these cases, the wells are "directionally drilled", that is, bored at an angle. Wells can be drilled as much as 70° from vertical. Sometimes old wells are redrilled so that at a certain depth the bit is forced away from the original hole and angled down to new zones. Most of the wells in Huntington Beach just landward of the Pacific Coast Highway and northeast of Goldenwest Street are directional wells that pump oil from offshore zones. Many of these existing wells are redrills of old ones, following the old hole part of the way down, then veering off to new strata. Directional drilling explains how many pumps can be sited very close together and why an active pump may be adjacent to an idle one: although the pumping units are next to each other, each well hole reaches to a different oil zone.

Oil recovered solely by drilling and pumping is called "primary production". Typically, only 15-20 percent of the oil in a zone can be extracted this way. The rest of the oil in the trap remains coated on grains of sand in the rock. To free that oil, water is pumped under pressure through the well and into the oil laden stratum. The pressurized water helps force the oil from the rock. The well then recovers a mixture of oil and water, and above-ground facilities later separate the liquids. This "secondary production" process is called water "injection" or "flooding." Most of the oil produced in Huntington Beach comes from wells supported by flooding operations.

Sometimes gas is injected into the wells instead of water to help build up pressure in the zone and sometimes, if the oil is very thick ("viscous"), steam is injected. In the latter case, the steam heats up the thick oil which helps it flow more easily. Some wells in Huntington Beach are currently steam injected.

Secondary production usually removes an additional 30-35 percent of the oil in a zone. Thus, typically, half the oil still remains in the porous rock even after water injection. Methods to remove more oil from the zone are called "tertiary production". These are very costly and are not generally employed. However, escalating oil prices may make these methods more attractive. Tertiary production usually involves injection of chemicals into the oil zone which facilitate oil flow. Aminoil has a pilot program underway for tertiary production. This process involves first injecting soft water into the zone. Then, a caustic gel is injected behind the water and more water is pumped in behind the caustic. If successful, a wall of thick gel will force its way through the rock pushing the oil out. In secondary production injected water tends to run through "channels"--relatively wide passageways--in the rocks, missing large amounts of the oil. The caustic is a more viscous medium, however, and may be less prone to channelization. Thus, it should wash out more oil. Chevron is also undertaking an experimental tertiary project. This company's method is based on the same principal of forcing a more viscous fluid through the rocks, but Chevron is using a polymer instead of a caustic as the thickening agent. The results of these pilot projects will not be known until at least 1981.

B.2.1.2 OIL EXTRACTION IN HUNTINGTON BEACH

A large part of the City of Huntington Beach sits on an oil field. This field also extends under the Bolsa Chica wetlands and under the ocean in a long, narrow arc reaching a few miles offshore. (See Figure B.2.2(a).)

The field is not one large contiguous oil pool, but many oil zones separated vertically from each other by impervious strata and sometimes horizontally by faulting and folding in the beds. Some of the productive oil zones identified in the Huntington Beach field include the Tar, TM, AA, A-37, A-66, Ashton, upper and lower Jones, and upper and lower Main. In many areas, the depth and thickness of the zones have been surveyed. For example, Table B.2.1 shows a profile of oil zones located in the offshore parts of the field.

The viscosity and quality of oil may vary from zone to zone and this may warrant different production methods in different zones. For example, oil from the TM zone is quite thick; thus, Aminoil has used steam injection, rather than water flooding, to improve production from this stratum.

Figures B.2.3 and B.2.4 summarize historical trends in oil and gas production in the field. (Note that this data includes output from the entire field - thus, production from the offshore platforms and from wells in the Bolsa Chica on unincorporated land is combined with that from wells actually in the City of Huntington Beach.)

When reviewing the annual production data, it should be noted that the oil wells in and near Huntington Beach tap many different oil zones. The activities undertaken in different zones may be relatively independent of one another. For example, an oil company may plan to instigate secondary production in a zone which, until now, was only in primary production. One could reasonably infer that production will increase and that the life of those wells will considerably lengthen. On the other hand, in a zone where secondary production has been employed for a long time and tertiary production seems unfeasible or uneconomical, production would be expected to decline and those wells phased out - or redrilled to new zones. Some of the actual activities in different zones will be discussed later.

Figure B.2.3 indicates that Huntington Beach is probably past its oil producing peak, but that relatively large quantities are still extracted each year. The offshore contribution to this production is increasingly important.

Figure B.2.3 shows that gas production has declined precipitously since the 1960's. Because the free-flowing gas can more easily leave the rock than oil, most of the gas is extracted in primary production. Secondary production programs have prolonged oil recovery, but have had little effect on gas outputs.

Figure B.2.5 indicates that the number of productive wells in the area has declined steadily through the decade. Few new wells are drilled while on the average, 50 wells have been abandoned each year since 1970. This reflects the fact that 1) most new production involves redrilling old wells or using secondary (and tertiary) techniques in already tapped zones, and 2) wells where these techniques are infeasible are phased out as output declines.

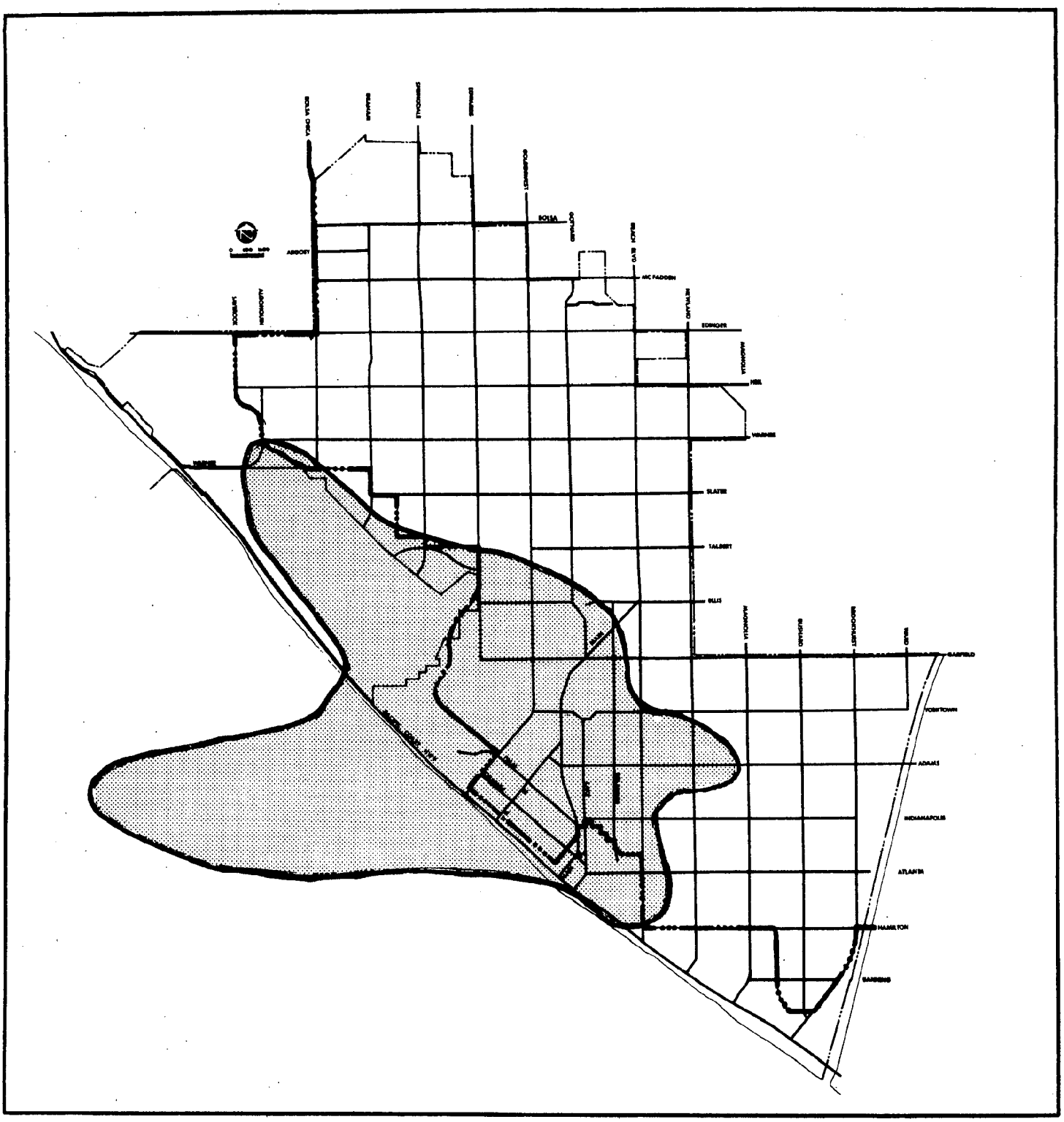
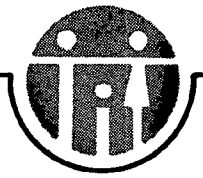


Figure B.2.2(a) Approximate Location of the Huntington Beach Oil Field
Source: Division of Oil and Gas, 44th Annual Report, 1958

EXAMPLE OF OIL ZONE PROFILE IN HUNTINGTON BEACH FIELD

ZONE	DEPTH (feet)	THICKNESS (feet)
"C"	950	120
"D"	1300	60
"AA"	1600	100
"TM"	2200	125
Upper Jones	2400	200
Lower Jones	2850	200
Upper Main	3600	250
Lower Main	3800	450
Deep	(below)5000	500+

Table B.2.1 Oil Zone Profile
Source: State Lands Commission, Continued Burmah Oil Operations, EIR, 1977



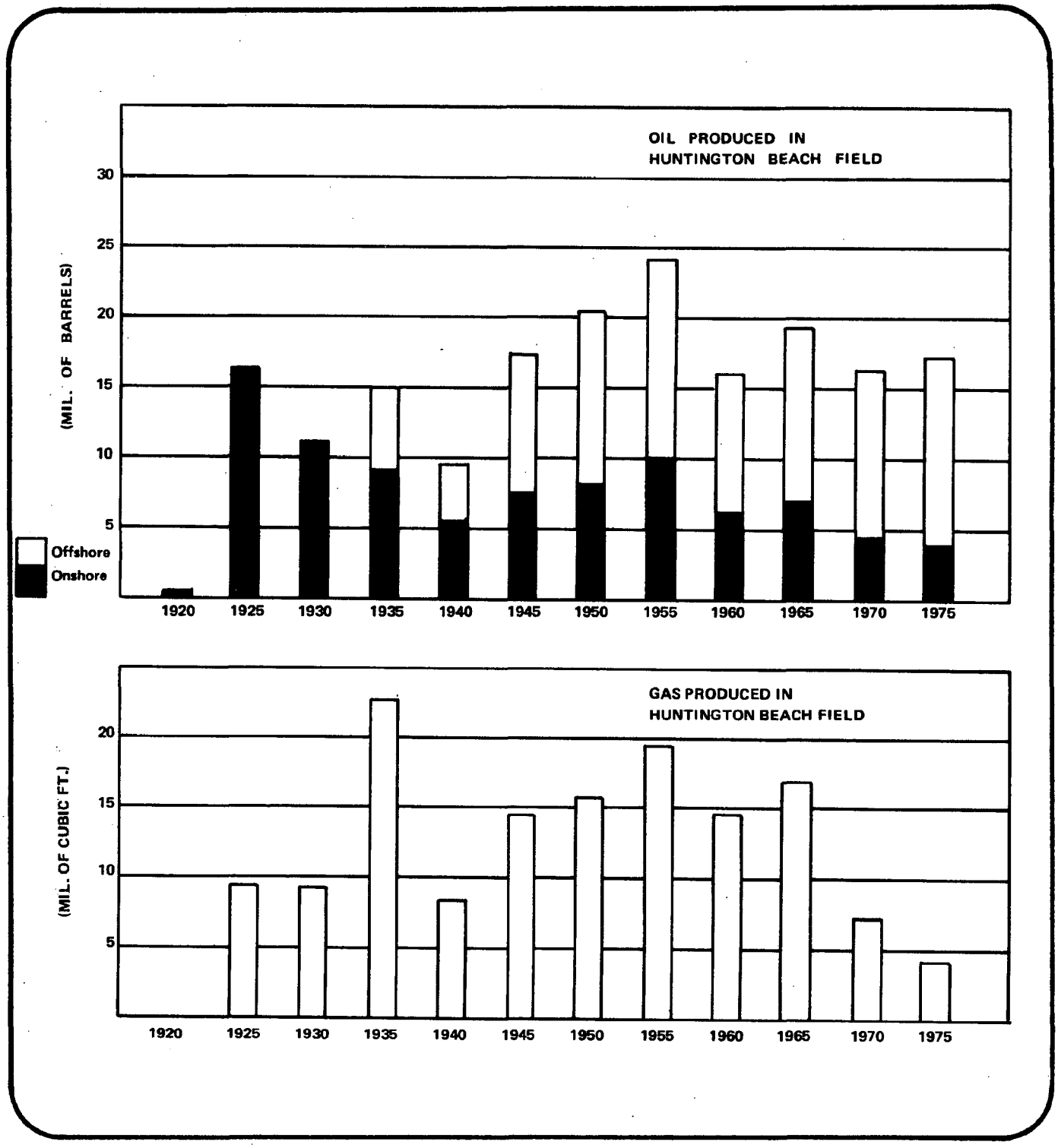
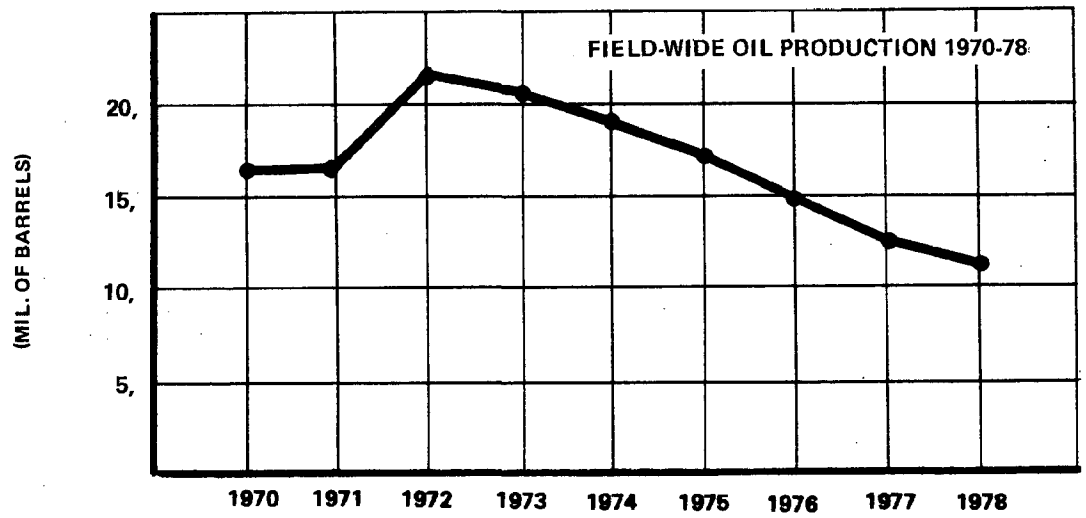


Figure B.2.3 Total Oil and Gas Production in Huntington Beach field
Source: Division of Oil and Gas, Annual Reports



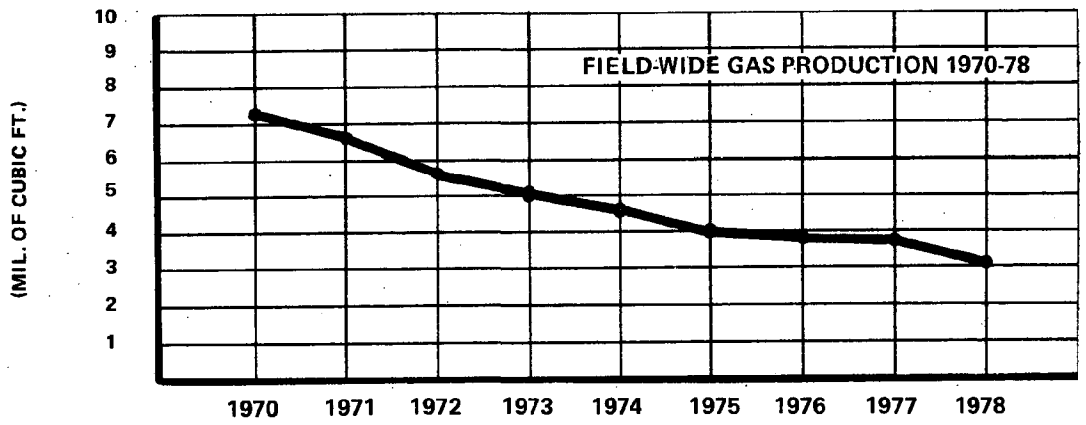


Figure B.2.4 Total Field-wide Production 1970-1978
Source: Conservation Committee of California Oil Producers, Annual Reports

huntington beach planning division

PRODUCING WELLS IN HUNTINGTON BEACH 1978 (approximate)

COMPANY	IN CITY		OUTSIDE CITY	TOTAL FIELD
	TOTAL	ONSHORE / ON PLATFORM		
Aminoil	245	220 / 25	90	335
Chevron	310	310 / 0	15	325
Union	35	0 / 35	0	35
Others	295	295 / 0	0	295
			TOTAL	990

Table B.2.2 Location of Producing Wells in Huntington Beach by Company, 1978
Source: Division of Oil and Gas and Huntington Beach Planning Division

huntington beach planning division

Figure B.2.6 shows the approximate distribution of producing oil wells in Huntington Beach. Two major oil companies, Aminoil and Chevron, USA, operate about two-thirds of these wells. (See Table B.2.2).

Aminoil has approximately 175 wells located on a strip 600 feet wide and two miles long just northeast of the Pacific Coast Highway from Goldenwest to the Bolsa Chica and 15 wells on the shore side of the highway south of Goldenwest. These wells are all within the City limits and are in the Coastal Zone. Aminoil also has numerous wells in the Bolsa Chica which are not in the City of Huntington Beach.

Chevron operates approximately 300 wells most of which are located on lands north and east of the Aminoil strip. Chevron also has several wells on the ocean side of Coast Highway. Almost all of these wells are within the City limits and many are in the Coastal Zone.

The remaining wells are scattered throughout the City on smaller sites. Over 70 companies operate these wells. Table B.2.3 lists all the oil companies operating wells in Huntington Beach.

Aminoil's onshore wells are directionally drilled under the beach to oil pools beneath the ocean. Some of these wells reach over two miles offshore. Aminoil also operates platform Emmy, which is connected to onshore facilities in Huntington Beach by pipelines. Wells on Emmy extract oil from offshore pools inaccessible to the onshore directional wells. Platform operations are discussed in Section B.3.

Aminoil concentrates its well heads into a narrow onshore site. This practice is called "island drilling" because a large underground area is tapped from a relatively small surface area or "island." About 3,000 offshore acres have been developed from this company's 130-acre onshore site.

Aminoil completed the primary production phase of their operations around 1968. They now use two kinds of secondary treatment, water and steam injection. The former technique is widespread in their operations but steam injection is limited to the TM zone which holds a viscous oil. Aminoil also has begun a pilot program using a tertiary method which involves injecting a caustic into an oil zone. The results of this project are expected in 1981 or 1982.

Figure B.2.7 shows the production of the major companies in Huntington Beach during this past decade. Aminoil produces more oil in the Huntington Beach field than all the other companies combined. The large surge in Aminoil's production in the early 1970's resulted from the waterflood of the lower main zone. Aminoil has recently initiated another program of redrilling old wells and drilling several new ones, both on Emmy and onshore. This project should at least arrest the recent downward production trend and could prompt another production surge in the early 1980's.

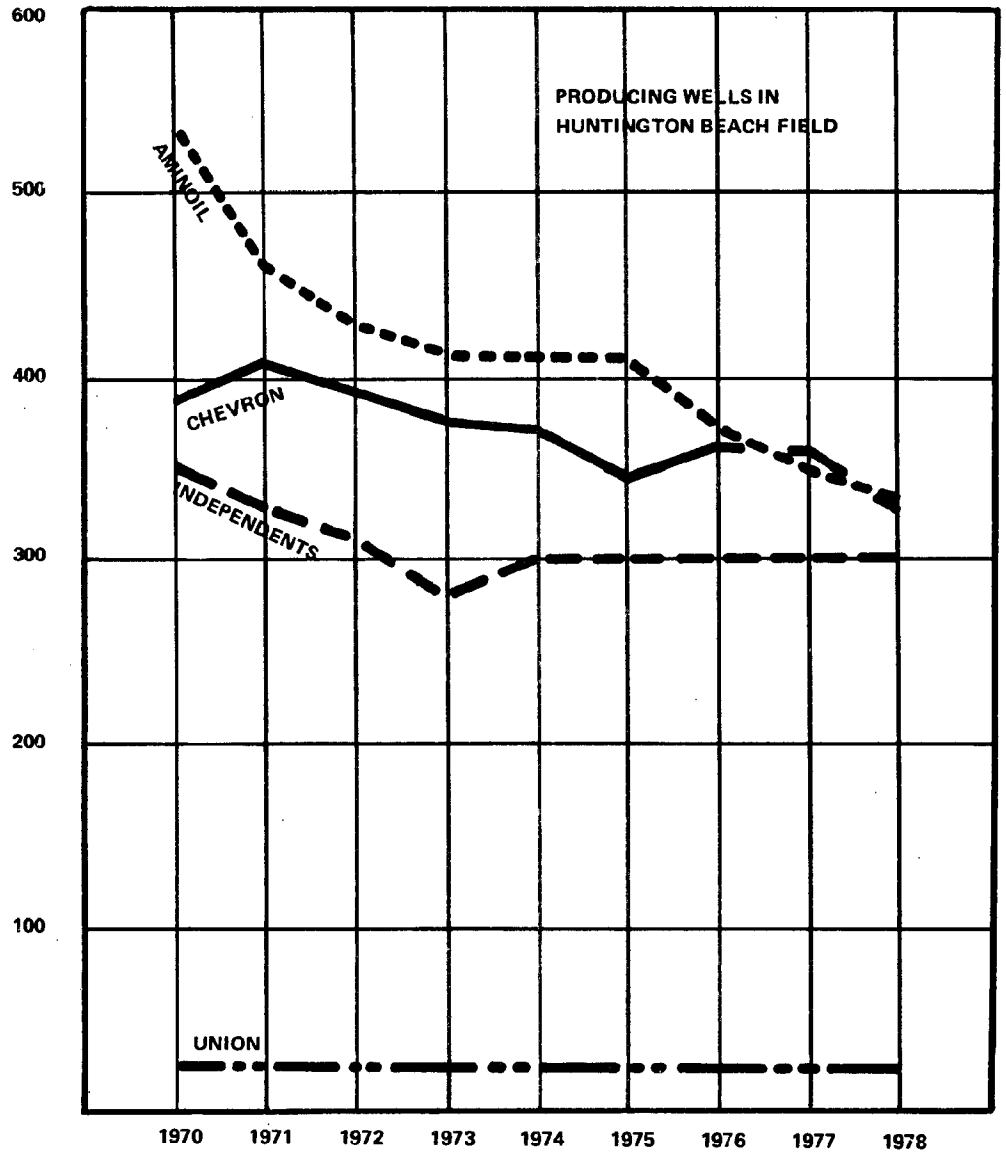


Figure B.2.5 Producing Wells in Huntington Beach Field by Company, 1970-1978
Source: Conservation Committee of California Oil Producers, Annual Reports

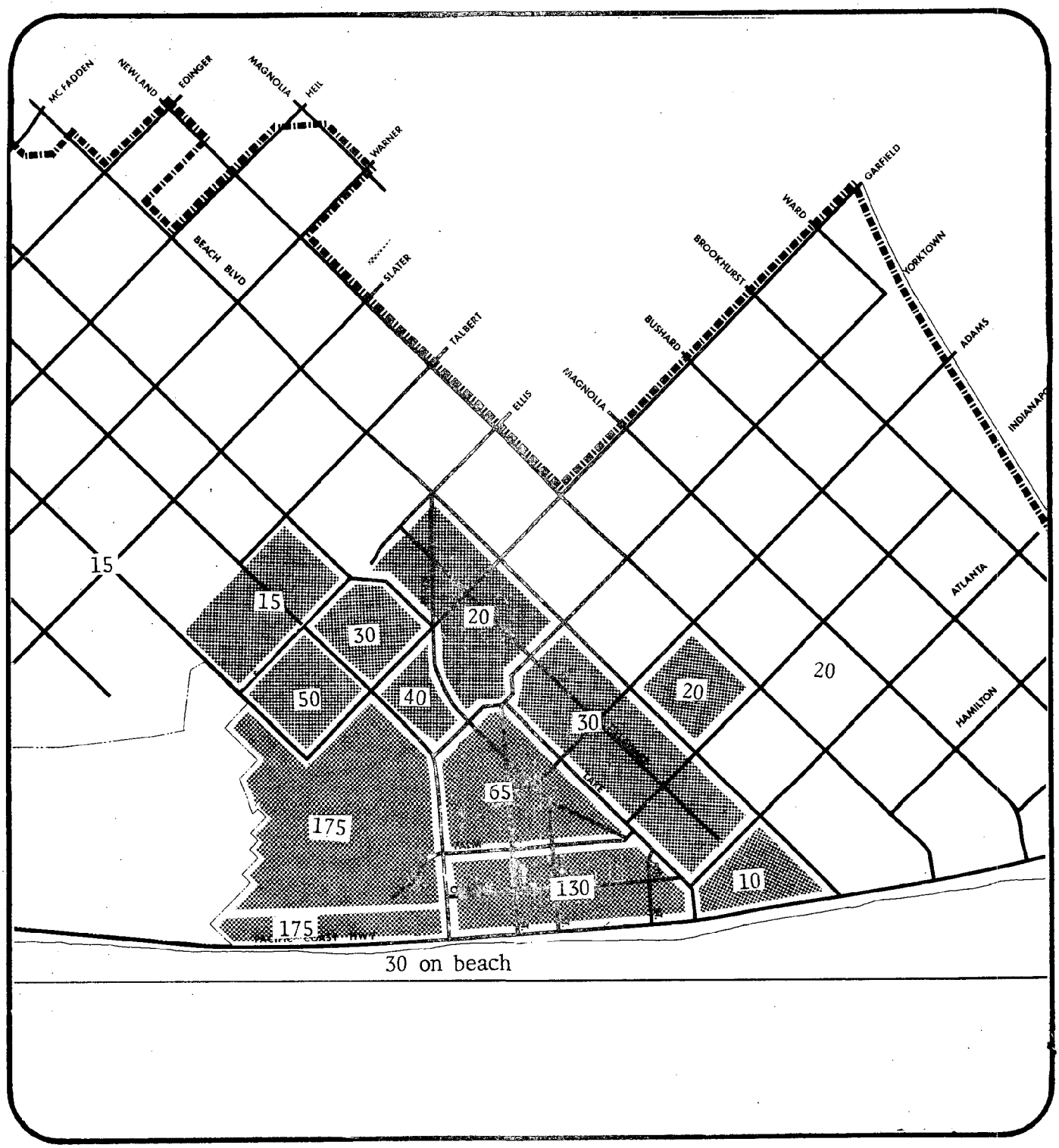


Figure B.2.6 Oil Well Distribution (approximate) in the City of Huntington Beach
Source: Division of Oil and Gas and City of Huntington Beach Planning Division

huntington beach planning division

OIL OPERATOR 1979-1980	NUMBER WELLS	NUMBER PRODUCING WELLS	NON-PRODUCING WELLS
ABC OIL COMPANY	1	1	0
ALK OIL COMPANY	2	2	0
ALEXANDER OIL	3	3	0
AMERICAN OIL SERVICE	1	1	0
AMINOIL U.S.A.	567	227	340
ATKINSON: T.A., OPER.	1	1	0
BEACH SUPPLY COMPANY	5	5	0
BOMASP	3	3	0
BRADLEY, MUHL & ASSOC.	4	4	0
BRAYTON PETROLEUM	1	1	0
BRAYTON: WM. H. (Trust)	4	4	0
CANTOR: GEORGE	7	7	0
CAPRO OIL CO.	8	8	0
CHEVRON, U.S.A.	588	293	295
DAVIS, DAVIS & DAVIS	1	1	0
DI STEFANO: VICTOR	1	1	0
DOUGLAS-RHOADS	5	4	1
E & S PRODUCTION	3	3	0
EDMONDSON: E.V.	1	1	0
ELLIOTT: W.M. JR.	11	11	0
ENERGY DEV: H.B. VENTURE	11	11	0
P.C. VENTURE	1	1	0
SPEIK/McCLURE	2	2	0
FREE OIL COMPANY	1	1	0
H & O PRODUCTIONS	5	5	0
HARDLY ABLE OIL CO.	1	1	0
HATHAWAY: J.I.	29	28	1
HUDSON: JAMES T.	3	3	0
HUNTINGTON BEACH COMPANY	17	16	1
HUNTINGTON SIGNAL OIL CO.	18	18	0
ISHIBASHI: AKIRA	4	4	0
KERNVIEW OIL COMPANY	10	10	0
KIESAU ESTATE	1	1	0
KING PETROL COMPANY	6	5	1
MC CALLEN & THOMPSON	1	1	0
M & W COMPANY	1	1	0
MARION: A. C. (Trustee)	2	1	1
MARVIEW OIL COMPANY	1	1	0
MILLER: C. EDWARD	2	2	0
MILLER: LES & LORI	1	1	0
MILLER & WEAVER	5	5	0
MILLER & WILSON	1	1	0
MOLA DIVISION	13	11	2
MUTZ OIL	1	1	0
OCEAN FRONT OIL COMPANY	1	1	0
O'DONNELL: GLADYS	1	1	0
OUR TOWN	1	1	0

Table B.2.3 Oil Companies in the City of Huntington Beach, 1979-80
Source: City of Huntington Beach, Licensing Office

OIL OPERATOR 1979-1980	NUMBER WELLS	NUMBER PRODUCING WELLS	NON-PRODUCING WELLS
PAULY OIL COMPANY	1	1	0
PETRO-LEWIS CORP.	13	13	0
PETROPRIZE	3	3	0
PLEGEL: EMIL & RUBY	1	1	0
RENNER: MRS. WILVIAN J.	1	1	0
REX OIL COMPANY	17	17	0
ROHRIG: JOHN M/M FRANK	3	3	0
ROHRIG PETROLEUM	1	1	0
ROUNTREE: JOHN S.	2	2	0
RUPE: ARTHUR N.	1	1	0
S & C OIL COMPANY, INC.	4	4	0
SCOTT: WILLIAM J.	3	3	0
SHAFFER OIL COMPANY	4	4	0
SHULL: R. W.	2	2	0
SIGNAL ASSOCIATES	1	1	0
STINNETT: ROY, OIL COMPANY	3	3	0
TEBERG OIL COMPANY	13	12	1
TERMO CO.: THE	1	1	0
TRANSPAC PETROLEUM	1	1	0
UNION OIL CO. OF CALIFORNIA	37	33	4
VIGUE: ROBERT D.	5	5	0
WEAVER: CARL M., PROP.	8	8	0
WEAVER & WEAVER	8	8	0
WEIR OIL COMPANY	13	13	0
WHITE: JAMES, OIL CO.	2	2	0
WILLIAMS: B.G.	4	3	1
WISE: GEORGE E.	1	1	0
YOUNG: RICHARD & ASSOC.	2	2	0
YUNKER, MORTON & DOLLEY	1	1	0

In addition to these private companies, the City of Huntington Beach operates three wells.

Most of Aminoil's production comes from the onshore wells which reach under the ocean. These wells are in the Huntington Beach Coastal Zone. Aminoil expects these wells to be active for at least another twenty years and perhaps many years beyond. The shrinking supply of oil, especially domestic, has generated trends toward very high prices. This makes expensive tertiary techniques more attractive and lower production levels acceptably profitable. Consequently, Aminoil foresees a long life for its Huntington Beach operations. The equipment needed during this long productive life can probably be accommodated on the existing leases and no new storage tanks or significantly expanded waste water handling facilities are expected at this time. Existing equipment may need to be modified, however, to accommodate advanced recovery. These modifications and their impacts are discussed in Section B.4.

Chevron is the second largest producer in Huntington Beach. (See Figure B.2.7). While most of Aminoil's wells tap offshore zones, Chevron's wells extract oil from onshore pools.

Most of Chevron's wells are in secondary production including some in the Tar zone which employ steam injection. The company also has a pilot tertiary program on its site near Lake and Atlanta. Results of this pilot are expected in 1981.

Chevron's largest production area lies east of the Aminoil facilities. Here, secondary production wells are scattered in a band from Goldenwest to 38th Street. Other wells and related facilities are located on both sides of Garfield north of Goldenwest, outside the coastal zone. In between these production areas lies the Seacliff development -- a golf course and country club, the shopping center, and residences. Chevron has consolidated its wells within this development into densely packed islands. From these islands the wells are directionally drilled to reach a much larger underground area. This consolidation allows recreational, residential and commercial land uses to coexist with oil extraction. Another large development between the golf course and the active oil fields is planned; the site has been cleared of oil wells, anticipating other uses. As in previous phases, oil extraction will continue, where economically viable, from islands walled away from the other activities. Chevron also has many other areas devoted to oil wells located throughout the City.

Like Aminoil, Chevron anticipates a long future for its oil extraction activities but plans continued consolidation programs to allow other land uses around walled oil islands. (Aminoil's wells along the highway are already so concentrated that further consolidation is not likely for a long time.) An important issue, discussed further below, is how to preserve access to oil reserves while allowing compatible, mixed uses on the surface of the fields.

Union Oil is the third largest producer in the Huntington Beach field, but virtually all of its oil comes from Platform Eva, offshore. Union's production has steadily declined throughout this decade, but the company has not yet instigated a major flooding project.

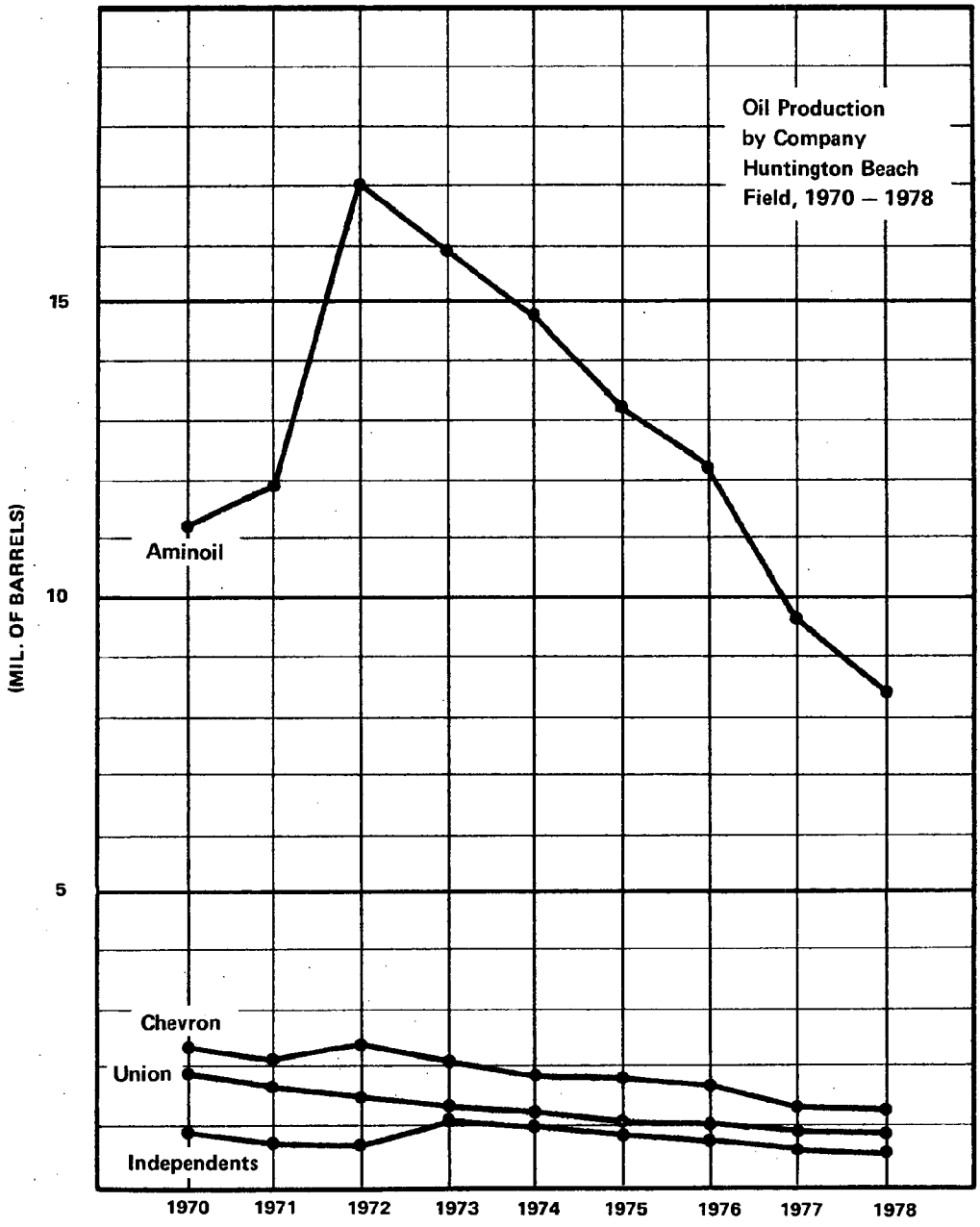


Figure B.2.7 Oil Production by Company, 1970-1978
Source: Conservation Committee of California Oil Producers, Annual Reports

huntington beach planning division

Besides Aminoil, Chevron, and Union, there are over 70 other "independent" companies operating oil wells in the Huntington Beach field. These account for almost 30 percent of the field's producing wells yet extract only five percent of the total oil. These facilities are scattered throughout the City on smaller parcels, including many in the downtown and townlot areas of the coastal zone, and are often interspersed among other uses.

The independent wells are in primary production. Secondary production requires a coordinated program and is an expensive undertaking. The dispersion of these wells and their highly fragmented ownership have precluded the coordination and cost sharing which would be needed to instigate flooding programs. Table B.2.4 shows that secondary production in Huntington Beach is carried out exclusively by Aminoil and Chevron. Unless some coordinated program is worked out by these smaller operators (or by a single larger firm which acquires several of these small operations), advanced recovery methods cannot be applied. Left solely to primary production, many of these wells will soon be "depleted" and more profitable land uses will replace oil extraction. However, during the last five years, the number of independent wells has remained remarkably stable. Apparently, higher oil prices have prolonged the lives of these wells, delaying the recycling of their parcels to new uses.

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* Aminoil (then called Burmah Oil) instigated an unitization project in Huntington Beach in the early 1970's. Aminoil (Burmah) was the lead company which consolidated the facilities and combined the interests of several other smaller, independent companies. The equipment is consolidated into an island between 18th and 19th Streets on Pacific Coast Highway. The wells tap offshore zones which have been subject to water flooding. This case indicates that, under certain circumstances, unitization is possible in Huntington Beach. The possibility of future unitization projects is discussed more fully in Section B.4.1.1.

WATER INJECTION 1977	
	Barrels Injected
Aminoil	139.3 Million
Chevron	5.0 Million
Others	0
TOTAL	144.3 Million

Table B.2.4 Water Injection in Huntington Beach Field by Company, 1977
Source: Conservation Committee of California Oil Producers, Annual Report, 1977

B.2.2 SEPARATION AND TREATMENT FACILITIES

The wells in Huntington Beach extract oil, water and gas. After these products reach the surface, they are separated from each other and prepared for further use (or for disposal, in the case of waste water). The principal oil companies in Huntington Beach -- Aminoil, Chevron and Union -- have large-scale, centralized facilities in the City. The numerous "independent" operators have smaller scale separation facilities located on their oil well parcels. Sometimes, many operators on adjacent parcels will share separation facilities. The following section describes a generalized model of a large-scale separation and treatment system. Smaller-scale systems, used by the independent operators, are described afterward.

B.2.2.1 GENERAL DESCRIPTION

Separation begins when oil, water and gas are pumped out of the wells into cylindrical tanks called "separators". (See Figure B.2.8). The fluids sort themselves out by gravity -- water sinks to the bottom; oil floats on top of the water; and gas rises out of the liquids to the top of the tank. The different products are then measured, comingled again, and piped to the actual separation and treatment facilities. These initial separators are usually sited close to the well heads. Sometimes small surge tanks will be located with the separators to hold the fluids until they can be piped away from the well head area.

The actual separation and treatment system can be located away from the wells; the products are simply carried by a pipeline system from the wells to these other facilities which are usually sited in some centralized or otherwise convenient location.

The next step in the system involves "free water knockout" tanks. These are larger versions of the well head separators. The products from the wells flow into these tanks where, again, gravity sorts out the three principal fluids: water, oil and gas. The reason the products are combined again after the initial separation is transportation cost. A three fluid pipeline system from the wells to the treatment facilities would be complex and costly. By recombining the fluids, a single pipeline can carry everything from the wells to the treatment system.

The different fluids separated in the free water knockout tanks are then piped to their respective treatment systems. Each of these will be described in turn.

Oil System

Crude oil must have less than three percent water and other impurities before a refinery will accept it, and oil leaving the free water knockout tanks does not meet that requirement. The wet oil is therefore heated to facilitate more complete oil and water separation and sent to "wash tanks" where it is further dehydrated. The water removed in the wash tanks is piped into the water treatment system.

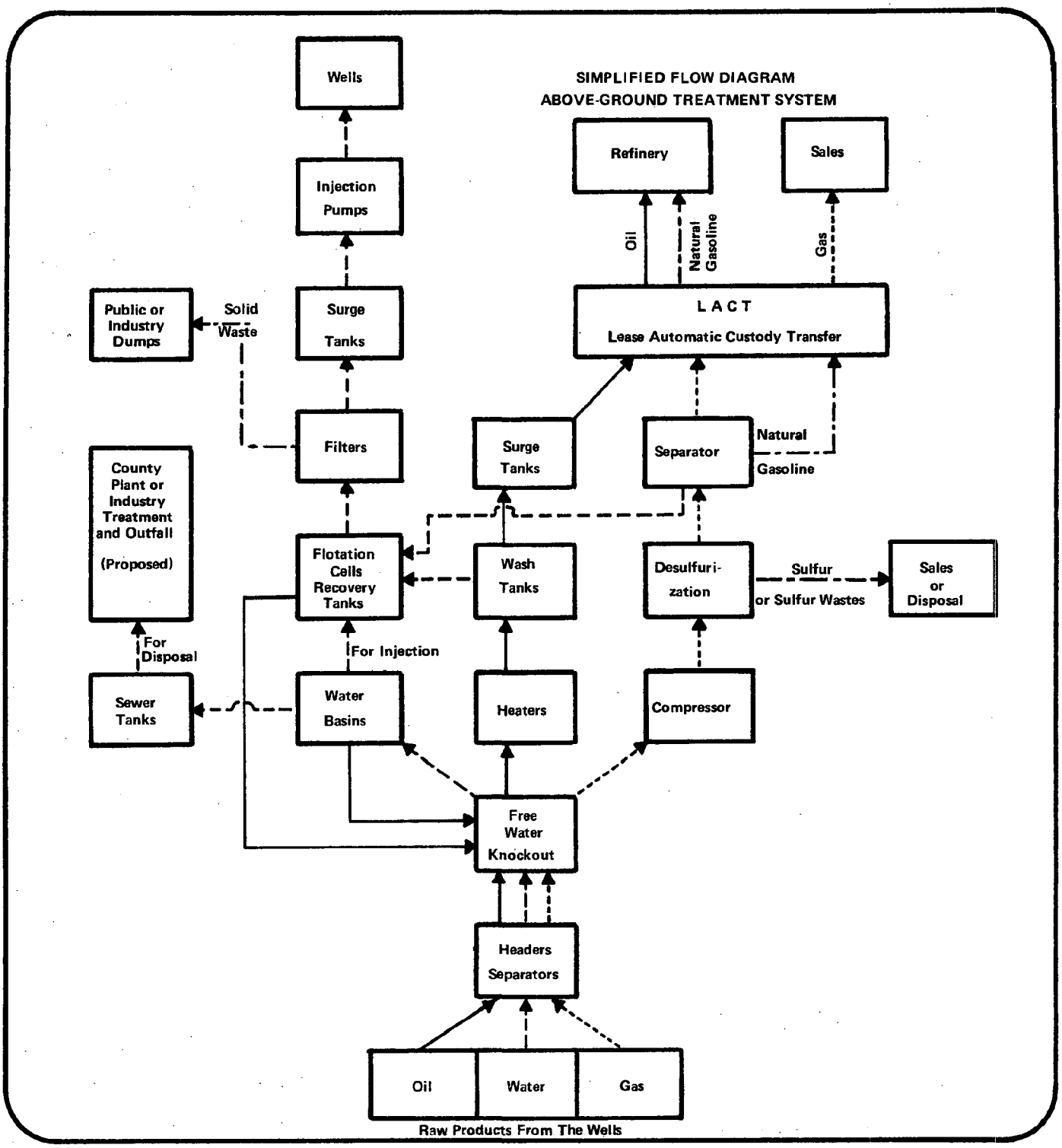

Figure B.2.8 Model of a Large-Scale Separation Sytem
Source: Huntington Beach Planning Division

huntington beach planning division

The oil is then put into "surge tanks" which simply hold the oil until it can be piped to a refinery. A "lease automatic custody transfer" unit, or LACT, monitors the oil flow as it leaves the surge tanks and enters the pipeline system, recording the amount of oil delivered to the customer. An automatic tester checks the water content of the oil as it enters the pipeline. If it exceeds three percent, the device shuts off the oil flow. In addition, during any oil delivery, small quantities of the oil are sent to the customer in separate containers, so they may test the product for quality and dryness.

Water System

The water separated in the free water knockout is stored in holding tanks, cement lined pits or water basins until the later treatment facilities can handle it. In these containers, oil which floats to the surface is skimmed off and returned to the oil treatment system. If required by air quality regulations, the tanks, pits or basins are covered to help control odors and air emmissions from evaporation.

If the water will not be used for injection, it may be held in sewer tanks after leaving the basins and is then discharged into the public sewer system. This water eventually reaches the County Sewer Plant, where it is treated and discharged into the ocean. Aminoil has a permit to treat their water wastes on site and to discharge the treated waste water into the ocean through their own pipeline and outfall. Chevron also has an ocean outfall which is used only in emergencies. This company has applied for permission to use its outfall on a regular basis.

Water used for injection, however, must be cleaned even further by the companies. It is sent from the basins to recovery tanks where any oil still in the water is removed. A typical recovery tank is called a "flotation cell," in which pressurized gases facilitate separation of the oil and water. Oil recovered in the flotation cells is returned to the oil treating system.

The water is then piped to filters, usually made of sand or coal, to remove any solids. The solids are collected and partially dried. Chevron trucks its solid wastes to a public disposal site. Aminoil disposes of its solids in diked areas in its Bolsa Chica lease. Aminoil's disposal area is described further in Section B.2.4.

The water is now clean enough for injection or for discharge into the ocean in conformance to discharge permit standards. It is held in "surge tanks" until needed; then it is pumped under pressure back into an oil zone through the wells.

Gas System

The gas which left the free water knockout tank is compressed to ease handling and then sent to a desulfurization unit. Natural gas often contains some sulfur compounds which form air pollutants when the gas is burned. Thus, the sulfur must be removed before the gas is sold. In some cases, the desulfurization process can remove the sulfur in elemental form. This is a useful product and is usually sold by the oil company. In other desulfurization processes, the sulfur remains combined with other materials. In this case, the sulfur-containing waste is trucked to a public disposal facility.

The desulfured gas is then sent to a separation plant. Here water and other fluids are removed. Any water recovered is piped to the water treatment system. Another important by-product is called "natural gasoline" and is a combination of hydrocarbons such as butane and propane. The natural gasoline is also a useful product and is piped through an LACT unit to a refinery or gas processing plant for further treatment.

The gas is now suitable for sale and is piped through an LACT unit to a customer, usually the gas utility company. Sometimes, the gas is not sold and is simply used to fuel equipment on the oil leases.

INDEPENDENT OPERATIONS

The small scale separation facilities used by the numerous independents in the City are analogous to the larger systems. See Figure B.2.9.

Fluids extracted through the wells are collected in separators. As before, the gas rises to the top of the tank and the liquids settle to the bottom. The gas is drawn off from the separator to an offsite treatment plant. The water and oil are further separated at the site.

The liquids flow into "wash tanks," where gravity separates the water from the oil. Oil floating at the top of the tank is drawn into another tank called a "shipping tank." The remaining oily water is piped to "clarifier tanks," which are simply more gravity separation tanks arranged in a series. In each clarifier tank, any oil that floats to the top is drawn off to the shipping tank.

The oil is sent to customers from the shipping tanks either through the pipeline system or, if the quantities are small, by tanker truck.

The water, now relatively oil-free, is discharged from the last clarifier tank into the public sewer system.

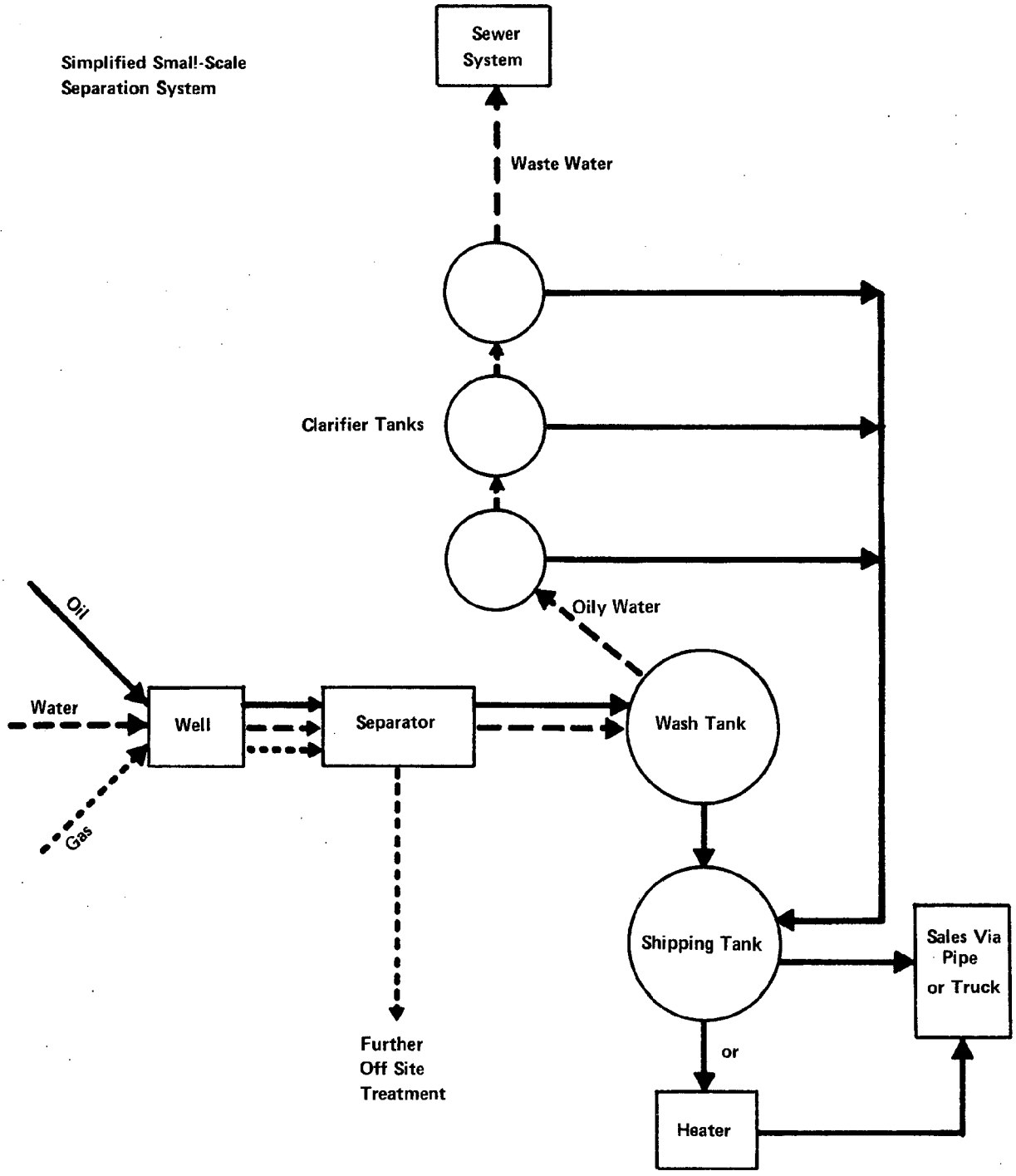

Figure B.2.9 Model of a Small-scale Separation System
Source: Huntington Beach Fire Department

huntington beach planning division

B.2.2.2 TREATMENT AND SEPARATION PLANTS IN THE CITY

Figure B.2.10 shows the location of the principal treatment and separation facilities in Huntington Beach.

Aminoil's facilities are generally located among its wells on the long, narrow lease along the Coast Highway north of Goldenwest, although its gas plant sits farther northeast at the City boundary on the bluffs above the Bolsa Chica. Table B.2.5 includes an inventory of Aminoil's equipment at these sites. These facilities handle Aminoil's production in the Huntington Beach field, including oil and gas from its offshore platform. This company's gas plant processes the natural gasoline into the commercial products which are then sold.

Most of the water produced through these facilities is used for injection. Aminoil has a permit from the Regional Water Quality Control Board to use an existing ocean outfall for discharging treated runoff and any clean production water not used for injection.

This company's drilling muds and other clean solid wastes are dried in diked areas in the Bolsa Chica. Its sulfur wastes are reduced to elemental sulfur which is then sold.

Chevron's principal separation facilities, including its low temperature gas separator (LTS), lie just south of Garfield, northeast of Goldenwest. Chevron also has other separation equipment at Atlanta and Lake, at Knoxville and Beach, and at Brookhurst near the County sewage plant. (See Table B.2.5)

Besides Chevron's own production, this company's LTS unit treats gas produced by many independents in the City.

Like Aminoil, some of Chevron's produced water is used for injection. The rest is discharged through City sewerage. Chevron has applied for permission to use an existing ocean outfall for treated wastewaters.

Chevron disposes all its solid wastes, including sulfur wastes, by trucking them to public landfills outside the City.

Union operates a separation facility at Heil Avenue near Algonquin to treat oil produced from its offshore platform. This plant is significantly smaller than Aminoil's or Chevron's facilities. (See Table B.2.5) It does not have gas processing equipment; any gas produced offshore is used on the platform and is not piped to land. Union's plant is an example of how fencing and landscaping can greatly improve compatibility of these facilities with their surroundings even in areas of mixed uses. The tanks are hidden behind a tall block wall and wooden gates. The front of the facility has a small, well-planted yard. The facility blends well visually with surrounding residential uses.

Aminoil's, Chevron's and Union's facilities all have significant surplus capacity. (See Table B.2.4(a).)

The remaining treatment and separation equipment is scattered throughout the City on the independent's oil producing parcels. These facilities have different sizes and configurations but are of the general design shown in Figure B.2.9. The approximate locations of these small-scale, independent units in the coastal zone are indicated on Figure B.2.11.

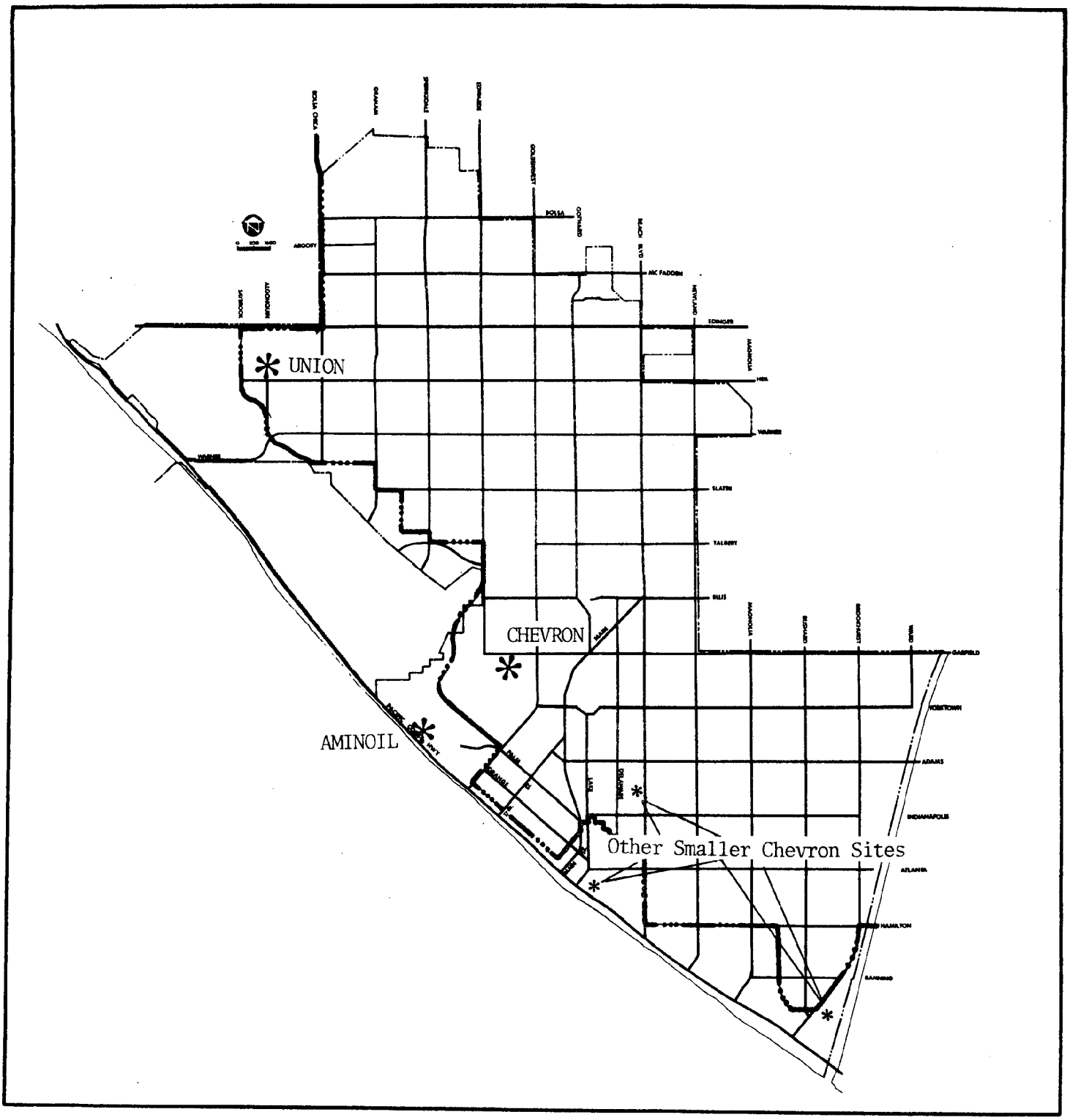

Figure B.2.10 Location of Separation Plants of Principal Oil Companies in Huntington Beach
Source: Huntington Beach Planning Division

huntington beach planning division

Company	current capacity		average production (1978)	
	bbls fluid /day	bbls oil /day	bbls fluid /day	bbls oil /day
Aminoil	450,000	80,000	250,000	27,000
Chevron (main site near Garfield)	60,000	5,500	57,000	3,800
Union	15,000	11,000	5,000	2,500

Table B.2.4.(a) Capacity of Principal Separation and Treatment Plants

Source: Office of Planning and Research, Offshore Oil and Gas Development: Southern California, 1977 and Conservation Committee of California Oil Producers, Annual Report.

	LOCATION	Separators	Dehydration Wash Tanks	Free Water Knockout Tanks	Oil Line Heaters	Oil Heater Treaters	LACT Units	Oil Shipping and Surge Tanks	Oil Line Shipping Pumps	Boilers and Water Heaters	Desulfurization Units	Water/Oil Skim Tanks	Water/Oil Surge Tanks	Water Recovery Tanks	Skimmed Oil Storage Tanks	Flotation Cells	Flotation Cell Surge Tanks	Water Filters	Filter Surge Tanks	Filter Backwash Tanks	Injection Water Surge Tanks	Injection Water Pumps	Water Collection Basins	LTS Units	Gas Compressors
		EQUIPMENT NAME																							
AMINOIL	Tank Farm #1 - North of Goldenwest and PCH	11	9				4	14	2	4		8			4	9	7	8	2	3	2					
	Tank Farm #2 - North of Entrance on PCH	13	4		2	2	2	18	2	2	2	3	2		1											
	Plant #3 - Near City/ County Line																					3				
	Plant # 4 - Near Goldenwest and PCH																					7				
	Aminoil Subtotal	24	13		2	2	6	32	4	6	2	11	2		5	9	7	8	2	3	2	10				
CHEVRON	Garfield between Edwards & Goldenwest	12	2	3	2		3					2			6	2	1	5			1	3	2	1	3	
	Atlanta & Lake		1				1				1				2							1			1	
	Knoxville & Beach		1				1				1				1										1	
	Brookhurst near Sanitation Plant		1		2										3										1	
	Garfield and Edwards		1																							
	Chevron Subtotal	12	6	3	4		5				2	2			12	2	1	5			1	4	2	1	6	
UNION	Heil Near Algonquin			1		4	2		2			2			1											

Table B.2.5 Separation Equipment Inventory of Principal Oil Companies in Huntington Beach
Source: Oil Companies

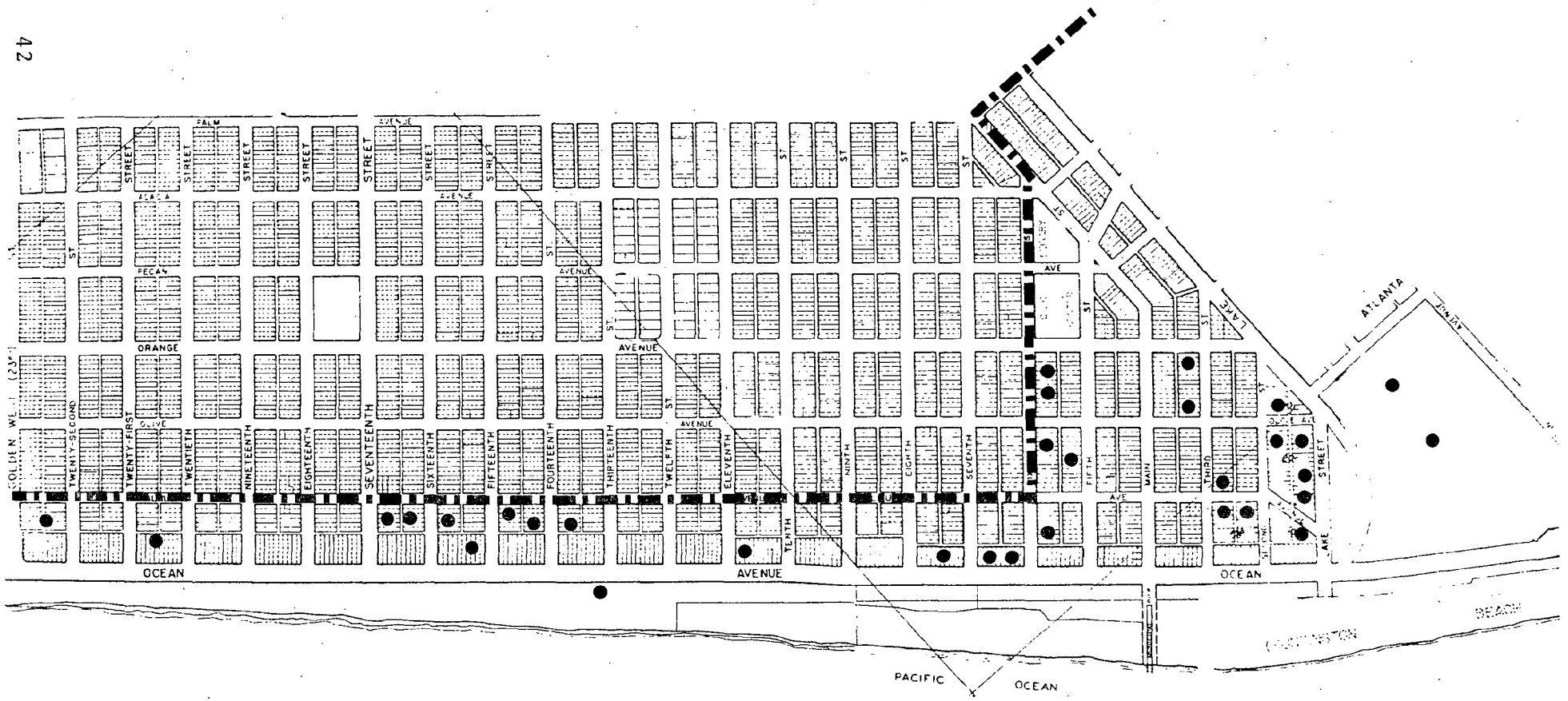

Figure B.2.11 Approximate Location of Small-scale Separation Systems in the Downtown and Townlot coastal zone.
Source: Huntington Beach Planning Division

B.2.3 TANK FARMS

A site used for several storage tanks is called a "tank farm." There are numerous storage tanks for oil and related products scattered throughout the City. Those which are associated with temporary well-head storage or which are part of treatment facilities are discussed above. There are three other large tank farms in the city: one is operated by Gulf Oil Company, another by Southern California Edison Company, and the third by Chevron. Figure B.2.12 shows the locations of these facilities.

The Gulf tank farm occupies approximately 20 acres north of Hamilton Avenue and west of Newland Street. There are three very large tanks (168 foot diameter) and five smaller ones. The tanks are surrounded by six foot dikes and the entire site is protected by a six foot fence. The tank farm is adjacent to the coastal zone boundary, but it is not within the coastal zone.

The tanks hold crude oil which is usually shipped from Indonesia and unloaded in Huntington Beach through an underwater pipeline from Gulf's offshore marine terminal. The pipeline and marine terminal operations are discussed more fully in later sections; it should be noted, however, that these are separate parts of one facility.

Indonesian crude is very viscous and consequently Gulf is installing heating equipment on the site to warm the thick oil and thus facilitate its flow. The heating equipment will be used about ten days a month. Currently, Gulf pipes the crude to the nearby Edison power plant where it is warmed by waste heat from the electricity generating operations. The new, on-site heating unit will be less costly to operate than this process.

The tank farm capacity is about 590,000 barrels. The oil held in these tanks is eventually transported by pipeline to Gulf's refinery in Santa Fe Springs.

The Edison tank farm stores fuel oil which is used at the nearby power plant to generate electricity. The four tanks adjacent to the power plant and south of the flood control channel were installed in the 1950's. Each can hold 230,000 barrels of oil. The three larger tanks which can hold 500,000 barrels each and are located north of channel were built more recently. All of these tanks are in the coastal zone. A residential area is located across Magnolia from the newer section of the facility. The tanks, however, have been partially screened by berms and vegetation. The landscaping has greatly reduced the visual incompatibility which would normally be expected when industrial and residential uses are so close together.

The oil stored at the facility is delivered through Gulf's marine terminal and also through a 12" overland pipeline.

Chevron's tank farm is outside the coastal zone at the corner of Gothard and Talbert, and consists of six tanks which hold oil, gasoline and diesel fuel. The refined products are distributed from this facility by tanker truck to commercial outlets in the area.

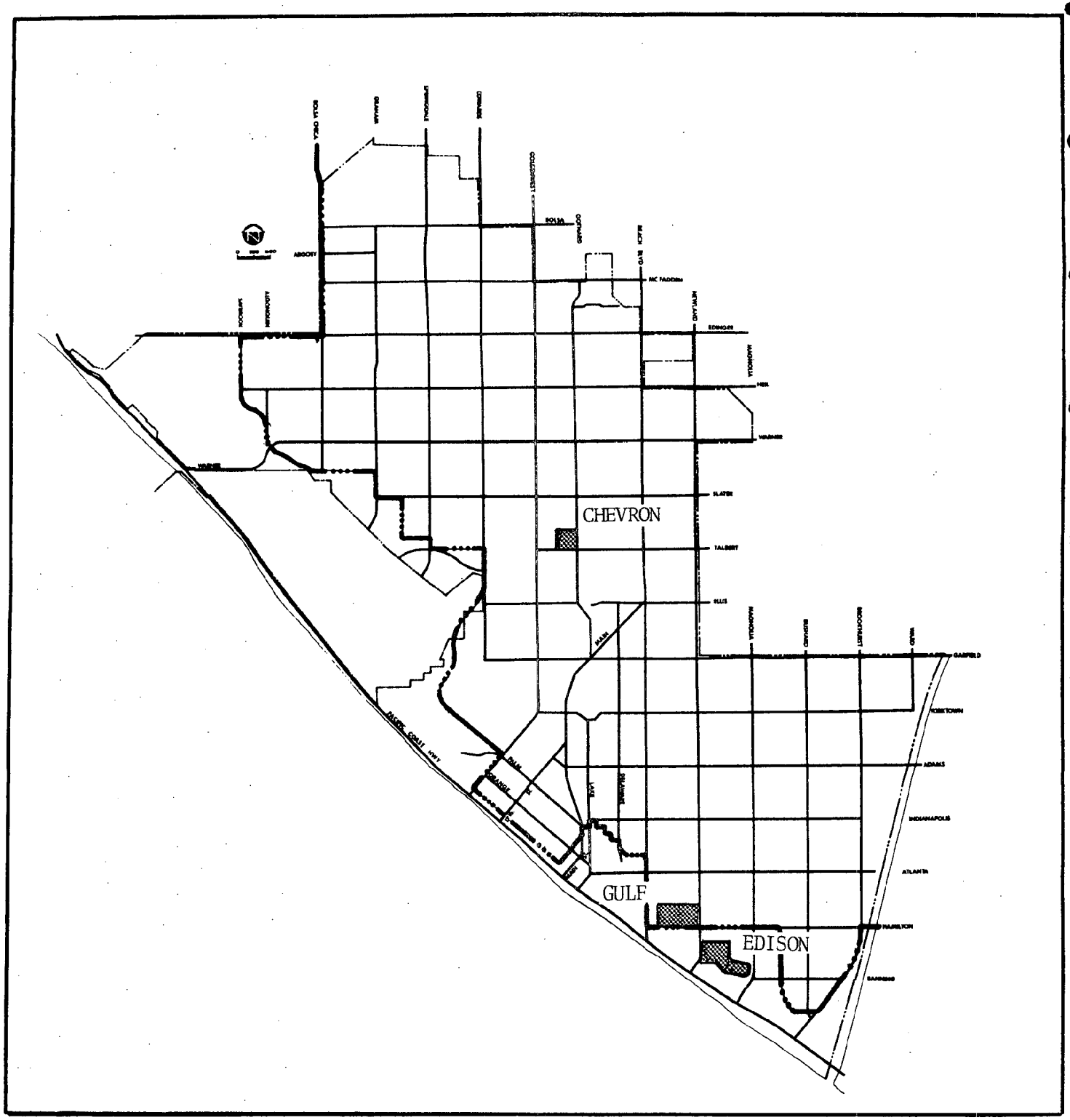

Figure B.2.12 Location of Principal Tank Farms in Huntington Beach
Source: Huntington Beach Planning Division

huntington beach planning division

B.2.4 DRILLING MUD DISPOSAL SITES

Disposal facilities used for drilling muds are an essential part of the drilling and extraction system. Therefore, they are considered oil-related facilities and are discussed in this report.

Chevron's drilling muds are all trucked to disposal sites outside the City.

Aminoil disposes its drilling muds into diked areas in the Bolsa Chica southeast of the wildlife refuge. The solids captured in the filter units of the company's water treatment system are also deposited there. These wet materials are dried simply by their exposure to the air. Drying is facilitated by turning and plowing which exposes more surface area. The final product is a light-colored dirt, although when wet the muds look very dark.

Analyses show that the solids contain no toxic materials but do include some organic substances which tend to degrade through aerobic processes. (See Section B.5.3).

Aminoil's current permit to operate this disposal area strictly prohibits the deposition of any toxic or hazardous material. The company has applied to the Regional Water Quality Control Board for another permit to continue this operation, pursuant to the federal Clean Water Act. The Regional Board staff report recommends approval of this application if strict performance criteria are met. Final determinations on this permit application are expected February 29, 1980.

These sites are in the coastal zone, but are not within the City of Huntington Beach. The continued use of these sites may depend on the outcome of negotiations now underway regarding the future uses of the Bolsa Chica between Signal-Landmark, the principal land owner, and the State of California which may have a public tidelands interest there.

The principal mud disposal site in the city was the rotary "mud dump" owned by the Steverson Brothers Company. This facility is located at Hamilton and Magnolia and is within the coastal zone.

The dump itself is formed by a dike made of fill approximately 20 feet high. The depth of the mud varies within the diked area.

The dump has recently been approved for use as a solid waste disposal site. The implications of this activity for the surrounding community and for future uses of the site are unclear.

B.2.5 ONSHORE PIPELINES

Pipelines are used to transport liquid and gaseous substances. In Huntington Beach, four kinds of hydrocarbon fluids are carried through pipelines: 1) crude oil, 2) natural gasoline, 3) natural gas and 4) refined products.

Crude oil is sent from the fields to refineries outside the City. This involves two pipeline systems. The first consists of the many small lines which gather the oil from the wells to the treatment and separation facilities. This gathering system forms an incredibly complex maze of pipes underneath many parts of the City, complicating new development there. The developer must sort out the active and inactive pipes, and then remove the unused lines and move the active ones so that they do not interfere with construction and new uses. The second oil line system includes the larger commercial shipping lines which carry the dehydrated oil to the refineries. Goldenwest is the major route for these pipes; Chevron, Arco, Gulf and Texaco have lines running underneath that street.

Figure B.2.13 is a simplified map of the principal crude oil pipeline routes in the City.

"Natural gasoline" refers to the by-products of natural gas separation like butane and propane. Aminoil's gas plants refine these products for commercial sale. Chevron does not have this kind of facility in Huntington Beach and pipes its unrefined natural gasoline outside the City for final processing. Figure B.2.14 indicates the approximate location of natural gasoline lines in the City.

Refined products are piped into the City. The three principal refined products lines in Huntington Beach are the following: 1) fuel oil line to the Edison plant, 2) gasoline and diesel lines to the Chevron tank farm, and 3) a diesel line to the Gulf tank farm for the crude oil heaters. (See Figure B.2.14)

Small amounts of natural gas are piped from the fields and sold to utilities. However, all the large natural gas lines in the City bring gas back into Huntington Beach. The gas has many uses, from heating and cooking in individual residences to fueling the Edison plant's peaking units. The routes of the principal gas lines are indicated in Figure B.2.14.

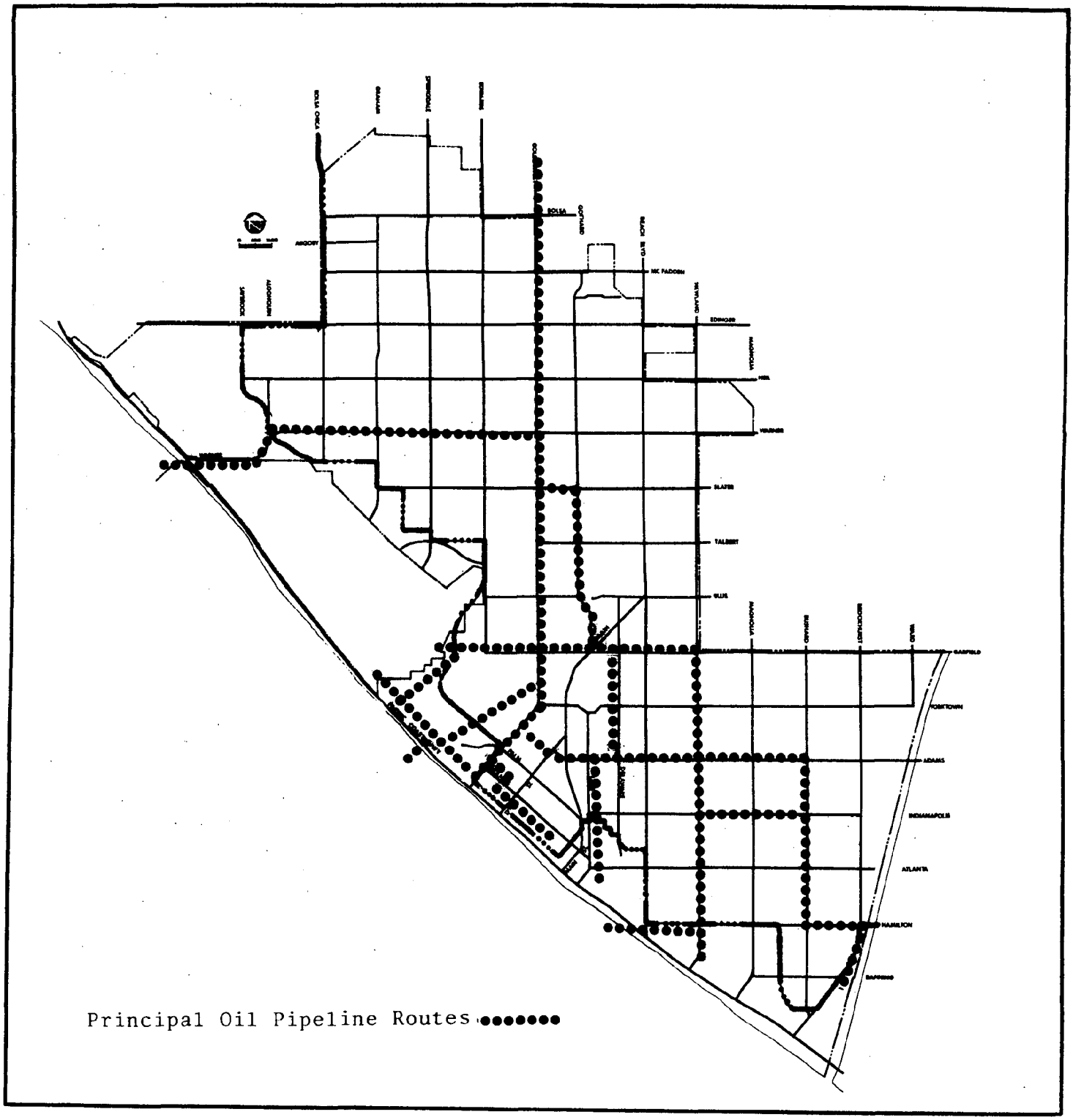

Figure B.2.13 Approximate Locations of Principal Crude Oil Pipelines
Source: Western Oil and Gas Association

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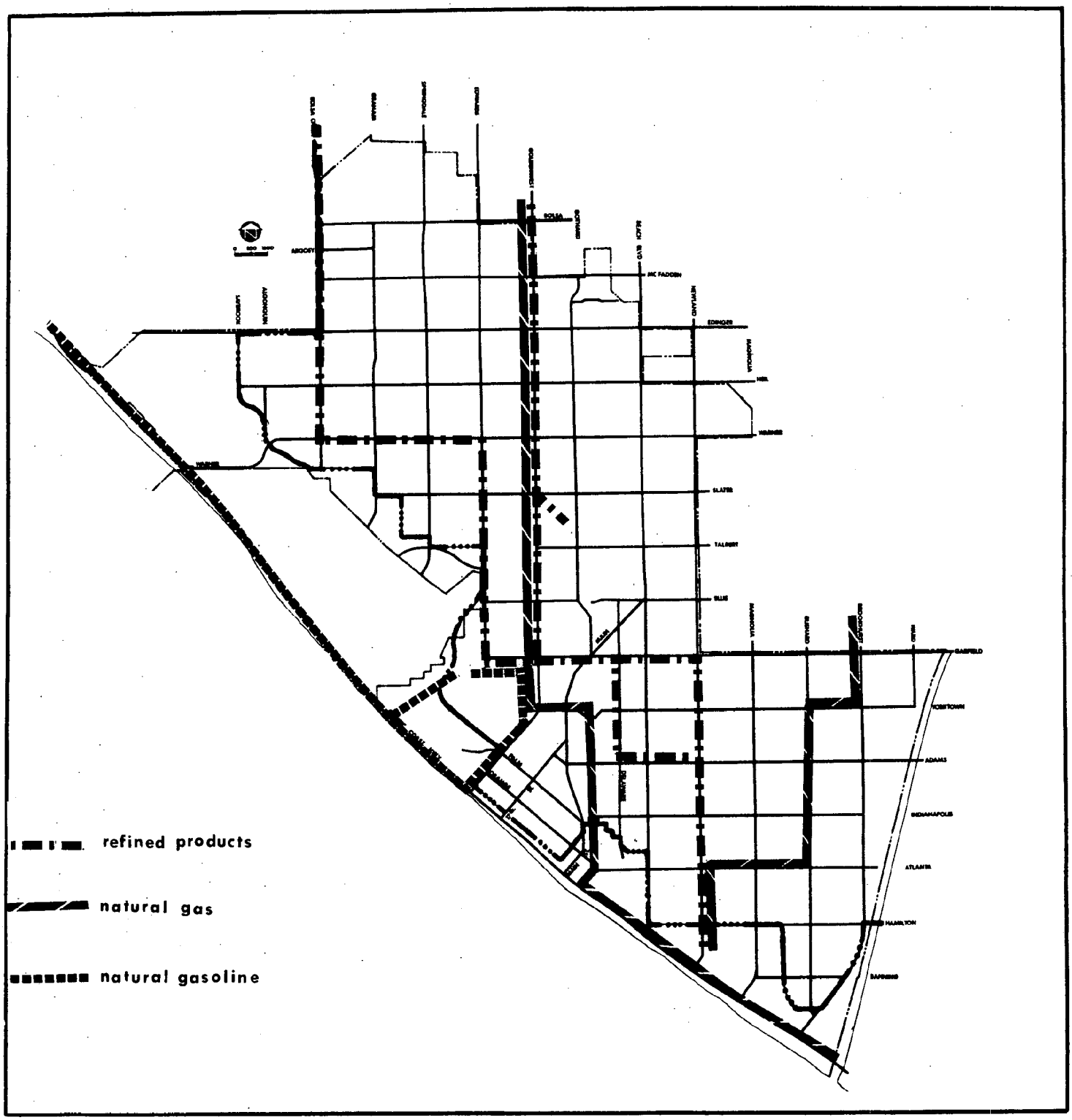

Figure B.2.14 Approximate Locations of Principal Natural Gas, Natural Gasoline and Refined Products Pipelines
Source: Western Oil and Gas Association and Huntington Beach Fire Department

B.3.0 OFFSHORE OIL OPERATIONS

B.3.1 OFFSHORE EXTRACTION

As discussed in Section B.2.1.2, oil can be extracted from strata beneath the seafloor. In the Huntington Beach field, many of these offshore zones are accessible from directionally drilled onshore wells. Other pools which are farther out or which are in such shallow rock formations that directional drilling is infeasible must be tapped by offshore wells placed either on manmade islands or steel platforms. Currently, there are two platforms offshore from Huntington Beach and others are planned for the near future.

Before offshore development can begin, the oil companies must acquire rights to the underwater areas, all of which are publicly owned. The State has jurisdiction over the seafloor from the shoreline to the three-mile limit. Farther out, on the "Outer Continental Shelf" or "OCS," the Federal Government controls the seabed and its mineral rights.

In both cases, the seafloor is divided into parcels which the oil companies can lease. The State or Federal Government collects revenues from the lease agreement and from royalties on any oil or gas extracted.

By 1969, the State had leased numerous parcels in its offshore waters between Point Conception and Newport Beach. Very extensive development was occurring near Santa Barbara, Ventura, Long Beach and Huntington Beach. However, after the oil spill near Santa Barbara in 1969, the State imposed a moratorium on further drilling in its waters. Although the full moratorium was lifted in 1973, the oil companies must apply to the State for permission to resume any drilling activities, even from existing platforms. The State Lands Commission, the agency responsible for reviewing drilling applications, can approve or deny them on a well-by-well basis. The State has also declared certain offshore areas as "sanctuaries" in which oil extraction is prohibited. There are no sanctuaries in the waters off Huntington Beach.

Federal OCS parcels have become available more recently. The process through which oil companies acquire rights to these parcels is called a "lease sale." The following describes the principal steps in a lease sale.[5] (See Table B.3.1).

"The OCS is divided into tracts, each about nine square miles. The Department of the Interior, through the Bureau of Land Management (BLM), announces that some general OCS area will be leased. Sometimes, the areas are very large and unspecified. For example, lease sale #53 in Northern California included OCS parcels from Point Conception to the Oregon border. The announcement is followed by a "call for nominations" through which the oil companies suggest the tracts that interest them most. Other parties may argue at this time to exclude tracts from the lease sale. The BLM then makes a preliminary determination of which tracts will be offered in the lease sale. An environmental impact statement is then prepared. After reviewing the impact statement and the BLM recommendations, the Secretary of the Interior lists those specific tracts which will be available in the lease sale.

TENTATIVE SCHEDULE OF LEASE SALE #68	
12/79	Call for Nominations
2/80	Nominations Due
5/80	Tentative Tract Selection
5/81	Draft EIS
7/81	Public Hearings
11/81	FEIS
1/82	Proposed Notice of Sale
6/82	Lease-Sale
2-7 Years after Lease Sale: Exploration Phase	
4-9 Years after Discovery: Development Phase	
25 Years approximately: Production Phase	

Table B.3.1 Tentative Schedule for Lease-Sale #68
Source: Department of the Interior, Proposed 5-Year OCS Schedule, DEIS, 1979

The companies or consortiums of companies next submit sealed bids to the government for each tract. The government can award the rights to the tract to the highest bidder, but may attach conditions to any lease agreement and may reject any bid.

The first federal lease sale in the San Pedro Bay, which includes the OCS off Huntington Beach, was Lease Sale #35 in 1975. Shell, Chevron, Gulf, Mobil, Texaco and Challenger all successfully bid for tracts there. See Figure B.3.1.

Other San Pedro Bay tracts were offered last June in Lease Sale #48. Chevron acquired another tract through this lease sale. See Figure B.3.1.

The call for nominations anticipating Lease Sale #68 was announced December in 1979. This lease sale will offer more tracts in the Southern California OCS. Whether tracts in San Pedro Bay will be included is not known at this time.

After a company successfully bids for OCS tracts, the exploration phase of the activities can begin.[6] The companies conduct extensive geological surveys of their parcels, locating the most promising oil bearing formations. They then contract with independent drilling companies who drill exploratory wells from temporary, mobile rigs. Temporary supply bases and helicopter pads are needed onshore to support the exploration activites. The bases require some land area for offices and warehouses and must have docks and berthing spaces for the supply boats.

If discoveries are made, further exploration will continue and development of known sites may begin. Large steel platforms are designed to meet the requirements of the specific offshore site and are then built at fabrication yards. The support structure of the platform is called the "jacket". This is floated to the offshore area for installation. Decks are then set in place on the jacket to hold the drilling rigs and other facilities.

Each drilling platform contains several wells, sometimes as many as 80. Just as on land, the wells can be directionally drilled to tap oil zones far away from the wellheads.

The fluids extracted from offshore wells are often piped to shore for separation and treatment. When the amount of oil is too small to warrant the expense of a pipeline, tankers are used to bring the oil to shore. In general, this procedure is less preferable from an environmental standpoint than pipelines because oil spills are more likely to occur from an accident involving a tanker than from damage to an underwater pipeline. Also, the frequent loading and unloading of tankers can cause many small-scale spills and leaks.

The products are occasionally separated and treated offshore on "production platforms" built for that purpose. The facilities are essentially the same as those onshore. Dehydrated oil and clean gas are piped to shore. In some rare cases, the separation and treatment facilities are built on large ships which act as floating production platforms.

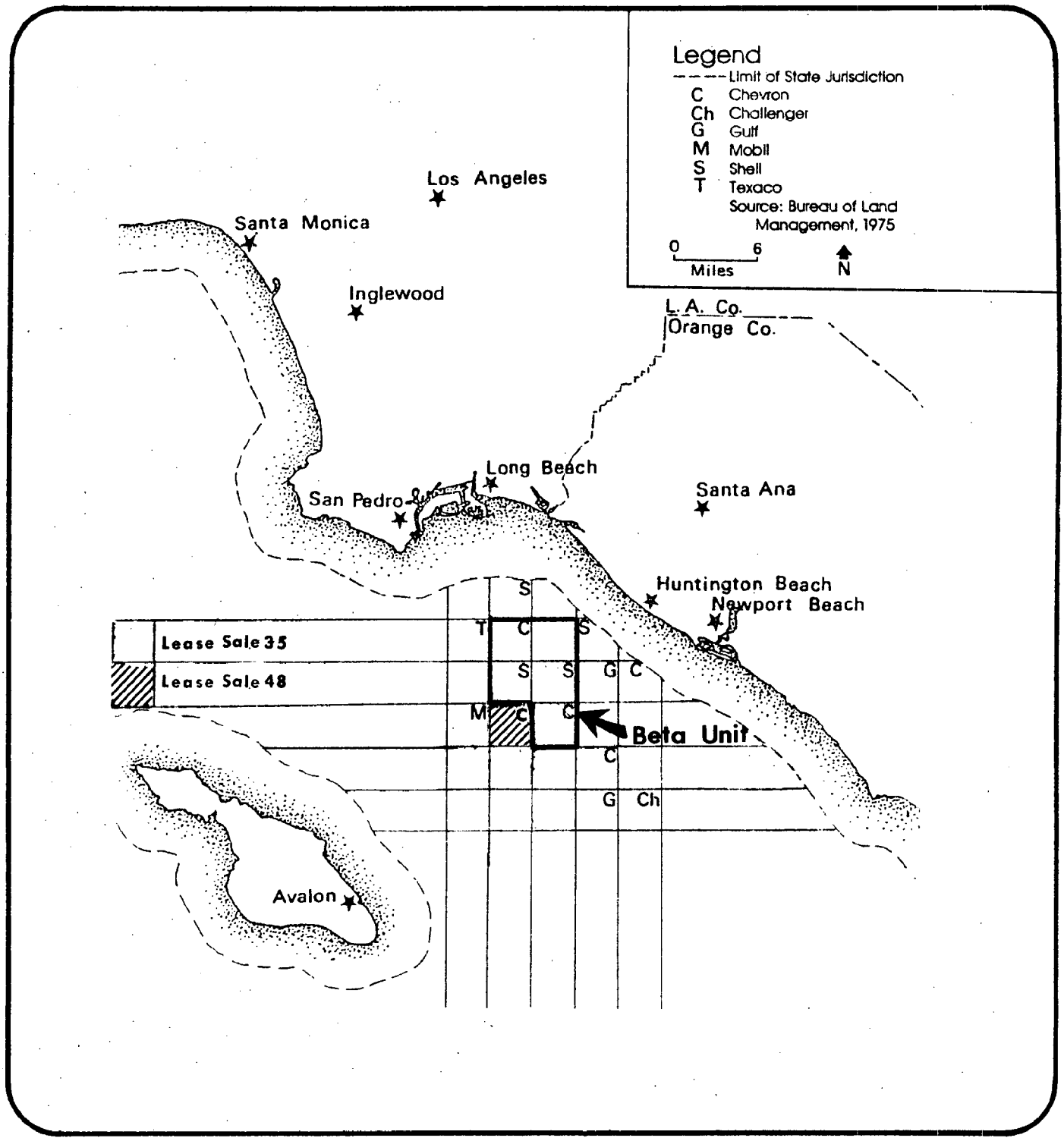

Figure B.3.1 OCS Tracts Leased in the San Pedro Bay
Source: Bureau of Land Management "Lease Sale #48 Review" and U.S. Geological Survey Shell Beta EIR

Besides bringing the products to shore, pipelines are used to transport products between platforms and to carry water from shore to the platforms. The underwater pipes are usually coated with cement to protect them and to help weigh them down. Often, the pipelines are buried in the seabed. Trenches are dredged along the pipeline route. A barge lays the pipeline into the trench and then the pipeline is covered over.

The pipes are coated with cement in "pipe-coating yards" onshore. These facilities require a large amount of space and must have rail access to a deepwater docking area.

During development and production, the platforms are serviced and supplied from bases onshore. These are essentially larger, more permanent versions of the exploration supply bases. Ancillary industries like drill mud companies, will often locate near the supply base. Thus, several onshore activities related to offshore oil production may cluster together in some port or harbor area.

B.3.2 EXISTING OR CURRENTLY PLANNED PLATFORMS AND PIPELINES

There are two oil platforms off Huntington Beach in State waters and three more platforms will be installed in the federal OCS by the mid-1980's.

Aminoil operates platform Emmy which is located about 1.3 miles offshore in about 40 feet of water. (See Figure B.3.2) This platform was installed in 1963. It has 52 well slots and taps shallow zones inaccessible from onshore locations. There are three decks: the lower deck contains water pumps and other equipment; the middle or production deck holds much of the well equipment similar to onshore facilities (pumping units, well testers, separators, injection lines, mud pumps and cement storage); the top deck supports the drilling rigs, offices and a helicopter pad.

The platform design allows all liquid wastes such as oil drips, rain water, and other fluids to be collected in a sump and piped to shore. Equipment failure that could result in an oil leak automatically triggers shut-down of the producing wells.

Several pipelines connect Emmy to Aminoil's onshore facilities.

The pipelines are internally coated to protect them from corrosion and are buried in the seafloor. The landfall for the pipelines (that is, the place where the pipeline comes ashore) is about 4,000 feet north of Goldenwest, under the State Beach.

Union installed platform Eva in 1966, about 2 miles offshore in about 60 feet of water. This platform is similar to Emmy in design, but it has only 37 well slots. Eva is connected to this company's separation plant by several pipelines. The landfall for these lines is near Warner Avenue.

Shell will install three platforms in the San Pedro Bay OCS by 1983. These platforms will be clustered about 9 miles southwest of Huntington Beach; see Figure B.3.3.

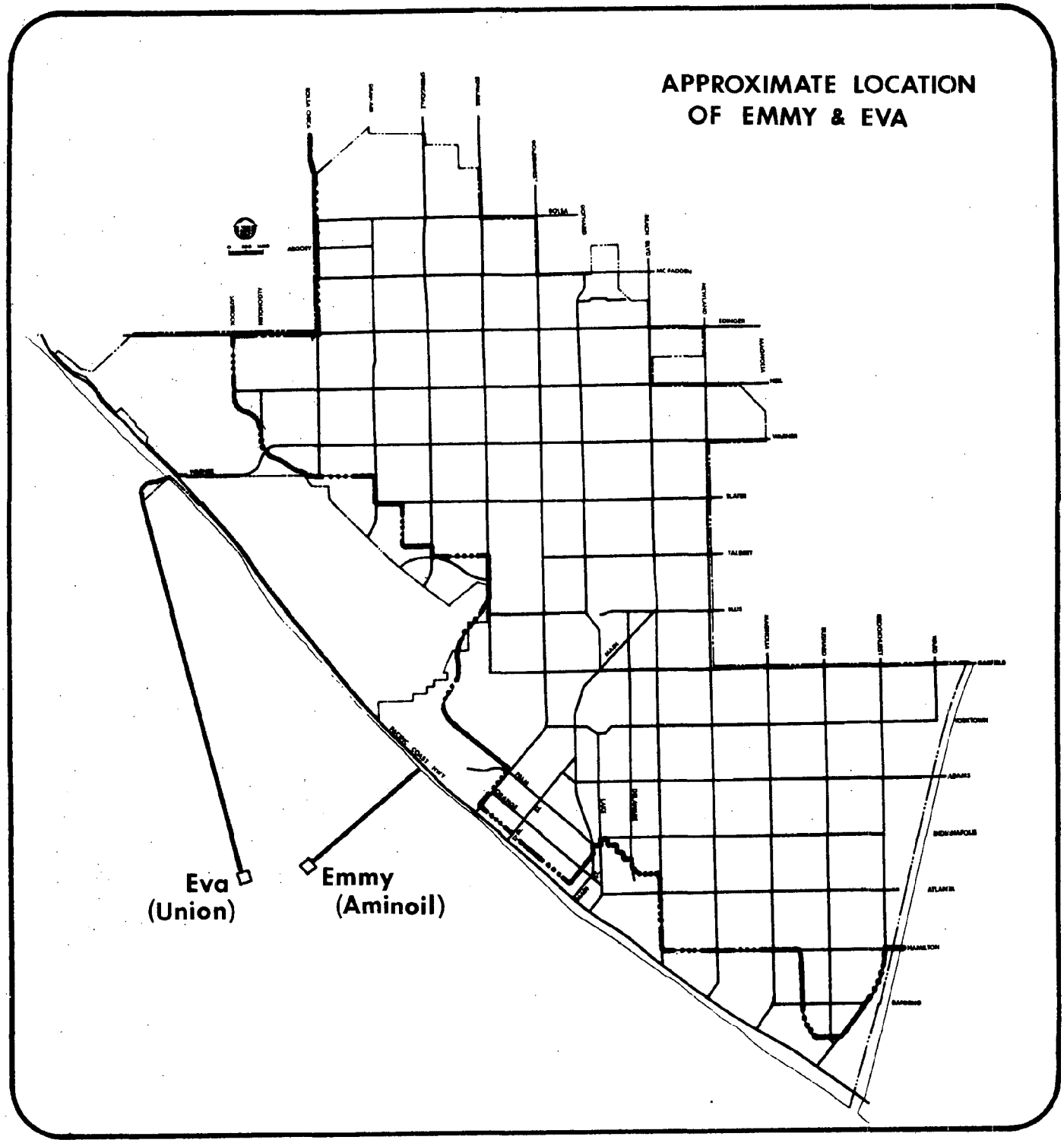

Figure B.3.2 Approximate Location of Emmy and Eva
Source: Aminoil, USA

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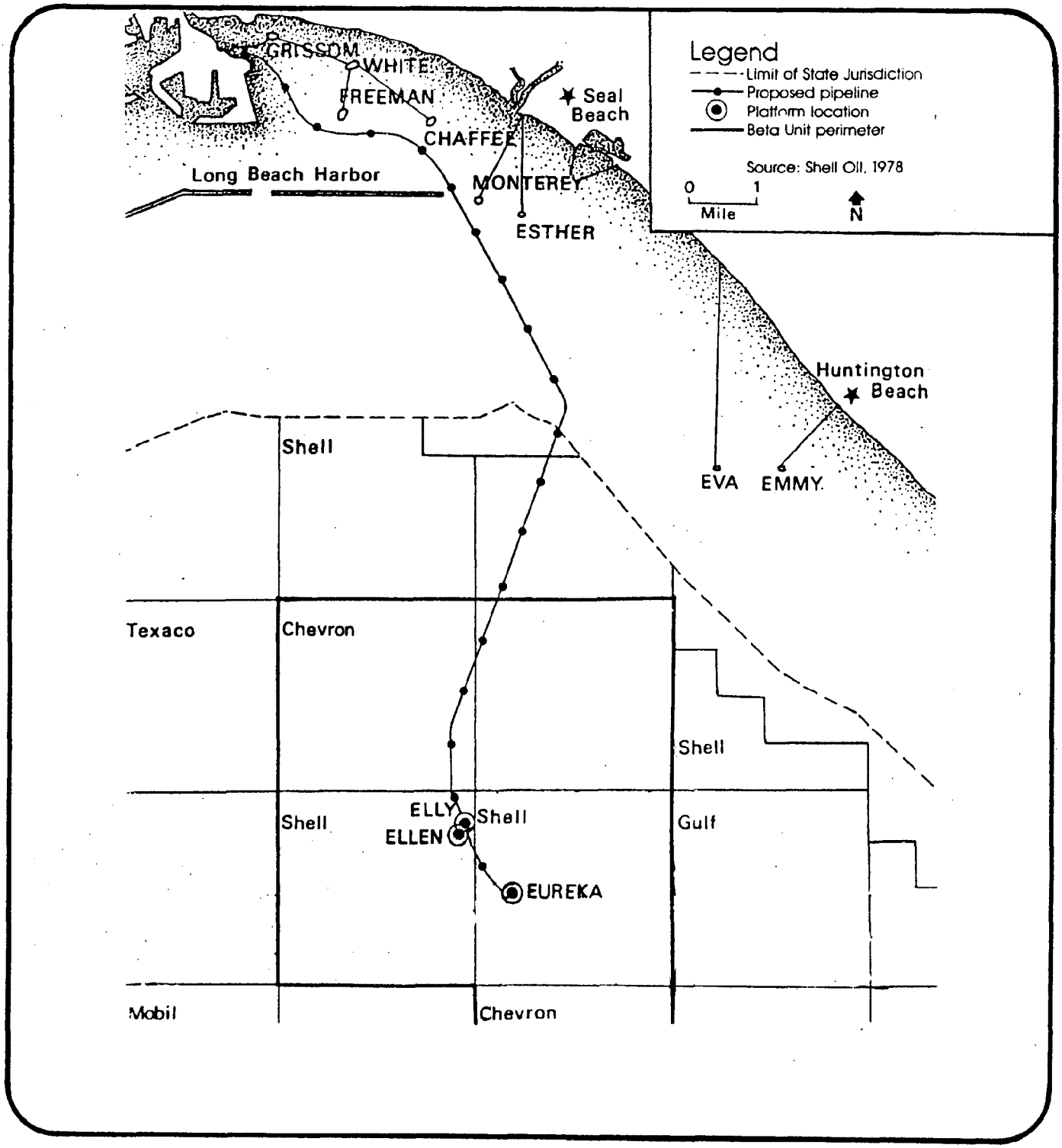

Figure B.3.3 Locations of Shell OCS Platforms and Pipelines
Source: U.S. Geological Survey, et al, Shell OCS Beta Unit Development, EIR-EA

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One, named Ellen, will be installed early in 1980, in about 265 feet of water. It is a drilling platform with 80 well slots and has a deck configuration similar to Union's and Aminoil's platforms.

Shell plans to separate and treat its OCS oil and gas on another offshore platform, called a "production platform". Elly, as this one is named, will sit in 255 feet of water only 200 feet from Ellen. The two platforms will be connected by a bridge. Elly will hold separation and treatment facilities similar to those described in Section B.2.2. A 16" clean oil pipeline will extend about 17 miles from Elly to a landfall in the Port of Long Beach. Shell plans to install this platform in 1980.

Another drilling platform, Eureka, is planned for 1982. Eureka will be located about a mile southeast of the other Shell platforms in about 700 feet of water. This platform will accommodate up to 60 wells. Pipelines will bring Eureka's products to Elly for processing.

United States Geological Survey regulations require that certain sections of the OCS be developed in a coordinated way (as a "unit") in order to minimize the number of facilities and increase efficiency. The two Shell tracts on which these three platforms will be built are part of such an arrangement, called the "Beta Unit", which includes three other adjacent tracts; (See Figure B.3.1). The Shell production platform and pipeline are designed with excess capacity in order to better accommodate production from other tracts in the Beta Unit in the future. However, at this time, there are no plans to begin development of those other leases.

B.3.3 MARINE TERMINAL

Section B.2.3 discussed the Gulf tank farm. The oil stored at that facility is brought to Huntington Beach by tankers which are unloaded at Gulf's offshore marine terminal.

The terminal is an arrangement of buoys about 1.3 miles offshore from the City just south of the municipal pier at which tankers moor to be unloaded. (See Figure A.1.1)

The terminal can accommodate a ship with a 1,000 foot length, 150 foot beam and 43 foot draft. On the average, four tankers visit the facility each month. The capacities of the tankers using the terminal may range from 200,000 to 475,000 barrels of oil. The terminal primarily handles crude oil destined for the Gulf refinery; however, fuel oil used at the Edison power plant is sometimes delivered through this facility.

A Mooring Master, employed by Gulf, boards the tanker when it arrives in the Los Angeles area. He inspects the vessel to insure that it meets minimum equipment and safety requirements. The Mooring Master must also check weather and wave conditions, before allowing the tanker to unload. He accompanies the tanker to the terminal, steers the ship into place and supervises the mooring and unloading activities.

After the tanker is moored into place, a 160 foot flexible hose is drawn up from the seafloor by a chain attached to one of the buoys. The oil is drained through the hose and pumped ashore through underwater pipelines.

Two pipelines, one 10 inches and one 24 inches, extend from the terminal to the tank farm. The landfall is a few hundred feet north of Beach Boulevard underneath the public beach.

B.4.0 THE FUTURE OF OIL AND GAS ACTIVITIES IN HUNTINGTON BEACH

The following section discusses possible future oil and gas activities in Huntington Beach. These projections are based on inputs from the industry and State agencies, and research by City staff. Like any attempt to foresee the future, this one is not certain. Continued monitoring of oil and gas activities, and continued cooperation and communication with the oil companies and the State, are essential to keep the City and the public aware of future developments in Huntington Beach.

B.4.1 ONSHORE OPERATIONS

B.4.1.1 OIL EXTRACTONS FROM ONSHORE - INDEPENDENTS

The independently operated oil wells, dispersed throughout the central part of the City, will probably be abandoned before the wells on the large Aminoil and Chevron leases. As discussed above, their fragmented ownership will make application of advanced recovery techniques quite difficult, limiting their productivity. At the same time, undeveloped land, especially in urban coastal areas, is becoming scarce and hence more valuable. These two effects will tend to reduce the number of independent wells, because land owners will earn higher profits from alternative uses of oil well parcels.

On the other hand, the price of oil is rapidly increasing and the City has changed its tax system to help make small-scale production more viable. Ten years ago a well producing five barrels a day might have been abandoned and the land put to other uses. Today, some wells in Huntington Beach pump as little as a single barrel a day. Figure B.2.7 shows that production by independents has dropped from about 1.2 million barrels in 1973 to about .6 million barrels in 1978, a reduction of about 50 percent in only five years. Yet the number of producing independent wells in the City has been virtually unchanged during that same time, (Table B.2.5). This implies that lower production levels are still acceptably profitable to the independents which has slowed the rate of abandonment among these wells.

It seems likely, however, that independent wells will be gradually abandoned over the next ten to fifteen years, barring some secondary recovery project. The actual rate of decline will be largely contingent on oil prices. Of course, certain wells which tap particularly productive pools may be pumping for a much longer time. The decision to abandon any well will depend on the value of the oil it can extract, the cost of extraction, and the value of the land for other uses. Thus, the least productive wells on the most valuable land are most likely to be abandoned first.

As discussed in Section B.2.1.2, advanced recovery is difficult among independents, but not impossible. If the price of oil is high enough and the amount of oil still in the ground warrants them, secondary projects could be attempted. Most likely, a large company will make agreements with, or simply buy out, several independents and initiate a flooding program. This kind of project where several companies share their plans and equipment is called "unitization." Such a project would probably require the drilling and redrilling of wells and the installation of injection equipment, new pipelines, and even new treatment facilities. The new treatment facilities might be built on a centralized parcel, or the fluids might be piped to existing plants on the large Aminoil or Chevron leases. A small-scale unitization program was undertaken by Aminoil in the early 1970's. This project involved the consolidation of wells into an island on Pacific Coast Highway and the water flood and development of offshore zones. The products are piped to the Aminoil plant north of Goldenwest Street for separation and treatment. See Section B.2.1.2.

A unitization project would lengthen the lives of existing independent wells and steps would have to be taken to ensure that these wells and any new equipment are compatible with other nearby uses.

Large-scale unitization projects have been undertaken in Wilmington and Signal Hill. In both cases, a large oil company was the mediator among the independents. To achieve unitization, the initiating company must first overcome the "free-rider" problem: any small number of operators will, at least temporarily, reap the benefits of a flooding program if they refuse to participate while their more numerous neighbors decide to. A free-rider's production increases without his sharing the expense of the program. This incentive not to participate frequently precludes multi-party projects.

Even if sufficient numbers of the independents are willing to go along with a flooding project, agreeing on the appropriate share of the expenses and profits to be allocated to the various parties is a monumental task. In the Wilmington case. Sun Oil Company set up a "technical committee" to help in this arbitration. The committee determined 1) the zones different wells tapped, 2) where new wells would be needed, 3) the quality of the oil in different zones and 4) the potential of the existing facilities to recover oil with and without flooding. Only through a complex and long-negotiated arrangement were the parties able to agree on a cost assignment and compensation scheme.

The Wilmington unitization has so far required 45 new wells, with at least 35 more anticipated. Most of these are directionally drilled from existing islands or oil parcels. A new, centralized treatment plant was built and new pipelines routed from the wells to this facility. The project is in an area which is generally built-up; the new drilling, new plant and new pipelines, all have had impacts on surrounding uses.

Whether additional unitization programs will be undertaken in Huntington Beach is very difficult to predict. However, two trends will make unitization easier in the future: 1) oil prices will rise perhaps providing the incentive to undertake the project, and 2) the number of independents active in the field will probably decline making negotiation simpler. The City must carefully monitor oil activities to anticipate such a project.

B.4.1.2 OIL EXTRACTION FROM ONSHORE - CHEVRON AND AMINOIL

The Aminoil and Chevron leases are already in advanced recovery programs. Continued water and steam injection will occur and new, more expensive, technologies may be applied as well. Both Aminoil and Chevron have pilot tertiary programs underway already.

Aminoil has been engaged in an extensive redrilling and injection program from its onshore wells and from Emmy. This project will continue into the 1980's. As a result, Aminoil's production levels are expected to level off or increase, arresting a sharp decline since the mid-1970's.

Aminoil has also begun flooding in the upper main zone, the last zone without a significant injection program. Some of this oil may be extracted from directionally drilled onshore wells, but most will come from Emmy's wells. A full injection program in this zone will require use of well slots on Union's platform Eva. This kind of unitization project between Union and Aminoil is discussed later.

Continued flooding, new flooding, and tertiary projects will keep the relatively large-scale oil operations active on the principal Aminoil and Chevron leases for perhaps twenty years. Fixing a final phase-out schedule is impossible at this time and will depend on the price of oil and the success of new extraction methods.

In some of Chevron's leases, consolidation has occurred on oil islands and new uses have been built on the re-opened surface lands. In a typical consolidation project, Chevron, which leases the surface area, appraises each of its oil wells by considering the present value of the oil that a well is expected to produce. The company also estimates the cost of relocation. The redeveloper then either 1) buys out a well and removes it, 2) pays for its relocation to another site, or 3) builds around it. On many of Chevron's leases in Huntington Beach the majority of the oil facilities were concentrated into islands many years ago. This has reduced the cost of recent consolidation projects, making them economically viable.

Chevron is involved in two currently planned projects involving consolidation and a combination of uses on the surface area. These are called, "Seacliff IV" and the "Ranch." The former is the latest phase of the Seacliff development extending west of the golf course almost to the Aminoil lease. A residential development will surround two existing oil islands; another new island is tentatively planned. "The Ranch" is another planned residential development involving well consolidation. It will be built on an irregularly shaped site near the Civic Center where the existing wells will be consolidated into four islands, walled and buffered from the surrounding residences.

Similar projects are anticipated. Candidate sites might include areas northeast of Seacliff IV, leases west of Edwards and an area near Lake and Atlanta. All of these sites are owned by the Huntington Beach Company and leased by Chevron. Other large parcels may also be subject to strategies involving consolidation and a combination of uses on surface areas.

In areas where contiguous oil producing parcels are owned by several independent parties, consolidation and redevelopment is less likely. Many of the same problems that occur when unitization is proposed may arise. Nonetheless, such a project is not impossible.

The wells on the oceanside of Pacific Coast Highway and in the State Beach deserve particular attention. Neither Aminoil nor Chevron has plans to phase them out. Both companies have agreements with the State allowing oil activities to occur as long as necessary to recover the underground resource. Pressures from the State Parks Department, the City and private citizens, however, may prevent these wells from being redrilled if the zones they now tap become unproductive. Thus, these wells may not be operating as long as the more general extraction activities on the other side of the highway. On the other hand, a well on a particularly productive zone may be there for a very long time. See Section B.5.2.7 for further discussion of strategies regarding these wells.

B.4.1.3 TREATMENT AND SEPARATION FACILITIES

The large treatment facilities owned by Aminoil, Chevron and Union will be active as long as their main oil well sites are pumping. Current capacity should be more than adequate to handle future production from the Huntington Beach field. Excess capacity in the systems may be phased out if no longer necessary. Some equipment may be modified to handle new technologies. For example, after Aminoil begins to recover oil from its tertiary pilot program, separation facilities will need to be changed to collect and treat the caustic medium injected into the wells. Other chemicals used in advanced recovery may need special storage, separation, and disposal facilities. In general, the equipment used in new methods is not expected to be fundamentally different from existing systems, requiring only new or modified tanks and pumps, for example. New equipment can probably be accommodated on the existing oil sites.

In the future, through depletion and, perhaps unitization, the number of independent treatment facilities will continually decline. As independent wells are abandoned, of course, their attendant separation facilities are dismantled. A unitization project in the built-up part of the City would also tend to reduce the number of small scale separation facilities. Unitization would require either a new, centralized treatment plant accessible from the scattered wells to handle the high volumes of produced water or a new pipeline gathering system from the wells to one of the large, existing plants - much like offshore oil is gathered and shipped to onshore facilities.

The lives of the large-scale treatment plants could be extended and their excess capacities utilized if OCS oil were treated there. At this time, Shell is the only operator developing OCS tracts in the San Pedro Bay, and it will treat its products on an offshore platform. Shell's production platform is designed with excess capacity and could accommodate oil from other San Pedro Bay tracts. In the unlikely event that such large quantities are discovered that Shell's capacity is exceeded, or if new discoveries are too distant from the Shell platform to be practically treated there, new facilities would be required. Excess capacity in existing onshore facilities could be utilized in this situation. Development of OCS tracts much farther out, near Santa Barbara Island or the Tanner-Cortez Banks (an area beyond Santa Catalina and San Clemente Islands, about 100 miles from Huntington Beach) could conceivably involve existing facilities in the Huntington Beach area, but this is unlikely. These possibilities and alternatives are discussed more fully later.

One situation which might require expansion of existing treatment facilities would be a flooding program from Union's platform. Such a program, which probably will occur in the 1980's, could require a new pipeline to Union's onshore facility and expansion of Union's treatment system to accommodate the large amounts of well water and to provide clean injection water. Another option would be to lay a new pipeline to the existing Aminoil facilities. If both Aminoil and Union undertake this future flooding program together, the latter option would probably be preferred because 1) the pipeline route to Aminoil's lease is shorter and 2) Aminoil already has enough capacity to accommodate this project.

B.4.2 OFFSHORE OPERATIONS

B.4.2.1 OFFSHORE OIL EXTRACTION - STATE LEASES

Aminoil's Emmy and Union's Eva will very likely be productive for at least another twenty years. As mentioned in Section B.2.1.2, Aminoil is undertaking an extensive redrilling and injection program involving Emmy. A similar program from Eva seems likely.

Union, however, has not yet applied to the State Lands Commission for permission to redrill wells from Eva and undertake such a project. It typically takes two to three years after the initial request for a company to win approval of a redrill proposal.

Future operations will almost certainly involve flooding of the upper main zone which could require unitization by the two companies.

Aminoil, Union, the State Lands Commission and the State Division of Oil and Gas all consider this kind of project likely; though it probably will not begin until at least the mid-1980's, considering the usual timeframe from proposal to initiation. This flooding project would prolong the activities of both Eva and Emmy, since both would probably be working the zone.

As part of this program, Eva would require a new pipeline to handle the new production volumes (mostly water) and to provide clean injection water from the shore. As noted above, the pipeline would probably extend to Union's or Aminoil's existing facilities. In the former case, new equipment would be required to clean the wastewater for reinjection.

Although neither Aminoil nor Union has proposed a new platform in State waters, such a project is possible if the full offshore field is developed and the necessary facilities cannot be accommodated on onshore areas or existing platforms. For example, Aminoil has recently proposed an experimental project involving a new steam injection technique to be employed on an additional small deck extending from Emmy. If this project is successful, the company may propose building a new platform. Results of the project are not expected before the mid-1980's.

B.4.2.2 OFFSHORE OIL EXTRACTION - FEDERAL OCS/SAN PEDRO BAY

As discussed in Section B.3, Shell plans to install three platforms on tracts it obtained in the 1975 Lease Sale #35. The jacket of the first drilling platform was floated into place late in 1979. A production platform will be installed during 1980. Within three or four years, another drilling platform will be built nearby. Oil extracted from the drilling platforms will be separated on the production platform. The clean oil will be piped to Long Beach. These platforms are expected to be producing for about 30 years.

None of the onshore support facilities will be in Huntington Beach. A supply and crew base had been proposed for Huntington Harbour, but Shell has changed its plans and the base will be in Long Beach.

Six major companies currently hold 14 tracts in the San Pedro Bay but no development besides Shell's is now planned. Chevron, which has two tracts in the Beta Unit with Shell as well as three other nearby tracts, appears to be the most likely company to act in the near-term. Oil extracted by Chevron platforms in the Beta Unit would be piped to Shell's production platform for treatment.

If platforms are installed in other San Pedro Bay tracts outside the Beta Unit, the products might be piped to Huntington Beach for separation in existing plants. Whether this option is exercised will depend on the locations of the platforms and the quantities of oil discovered.

If very small quantities of oil were discovered in other San Pedro Bay tracts, tankers might be used instead of pipelines to bring the oil to shore. Gulf's Huntington Beach terminal might be used for this. The proximity of these tracts to onshore facilities, however, increases the viability of pipelines. The tracts are also near shipping lanes which makes a plan involving increased tanker traffic an unattractive option.

Huntington Harbour could again be considered a site for a crew launch base if more San Pedro Bay tracts are developed. However, Long Beach is probably a more likely location because there are less conflicts with surrounding uses. Existing heliports in Huntington Beach could be used to carry crews to and from new platforms. No fabrication yards, pipe coating yards, refineries or any other heavy industrial facility would likely site here.

In summary, Huntington Beach could be the landfall for future pipelines from San Pedro Bay tracts. Existing separation and treatment facilities could be used for OCS oil. Current excess capacity might be able to handle new production; some new or expanded facilities could be accommodated in the existing sites if necessary. At this time, none of these possibilities seems likely. San Pedro Bay oil will more likely be separated offshore and then shipped to Long Beach. Huntington Harbour could be used for a supply base or crew boat harbor, but Long Beach would probably be a preferred site.

B.4.2.3 OFFSHORE OIL EXTRACTION - OTHER OCS AREAS

The federal government has also leased OCS tracts near Santa Barbara Island and near the Tanner-Cortez Banks. Activities in these tracts could possibly affect facilities in Huntington Beach. But the development strategies considered most likely at this time do not involve facilities in the City.

Products extracted in the Tanner-Cortez Banks would most likely be piped to the Ventura area. Oil found near Santa Barbara Island would probably be brought by tankers to Los Angeles or Long Beach.

Tracts south of Huntington Beach have not yet been leased. Development of these tracts would probably involve a pipeline landfall near San Diego and transportation of oil by tanker to the Los Angeles-Long Beach area. Huntington Beach could be affected if an onshore pipeline were built to bring oil from San Diego to Los Angeles area refineries and if tanker traffic along the City's shoreline increased. Two other possibilities would be a pipeline landfall in the City from nearshore OCS tracts south of Huntington Beach or use of the Gulf terminal for unloading OCS oil.

The City should continue to monitor activities in all these areas in case projections are revised and Huntington Beach is considered in future plans.

B.4.2.4 OFFSHORE - MARINE TERMINAL

Gulf has no plans to alter its marine terminal operations. Activity at the terminal is largely contingent on the availability of foreign crude for Gulf's Santa Fe Springs refinery.

The facility could be used for unloading OCS oil. However, there are no plans for such use now. Feasibility would depend on the quantity and type of oil discovered in the OCS.

B.4.2.5 OCS OIL AND GAS - FUTURE LEASE SALES

Lease Sale #48 occurred last June. In the areas closest to Huntington Beach, only one tract in the San Pedro Bay and three in the Tanner-Cortez Banks were released to oil companies in that transaction. (See Figure B.3.1.)

The call for nominations for Lease Sale #68 which includes tracts in the Southern California OCS was held in December, 1979.Tentative tract selection is planned for May, 1980 and the sale is expected in summer of 1982.

Lease Sale #73 which may involve tracts anywhere in the California OCS is expected in 1983. Call for nominations are planned for November, 1980 and tentative tract selection for 1981.

Lease Sale #80 may also affect OCS tracts anywhere in California. The call for nominations is expected in summer of 1981. Tentative tract selection is proposed for early 1982 and the actual lease sale in 1985.

The City should monitor these activities in order to keep abreast of events that could affect Huntington Beach and should participate in the commenting and review processes if interests of the City are at stake.

B.5.0 IMPACTS FROM OIL ACTIVITIES

B.5.1 OIL SPILLS

Of all events related to oil activities, a major spill on land or offshore could have some of the most serious impacts on Huntington Beach. Consequently, oil spills are discussed separately in this section.

Oil spills occur in and near Huntington Beach frequently. Table B.5.1 lists all the spills in this area reported to the Regional Water Quality Control Board during the last seven years. Many other small spills probably occurred but were not reported.

The quantity of oil in most of the spills is unknown. Most of these spills, however, were very small, typically one or two barrels or less. The largest seems to have been a leak of 20-40 barrels (42 gallons per barrel) from the Gulf Terminal loading line in 1978.

B.5.1.1 OFFSHORE SOURCES

The sources of many of the offshore spills, especially of the ocean slicks, are unknown. Tar "globs" are thrown on the beach every year during the storms of winter and spring. The source of these globs is probably natural seepage in the Channel.[7]

As more oil related activities occur offshore in this area, the likelihood of major spills will probably increase. These can result from accidents involving platforms, tankers or pipelines.

REGIONAL WATER QUALITY CONTROL BOARD
SPILLS REPORTED IN HUNTINGTON BEACH AREA

DATE	LOCATION	ORIGINS		AMOUNT	SOURCE
		ONSHORE	OFFSHORE		
*12/79	City Beach		X	na	tanker terminal
10/79	20th and PCH	X		na	pipeline
* 9/79	City Beach		X	na	unknown
6/79	Offshore		X	na	tanker terminal
5/79	Bolsa Chica State Beach		X	na	unknown
5/79	Mouth of Santa Ana River		?	na	unknown
4/79	Offshore		X	3 bbl	tank overflow on Emmy
3/79	Mouth of Santa Ana River		?	na	unknown
3/79	Huntington S. B.		X	na	natural seepage?
3/79	Bolsa Chica	X		na	pipeline
2/79	Offshore		X	na	unknown
12/78	Bolsa Chica	X		2 bbl	pipeline
11/78	Ellis Avenue	X		10 bbl	not specified
10/78	Offshore		X	na	unknown
9/78	Offshore		X	na	unknown
6/78	Offshore		X	20-40 bbls	tanker terminal
2/78	Offshore		X	na	unknown
2/78	Bolsa Chica State Beach	X		na	pipeline
1/78	Bolsa Chica State Beach		X	na	unknown
1/78	Offshore		X	na	unknown
1/78	Offshore		X	2 bbl	tanker terminal
1/78	Santa Ana River	X		na	pipeline
12/77	Goldenwest	X		na	not specified
8/77	Offshore		X	na	Eva
8/77	Offshore		X	na	unknown
7/77	Bolsa Chica	X		na	pipeline
6/77	Offshore		X	na	tanker terminal
5/77	Bolsa Chica	X		na	pipeline
4/77	21st Street	X		na	pipeline
2/77	Pacific Coast Highway	X		**	injection line
6/76	Bolsa Chica State Beach		X	na	unknown
4/76	Bolsa Chica	X		na	pipeline
10/75	Offshore		X	na	unknown
9/75	Offshore		X	na	tanker terminal
9/75	Bolsa Chica State Beach	X		na	pump unit
4/75	All Beaches		X	na	natural seepage?
4/75	17th Street	X		na	tank leak
3/75	Walnut & Lake	X		na	pump station
2/75	City Beach	X		na	pump station
12/74	Goldenwest & P.C.H.	X		na	sump+cellar overflow
7/74	Bolsa Chica State Beach	X		na	pump unit
6/74	17th and P.C.H.	X		na	pipeline
4/74	City Beach		?	na	unknown
2/74	City Beach/Bolsa Chica State Beach		X	na	unknown
6/73	21st and P.C.H.	X		na	pipeline
6/73	Offshore		X	na	unknown
3/73	Huntington State Beach		X	na	natural seepage?
3/73	12th Street	X		na	basin overflow

* From City Reports
** 15,000 Gallons of Injected Water; Oil Unknown

Table B.5.1 Oil Spills Reported to Regional Water Quality Control Board in Huntington Beach Area, 1973-1979

One source of spills is platform equipment failure; for example, valves may leak or tanks may overflow. Platforms are designed to minimize the amount of oil escaping in this way. An automatic system shuts down the wells if equipment damage or leaks are detected. Any liquids on the surface of the platform are collected in drip pans and sumps, where any oil can be recovered. Despite these preventative measures, oil does occasionally escape into the ocean. Twice in the last three years, small spills have occurred from the existing platforms off Huntington Beach. (See Table B.5.1).

Well blowouts occur when valves or casings are broken by pressurized fluids or when thin cap rocks burst from pressure. Improved drilling techniques and the use of blowout prevention equipment have largely reduced the occurence of disasterous blowouts. When the underground strata and their pressures are well known, preventative methods are especially effective. Blowouts are highly unlikely during redrilling operations from Eva or Emmy because of the industry's familiarity with the zones and because natural pressures are largely dissipated and are now only artifically induced by injection.[8] OCS blowouts are also unlikely because of strict federal regulation and monitoring of drilling activity.[9] Nonetheless, human error, equipment malfunction or other accident could lead to a blowout.

Some catastrophic natural events could damage platforms, wells or pipelines and result in oil spills. In Huntington Beach, the most likely of these is a major earthquake because this is a seismically active area. The Newport-Inglewood fault zone is about 2.5 miles northeast of the two existing platforms.[10] The Palos Verdes fault zone is very near the planned OCS platforms.[11] Other smaller fault zones underlie the offshore area. Conceivably, wells could be sheared, platforms damaged or collapsed, or pipelines burst by an earthquake.

The platforms are designed to withstand large-scale earthquakes.[12] Pipelines have automatic shut-off valves which would minimize leakage in case of disruption, and wells in the OCS are equipped with subsurface valves which close off the wells if surface control is lost. All of these make a large earthquake-induced spill unlikely. Still, human error, equipment or material failure or combinations of events (storms and a large earthquake, for example) make such an occurence possible, though very unlikely.

Existing and planned platforms are designed to withstand storms and tsunamis which could hit this area.[13] Seabed subsidence, another possible cause of structure collapse, is not likely on the sites of the Huntington Beach area facilities.[14]

A very serious concern in this area, however, is the possibility of collisions involving platforms, tankers, or both, which could result in spills. Eva and Emmy are in relatively shallow water and close to shore, miles from the principal traffic lanes. Ships large enough to damage these platforms do not use these waters frequently. However, the Shell platforms lie in the separation area between the major north and south bound shipping lanes in the Coast Guard's Traffic Separation Scheme (see Figure B.5.1). Platform Elly will be 3,900 feet, Ellen 4,300 feet and Eureka only 2,600 feet from the northbound traffic lane. This lane is used by commercial vessels, including oil tankers, which are large enough to seriously damage a platform. The principal mitigation against collision with a platform is the provision of adequate lighting and other navigation aids on the structure.[15]

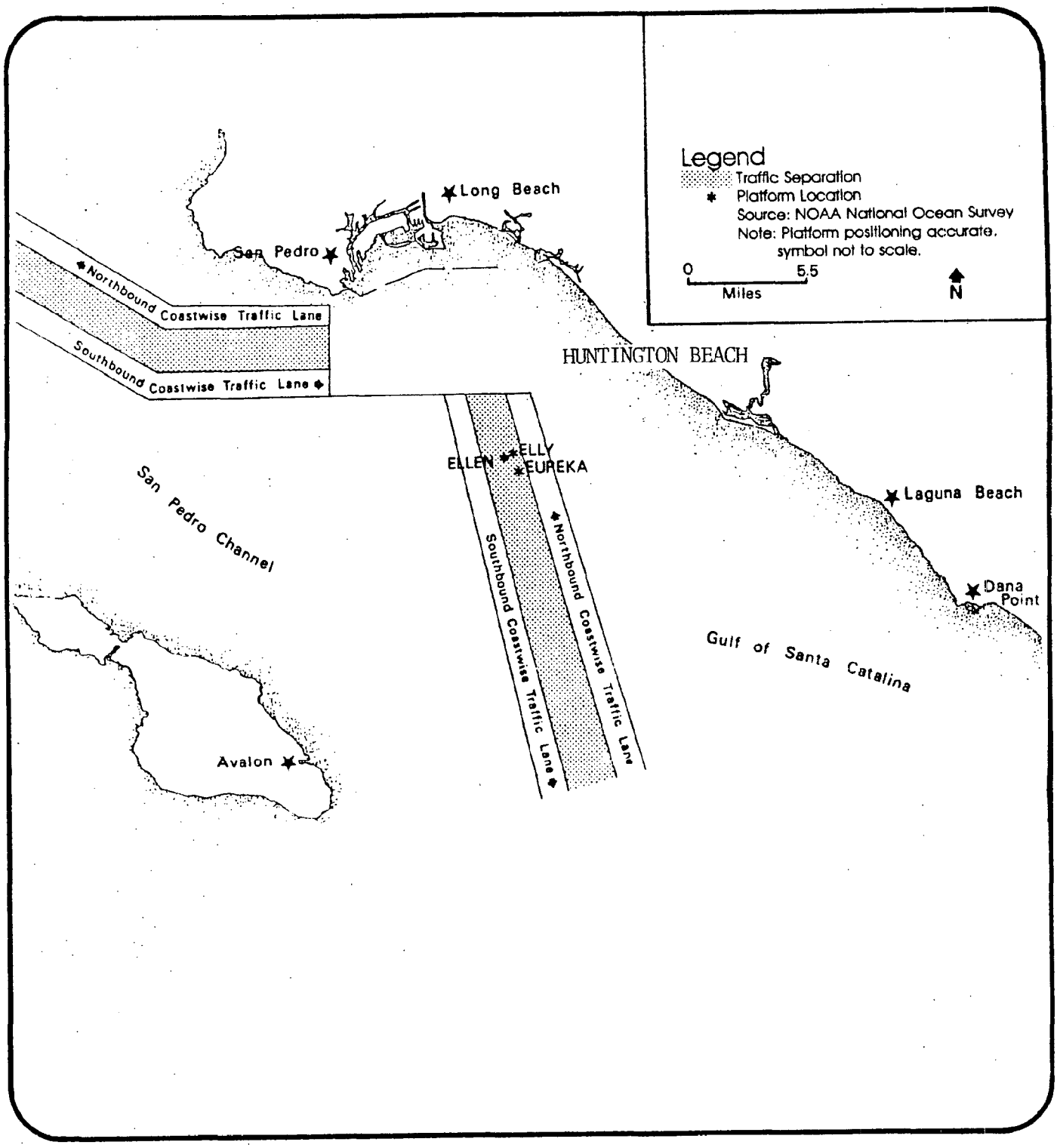

Figure B.5.1 Traffic Lanes and Proposed Platforms in the San Pedro Bay
Source: U.S. Geological Survey, et al, Shell OCS Beta Unit Development, EIR-EA

huntington beach planning division

Besides the U.S. Geological Survey, the U.S. Coast Guard and the Army Corps of Engineers are the agencies responsible for the safety of offshore oil activities. The U.S. Coast Guard is currently studying traffic patterns in Southern California coastal waters and will recommend policies to improve traffic safety. In the future, the Army Corps of Engineers will require proposals for offshore platforms to conform to the recommendations of the Coast Guard study, before issuing permits for platform construction.

Oil tankers using the San Pedro Bay could collide with other vessels or platforms or could be damaged by fire, storms or other accidents. About four tankers each month now unload at the Gulf terminal. Future OCS activity could increase tanker activity in the waters near Huntington Beach, resulting in small scale spills or leaks due to human error or equipment malfunctions. Most spills occurring off Huntington Beach with known sources originate at the tanker terminal. (See Table B.5.1).

In general, tankers pose greater spill problems than platform activities or pipelines: 1) the number of tankers frequenting these waters, and the fact that they must move among other vessels and obstacles, sometimes under difficult weather conditions, makes them more susceptible to serious accidents; 2) tankers hold much more oil than can be stored on a platform or is typically leaked from well or pipeline accidents; 3) tankers can hold other oil-related products besides crude which tend to be more toxic and volatile.

Another source of leaks can be damaged pipelines. Beside earthquakes, pipelines can be broken by ship anchors, corrosion, accidental sinkings or groundings, and dredging activities. The pipelines from the oil platforms have automatic testing and shutoff equipment. The pipelines from the marine terminal do not, but they are tested prior to each tanker delivery.

B.5.1.2 ONSHORE SOURCES

About three spills or leaks from onshore facilities are reported in Huntington Beach each year; (see Table B.5.1). Most of these are very small, amounting to less than a barrel. Pipeline leaks are the most common sources, followed by pumping unit accidents and tank overflows. Once, in 1977, an injection line ruptured spilling about 15,000 gallons of water onto the Coast Highway and the beach. A small amount of oil was carried out with the leaking water.

Most of these leaks and spills resulted from accidents, human error, or equipment or material failure. These same factors will undoubtedly contribute to the incidence of future spills.

Blowouts from onshore drilling activities are probably even more unlikely than from offshore wells.[16] The field is old and the zones well known. Natural pressures are largely dissipated. Strict drilling and redrilling regulations and the mandatory use of blowout prevention devices also apply to onshore wells.

Major spills could occur from several possible, but rare, circumstances: severe earthquakes, floods, and liquefaction.

Severe seismic activity could 1) "slosh" the liquids in a tank so that the roof is damaged and the materials spill out; 2) stretch or strain tank materials, perhaps shearing bolts; 3) shear pipelines or wells; and 4) collapse structures. Examples of all have occurred in past California earthquakes, sometimes resulting in spills or leaks.[17] Earthquake induced accidents have not been recorded in Huntington Beach.

Liquefaction or flooding could cause similar accidents. Some facilities are in known subsidence areas; virtually all oil operations are in flood hazard areas.

In most cases, any spills from tanks would be contained in dikes or other containment systems. However, it is possible that the catastrophic events that could result in a severe spill -- an earthquake or flood -- might also damage the containment system. In that case, spilled liquids could flow off the site damaging surrounding areas. In the past, heavy rains have contributed to tank overflow and dike failure resulting in spills in Huntington Beach.

Fires are another source of spills. Hydrocarbon vapors can accidentally ignite, damaging tanks or wells, perhaps resulting in a discharge. (Fires are discussed again later.)

B.5.1.3 THE LIKELIHOOD OF MAJOR OFFSHORE SPILLS REACHING HUNTINGTON BEACH

It is really impossible to predict the number of major spills that will occur in the waters off Huntington Beach or the amount of oil that will be spilled. The best available studies compare the estimates of future activities in this area to historical data about other places where offshore oil activities occur. The Pacific OCS Research Paper No. IV used this method and concluded that about five spills of greater than 1,000 barrels can be "statistically expected" in the San Pedro Bay by the year 2000.[18] More important than the exact numbers, this study indicates that large spills are possible here.

Whether a spill occurring off Huntington Beach would actually reach the City's shoreline, would depend primarily on: 1) the location of the spill, 2) spill size, 3) spill source, 4) weather conditions, 5) currents and tides. Studies have been done which predict the pathways of an oil slick given certain circumstances. Other studies have analyzed typical conditions in the waters near the City. These suggest that Huntington Beach will be highly susceptible to oil damage if a large spill occurs because prevailing winds and currents will tend to push spills landward.[19]

Spills from Emmy or Eva will almost certainly hit the beaches very quickly after discharge under almost any conditions. Spills from the Shell platforms could reach the City within four hours in "worst case" conditions -- or could miss it altogether under other circumstances. In a more typical situation, a slick from that area would reach Huntington Beach within two or three days.[20] Of course, a myriad of factors can affect the timing and eventual destination of the oil.

The City would also be very susceptible to tanker spills in the San Pedro Bay. Again, several conditions at the time of the accident would affect where and when the oil would hit the shoreline, if at all.

B.5.1.4 DISPOSITION OF THE OIL

After oil enters a water body, it tends to spread out on the surface of the water. At the same time, the actual volume of the slick begins to diminish because of several events. First, the lighter, more volatile fractions of the crude tend to evaporate. These compounds are usually the most toxic part of the oil. Second, emulsification occurs through which some oil mixes into the water. Third, the crude may sometimes agglomerate around small sediments in the water and may sink to the bottom as "tar balls". Fourth, certain bacteria may attack the oil. The extent to which these factors actually affect the spill depends on many other variables; but their impact can be important, because they help to determine the timing, the volume and the disposition of the spill.

In an onland spill, the fluid oil is drawn downward, by gravity, coating everything in its path. This spreading and coating enhances evaporation, and also makes clean-up more difficult. The other variables are not relevant to onland spills.

B.5.1.5 IMPACTS FROM A SPILL

The damage from an oil spill depends on several variables including:

1. The type of oil -- different oils have different toxicities and have different physical properties.

2. The amount of oil -- this can affect the extent of the contaminated area.

3. Where it goes -- different natural ecosystems as well as human activities can be more or less susceptible to oil damage.

4. The weather -- wind and wave conditions affect the movement of the oil on a water body and may impede containment and clean-up efforts.

5. The season -- biological and human activity varies with the time of year. Spills during breeding seasons, for example, could be especially damaging to bird populations. Spills during the summer would affect larger numbers of would-be beach users than if they occurred in the winter.

6. Co-contaminants, including clean-up agents -- chemicals used in spill control or clean-up may adversely affect some organisms.

The possible impacts of an oil spill on different resources in or near Huntington Beach are summarized below.

B.5.1.5.1 WATER

Water quality is obviously degraded when hydrocarbons float on the surface and when the oil mixes with and sinks through the water. This impact, though, tends to be short-term, and water quality returns to normal after the slick is gone and the oil settled out.[21]

B.5.1.5.2 AIR

Volatile hydrocarbons will evaporate from the surface of a slick, adversely affecting air quality. This impact is short-term, disappearing when the oil sinks or is cleaned-up.[22] Localized emissions and odor impacts can be expected in places where clean-up was incomplete or, in the case of ocean spills, where small slicks or oil globs wash ashore after the principal spill is gone.

B.5.1.5.3 PLANTS AND ANIMALS -- OCEAN SPILLS

a. Plankton: These tiny, floating plants and animals are the base of the food chain in the waters off Huntington Beach. The effects of oil on plankton populations are unclear.[23] Studies indicate that sometimes many of the organisms are damaged or killed, and photosynthesis is reduced among the phyto-plankton. In other cases, the species appear unharmed and photosynthetic rates actually increase. One effect that does seem certain is that eggs and larval forms of fish and other organisms, which are an important component of plankton, are usually killed or damaged by the oil. Any adverse impacts are expected to be short-term and localized, and because of the wide range of these organisms, plankton populations in the area should not be seriously or permanently affected.

b. Bottom dwellers: Oil agglomerating on sediments in the water and settling to the seabed may impact benthic communities (bottom-dwelling animals).[24] In addition, some chemicals used to encourage sinking have been lethal to certain bottom-dwelling species. Some of the creatures may be covered or smothered by the oil; others may be poisoned. Their habitat may be impaired significantly and for a long time. The creatures affected include crustaceans, mollusks, worms and echinoderms (starfish, sea urchins, sea cucumbers).

c. Sandy beach communities: If an oil spill coats a beach, there would probably be very high mortality among the crabs, clams and worms that live there.[25] In addition, scraping and removal of oil-contaminated sand -- which is a usual cleanup measure for severe spills -- would, of course, destroy the existing animal community. Nonetheless, rapid repopulation of the strand usually occurs once the sandy habitat is restored, because larval forms of these creatures live in the ocean and easily colonize a new area. In the mean time, however, bird species which eat the other sand dwellers would be displaced to other beach areas.

d. Fish: Generally speaking, few adult or juvenile fish are killed by direct contact with oil spills, because they can swim underneath and away from the slick. Increased hydrocarbon concentrations in the water and in their food chain, however, may affect some fish species. The severity of these effects is not known.[26] Eggs and juvenile forms which are less mobile may be directly killed by oil. In some places, damage to the population and to food sources may have short-term, localized affects on certain species. Considering the range of these creatures and their reproductive capacities, however, no long-term consequences from spills are anticipated.

e. Marine Mammals: Whales, dolphins, porpoises, seals and sea lions live in the waters off Huntington Beach. In general, these animals avoid oil spills. Thus, mammals that normally frequent Huntington Beach waters would be absent during the oil spills and for sometime afterward. The most serious impacts of a spill on mammalian species probably occurs when breeding grounds are contaminated.[27] None of these exists in Huntington Beach.

f. Sea and Shore Birds: Birds are usually adversely affected by oil spills.[28] The oil can coat the feathers of a bird, impeding swimming or flying and destroying the heat-retaining properties of the plummage. Also, the birds may be poisoned when they try to preen the oil from their feathers. Species which normally fish by swimming or diving in the ocean are particularly susceptible to oil coating. These include grebes, loons, cormorants and alcids. Other species that fly over the water and dive from the air when they see fish, such as gulls and pelicans, are somewhat less vulnerable.

Besides ill-effects from direct contact, oil can contaminate food sources, poisoning some bird species or forcing them from their usual feeding grounds.

Sub-lethal effects such as abnormal mating and reproductive behavior can result from ingesting oil and from habitat disruptions by a spill and clean-up activities. Habitat disruption may have especially important effects on the Least Tern, an endangered species found in Huntington Beach. This rare bird nests on a sandy beach in this area. An oil spill reaching their nesting grounds during the breeding season would obviously interfere with reproductive activities at that time. Longer-term impacts on nesting behavior could occur but are harder to predict.

B.5.1.5.4 PLANTS AND ANIMALS -- ONSHORE SPILLS

Most of the onshore oil facilities in Huntington Beach are in areas which have been disturbed by man's activities for many decades. Consequently, oil spills in these places do not seriously affect natural flora or fauna.

Spills from these facilities do occasionally reach the beach and ocean. Impacts on beach, benthic and ocean water habitats were discussed above.

Leaks or spills from upland facilities can adversely affect wetlands in and near the City. Wetlands are very important ecosystems. The Bolsa Chica as well as areas landward of the Coast Highway between Beach Boulevard and the Santa Ana River have wetland characteristics. An ocean oil spill would not likely affect either of these wetlands because of the very limited communication they have with the sea.* Oil facilities, however, are located within the Bolsa Chica itself and on the upland areas to the south. These facilities occasionally leak oil into the Bolsa Chica. The other wetland areas are susceptible to oil spills from the Gulf and the Edison tank farms.

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* In early 1979 a lowland area near the Santa Ana River was restored to an intertidal wetlands when the County opened culverts from sanitation channel allowing tidal flushing in the site. Later that year the culverts were closed. If opened again, the site would become an intertidal wetlands habitat once more and would be susceptible to an ocean spill through the Santa Ana River mouth and the sanitation channel.

These areas are very important habitats for several bird species, including two endangered types: the Least Tern and the Belding's Savanna Sparrow. The birds use the wetlands for feeding and breeding areas, and a part of the Bolsa Chica has already been set aside as an ecological sanctuary.

These wetlands are especially vulnerable to oil damage because they experience very little tidal flushing. Without water movement, oil tends to remain trapped in the wetlands. Clean-up would also seriously damage the existing ecosystem.

The fragility of these areas and their importance as special habitats warrants special protection measures against oil spills or leaks.

B.5.1.5.5 PUBLIC HEALTH

The impacts of an oil spill on public health are usually not serious.[29]

Some hydrocarbons may be carcinogenic and exposure to these compounds may increase after a spill from breathing evaporation emissions or from eating fish or mollusks which have ingested or absorbed these chemicals. The hydrocarbons most highly suspected of being carcinogenic are not the major components of crude oil. Although the effects are not fully known, crude oil spills are probably not major sources of carcinogens in the environment.

Occasionally, edible species of fish or other animals are contaminated by oil. This could lead to restrictions on fishing or clamming in certain areas.

B.5.1.5.6 RECREATION

Probably the most serious impacts from an ocean oil spill in the Huntington Beach area would be on recreational activities -- beach use, boating and sport fishing.

If a major spill were to threaten a beach in the City, public use of the area would be closed in order to stage clean-up equipment and personnel. If a large spill hit the beach, public access would continue to be foreclosed until the strand were cleaned up or the contaminated sand removed and replaced. Enjoyment of area beaches might be reduced if oil was not completely removed or if small slicks or tar balls were to wash ashore from time to time after a spill. These residues might have adverse odor and visual impacts.

The costs of these impacts on recreation would depend on the time of year the spill occurred, the extent of affected area, and the amount of time needed to clean the beach. Local beaches are heavily used, especially in the summer; thus a major spill could affect large numbers of people. Table B.5.2 summarizes estimated beach attendance in Huntington Beach during the summer.

If an oil spill threatened Anaheim Bay, the entrance would probably be closed to protect the wetlands, marinas, docks, boats and other property within. Access to the ocean by boats from Huntington Harbor and Sunset Aquatic Park would be closed; recreational boating in this area would be drastically limited. Large numbers of boatws could be affected. For example, a 1975 study found that about 280 boats left the Bay for the ocean on a typical summer Sunday.[30]

	BOLSA CHICA STATE BEACH	HUNTINGTON CITY BEACH	HUNTINGTON STATE BEACH	TOTAL
AVERAGE SUMMER WEEKDAY	8,144	18,562	14,451	41,157
AVERAGE SUMMER SATURDAY OR SUNDAY	21,681	30,211	26,644	78,536
PEAK DAY ATTENDANCE	42,500	44,500	35,000	122,000

Table B.5.2 Attendance at Beaches in Huntington Beach
Source: Calculated from data provided by State Department of Parks and by City Department of Community Services

Even spills which did not close the entrance to the Bay, could have impacts on recreational boating. Boats would be forced to avoid the slick, making certain travel routes temporarily unusable. For example, slicks could inhibit boat access from Huntington Beach to Santa Catalina Island, a popular destination for recreational boaters. In addition, the appearance and odor of a slick would surely detract from the aesthetic experience of ocean boating. Boats could also be soiled and damaged if they contacted oil slicks. All these impacts would probably be significant, but temporary.

Recreational fishing could also be disrupted by an oil spill. Two operators in Newport Beach bring anglers to fishing areas off Huntington Beach such as the Huntington Flats, near the mouth of the Santa Ana River, and the artifical reef north of the City pier. Other anglers fish directly from the pier and from the strand. Oil spills could temporily preclude fishing in these areas.

B.5.1.5.7 ECONOMIC IMPACTS

Oil spills impose some important, but short-term, economic impacts on the community. These are summarized below:

First, small spills, when the responsible party is unknown, are cleaned by the City.*

Even when the City does not directly clean the spill, it does provide support services (such as police to control access to the spill site). Thus, the City government incurs costs when a spill occurs.

If a major spill reduced use of a beach, the City or State would lose income from lost parking and entrance fees. Commercial establishments which cater to visitor needs may also suffer economic losses. The ability of these parties to recover these losses is discussed in Section B.5.1.8.

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* When the responsible party is known, he is liable for clean up. When the responsible party is unknown but the spill is large, the federal government arranges the clean up.

B.5.1.6 OIL SPILL CONTINGENCY PLANS

Adequate response to an oil spill must include the following elements:

1) Early detection of the spill and analysis of conditions

   The latter should include at least some assessment of the following:

   a) the type of oil
   b) location of the source
   c) present location and movement of the spill
   d) amount of oil, and rate of discharge if continuing
   e) environmental conditions such as wind, waves, currents, and tides
   f) areas most likely to be affected by the spill.

2) Alerting the appropriate action agencies including local jurisdictions which might be affected.

3) Deployment of adequate equipment.

4) Protection of special areas.

All the major oil companies have response plans for oil spills. (The small independents generally do not.) The federal, State and County governments also have spill contingency plans. These are discussed below.

B.5.1.6.1 COMPANY SPILL PLANS

The federal government requires operators of most large oil handling facilities to prepare a Spill Prevention, Control and Countermeasure Plan (SPCC). This plan must include an inventory of potential spill sources, estimates of the expected quantities which could spill from each source, analysis of the likely direction of flow from each source, and a discussion of containment systems and equipment inspection procedures.

The major oil companies in this area have also developed response procedures for their personnel when a spill occurs. These include guidelines for spill assessment and call lists for alerting other company officials and appropriate outside agencies. The company contingency plans also show responsibility assignments, operating procedures and equipment inventories.

Some companies also have devised "critical operations and curtailment plans." These define the operations which will be curtailed or halted when bad weather or other adverse conditions increase the likelihood of an accident. These are especially applicable to offshore activities.

All the companies operating offshore from Huntington Beach also belong to spill clean-up cooperatives such as Clean Coastal Waters and the Southern California Petroleum Contingency Organization. These cooperatives are put together and funded by the oil companies. They provide equipment and personnel for ocean oil spills too large for any single company to deal with. Each cooperative has its own contingency plan.

B.5.1.6.2 FEDERAL CONTINGENCY PLAN

A National Oil and Hazardous Substances Pollution Contingency Plan establishes regional and subregional task forces to respond to oil spills when the action of a spiller is deemed inadequate. The Coast Guard is the lead agency for spills in coastal waters, although the U. S. Geological Survey has authority over spills within 500 yards of an OCS platform. The Pacific Strike Team, a regional task force based in San Francisco, can supply equipment, staff and expertise in case of a spill. This area also has a subregional task force. The Commander of the 11th Coast Guard district serves as the coordinator for this spill unit which has a detailed contingency plan for the Southern California area.

When a spill occurs in the ocean, the Coast Guard investigates the accident and notifies the spiller, if known, of his responsibility to clean up the spill. If the response by the spiller is considered inadequate or if the spiller is unknown, the Coast Guard hires private contractors to clean the spill. In any case, the Coast Guard has authority over the procedures and equipment used, except for use of chemical dispersants over which the State retains preemptive authority.

The Environmental Protection Agency has analogous responsibility for onshore spills which threaten inland water bodies.

The National Plan legislation also establishes a national response center for coordinating activities in a spill emergency.

B.5.1.6.3 STATE PLAN

The California Oil Spill Contingency Plan coordinates the responses of various State agencies and provides a system for keeping the public and local governments informed about spills. The plan also provides for a State Agency Coordinator who directs the on-scene operations of the State agencies involved in the spill. The State may also provide technical and supervisory teams to aid federal or local governments or private companies in responding to a spill. The Department of Fish and Game is the lead agency in the State plan.

B.5.1.6.4 LOCAL PLANS

The State and federal governments have the prinicipal responsibility for reacting to major spills. The role of local government focuses on 1) discovery and evaluation of the emergency, 2) notification of the appropriate State or federal agencies, 3) immediate actions to limit damage and to protect the public, and 4) support for the main clean-up efforts.

The County has developed a "Hazardous Materials Spills Plan" which defines the County's response to a spill of dangerous fluids including oil. The plan establishes emergency procedures and responsibility assignments.

The City also has a plan for hazardous materials including oil. The Fire Department is the lead agency. The City plan sets up emergency procedures, responsibility assignments and action priorities.

B.5.1.6 OIL SPILL CONTINGENCY PLANS

Adequate response to an oil spill must include the following elements:

1) Early detection of the spill and analysis of conditions

   The latter should include at least some assessment of the following:

   a) the type of oil
   b) location of the source
   c) present location and movement of the spill
   d) amount of oil, and rate of discharge if continuing
   e) environmental conditions such as wind, waves, currents, and tides
   f) areas most likely to be affected by the spill.

2) Alerting the appropriate action agencies including local jurisdictions which might be affected.

3) Deployment of adequate equipment.

4) Protection of special areas.

All the major oil companies have response plans for oil spills. (The small independents generally do not.) The federal, State and County governments also have spill contingency plans. These are discussed below.

B.5.1.6.1 COMPANY SPILL PLANS

The federal government requires operators of most large oil handling facilities to prepare a Spill Prevention, Control and Countermeasure Plan (SPCC). This plan must include an inventory of potential spill sources, estimates of the expected quantities which could spill from each source, analysis of the likely direction of flow from each source, and a discussion of containment systems and equipment inspection procedures.

The major oil companies in this area have also developed response procedures for their personnel when a spill occurs. These include guidelines for spill assessment and call lists for alerting other company officials and appropriate outside agencies. The company contingency plans also show responsibility assignments, operating procedures and equipment inventories.

Some companies also have devised "critical operations and curtailment plans." These define the operations which will be curtailed or halted when bad weather or other adverse conditions increase the likelihood of an accident. These are especially applicable to offshore activities.

All the companies operating offshore from Huntington Beach also belong to spill clean-up cooperatives such as Clean Coastal Waters and the Southern California Petroleum Contingency Organization. These cooperatives are put together and funded by the oil companies. They provide equipment and personnel for ocean oil spills too large for any single company to deal with. Each cooperative has its own contingency plan.

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The City also has a plan specifically for oil spills on the beach. This plan is quite old and is being updated in a cooperative effort with the Coast Guard and other local governments. This work will establish Local Response Teams through which an affected municipality can call in equipment and personnel from nearby cities and the county to form a primary response unit to contain and clean-up spills.

B.5.1.7 SPILL CONTAINMENT AND CLEAN-UP EQUIPMENT

B.5.1.7.1 OCEAN SPILLS

The most important tool for containing spills on a water body is a boom.[31] This is some kind of physical barrier extending partially below the surface of the water and partially above which can gather and hold the slick. There are many kinds of booms for use under different conditions. Small craft usually tow the barrier around the oil and then hold the boom in place. (See Figure B.5.2.)

After the oil is contained, a "skimmer" craft is often used to collect the oil from the water. Sometimes, vacuum hoses are run from a platform or from the shore. The oil and water mixture which is sucked-up is stored in tanks for separation and clean-up or for disposal.

Chemicals exist which can help either disperse or contain a slick, or encourage sinking. Physical containment and removal, however, is generally considered the best clean-up approach because the environmental effects of these chemical agents are not fully known.[32]

The effectiveness of spill containment equipment is largely contingent on the environmental conditions. Under demanding circumstances like high winds, strong currents or rough seas, booms and skimmers are less effective, and spill containment is difficult or impossible.

All of the oil companies, the spill cooperatives and some government agencies have spill equipment ready for deployment.

B.5.1.7.2 BEACH CLEAN-UP

Beach clean-up techniques depend on the size of the spill. In the case of small spills, the oily sand is "disced", that is, plowed and turned over. This helps disperse and bury the oil. Sometimes straw or absorbent pads are used to blot up the oil near the shoreline to reduce the amount of oil, making simple discing more effective. After large spills, discing is inadequate and the sand may be simply removed. The beach may be restored by natural forces or by artificial replenishment.

B.5.1.7.3 OTHER LAND SPILLS

When possible, the oil is collected in basins or pits to prevent its uncontrolled flow. The oil is then pumped into tanker trucks for removal. Absorbent materials, like sand, are spread over oily areas to help pick up the oil. Sometimes the contaminated areas are scraped or plowed. Detergents and solvents may be used to clean damaged structures and streets.

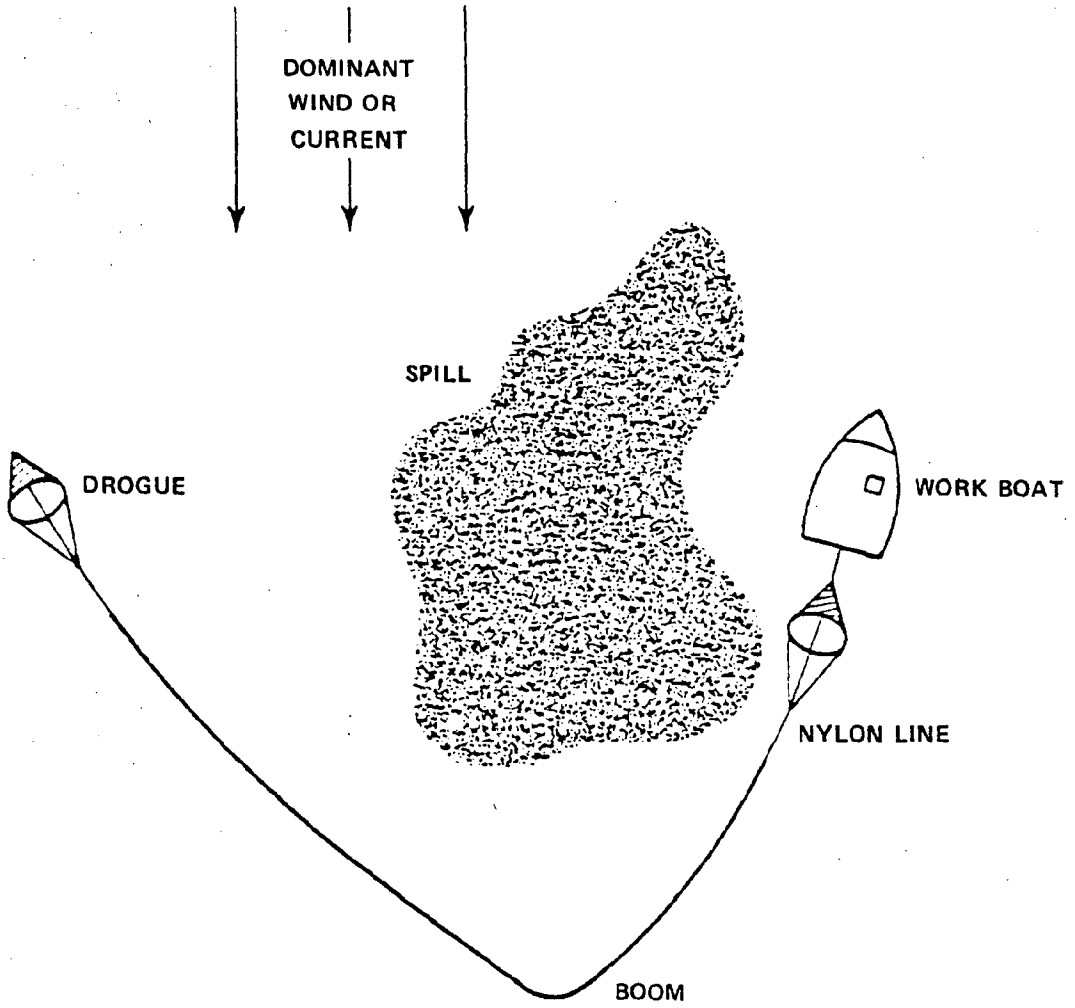

Figure B.5.2 Boom Deployment
Source: Shell Oil Company, "Oil Spill Contingency Plan, Beta Unit Complex, San Pedro Bay"

B.5.1.7.4 SPECIAL AREAS

Certain areas of Huntington Beach are especially sensitive to oil spill damage: 1) the Santa Ana River mouth, 2) the wetlands and residential/marina areas communicating with Anaheim Bay, 3) the least tern nesting areas, and 4) parts of the Bolsa Chica and the other wetlands between Beach Boulevard and the Santa Ana River. Some oil spill plans do not explicitly recognize the importance and susceptibility of these areas. All spill plans should include specific procedures for protecting these areas in the case of a threatening spill.

B.5.1.8 OIL SPILL LIABILITY

Federal law makes the spiller liable for clean-up costs regardless of fault, except under the following special circumstances: 1) an act of God, 2) an act of war, 3) acts of third parties, 4) negligence on the part of the U. S. government.

In many cases, especially those involving ocean slicks, the responsible party is unknown. The federal government provides funds for cleaning up these "mystery" spills. The Coast Guard, usually the lead agency for cleaning them when they reach beaches, hires private contractors to clean and restore the damaged area. When the mystery spill is small, local governments often clean it themselves using available beach maintenance equipment and personnel. Local governments are not usually compensated for the clean-up activities.

Many parties may incur injuries directly and indirectly from an oil spill. An injured party must overcome several obstacles before receiving compensation for his loss. First, the spiller must be identified; but, as noted above, in many cases the source of the spill is unknown. Second, negligence must be established and this can be difficult especially in cases involving complex and highly technical operations. Third, the plaintiff must have legal standing to sue. Only certain claimants who have suffered certain kinds of harm have been successful in these kinds of cases. For example, persons who own property which is directly affected by oil can usually recover for these damages. State and local governments can often recover damages for lost income from loss of leases or fees by beach visitors if a spill on a beach reduces use. Other parties, however, whose harm is an indirect result of the spill do not typically have legal standing:

> Claimants such as hotels, restaurants and other small businesses depending on tourists have generally been denied recovery for their economic losses in marine pollution cases unless they happen to own waterfront property which was directly affected.[33]

This gap in the protection afforded by the legal system may be especially important to commercial areas of Huntington Beach which cater to beach users if a major spill were to reduce visitors to the area.

B.5.2 OTHER IMPACTS FROM ONSHORE OIL FACILITIES

B.5.2.1 LAND USE

Oil wells and related facilities occupy a large land area in Huntington Beach -- about 500 acres -- centered in and near the coastal zone. This has a significant "impact" on the City and coastal zone.

The use of the word "impact" does not imply that oil extraction is an inappropriate or negative land use. Rather, continued resource recovery is now, and will continue to be, a very important activity, with local, regional, and even national benefits. However, land is an important environmental and economic resource needed for many kinds of activities. Through the Coastal Act of 1976, the State has recognized that land in the coastal zone is especially valuable. The Coastal Act directs local governments to survey the use of their coastal areas and to plan for activities which are most appropriate there. This section is concerned with the siting of oil extraction in the coastal zone.

The Coastal Act mandates that "coastal dependent developments shall have priority over other developments on or near the shoreline." Much of the oil extraction in the City's coastal zone is "coastal dependent." The underground oil field extends beneath the ocean and the onshore coastal zone; and, while there is some flexibility in locating well heads, the wells must have access to the underground pools. A large number of the existing wells must be in the coastal zone to economically tap these reserves.

It is possible that some wells now in the coastal zone could have been drilled farther inland and still could have reached their oil zones. However, these wells were installed at the most convenient location at a time when population growth had not yet strained the limits of our coastal resources. Abandoning these wells now because they are not "coastal dependent" and drilling new ones farther inland to tap the same pools would be inappropriate and impractical for several reasons. First, such a move would be very expensive; in most cases, the revenues from the oil would not cover the costs. Second, even if inland sites could be found today, drilling and pumping would be environmentally disruptive in the area. Such activities might also conflict with surrounding uses and might impose large infrastructure costs (for example, digging trenches for new pipelines). Third, such a strategy would tend to disperse oil activities which should be concentrated to efficiently utilize land area.

Most future oil activities in Huntington Beach will involve advanced recovery methods and redrilling of existing wells. Conceivably, some redrilling of wells now in the coastal zone could be avoided if new wells are drilled farther inland. However, all the factors cited above -- cost, inland disruption, dispersion -- argue against this kind of strategy in most instances.*

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* One case where consideration should be given to relocating existing wells farther inland or where future redrilling should be avoided is the series of oil wells on the beach side of the Coast Highway. This case is discussed further in the next section.

Practically speaking, few new wells are anticipated in the City. However, decisions about siting new wells should consider whether the wellhead must be in the coastal zone and whether the location contributes to dispersion or consolidation of surface activities (as well as other costs and benefits).

The amount of land used for oil extraction in Huntington Beach is expected to decrease in the future because of consolidation practices and the abandonment of smaller operations. In the future, as oil fields are no longer used for extraction, they will be sources of open space in an increasingly crowded urban environment. Appropriate uses of this resource must be anticipated and planned for.

Three particularly important objectives arise in regard to future use of oil lands: 1) increasing the compatibility with adjacent uses; 2) discouraging piecemeal development; and 3) preserving access to oil reserves.

In the past, after a small parcel was no longer used for oil wells, it could then be redeveloped to a new allowable use while adjacent parcels were still in oil use. The result often has been the construction of residences next to oil facilities. This can create problems for both uses -- for example, the oil activities may be aesthetically degrading or may impose safety risks on the residences; the residences may obstruct access and may limit oil operations. When oil wells are abandoned, new uses should be compatible with the surrounding area. Screening and buffering between uses may help separate them. The City could also prohibit certain uses until all adjacent oil activities are completed. Another strategy would require that activities on contiguous lots be consolidated into islands before other kinds of development are allowed on any of the lots.

Depleted or consolidated oil fields may provide opportunities to build planned developments in the City, opportunities which will be increasingly rare in the future. Planned developments can allow for more efficient utilization of land and energy, and for better integration of uses than piecemeal development.

After the surface of an oil field is covered by other uses -- houses, roads and so on -- it will be very difficult to tap the oil reserves at a later date. However, as was discussed above, about half of the oil in a pool remains in the ground even after secondary recovery. Higher oil prices may stimulate the development and use of new extraction technologies. Aminoil and Chevron are already experimenting with some new methods. These new extraction technologies will be useless if access to the fields is not preserved.

Planning for this access is difficult. The concerned parties must consider the probable future value of the oil remaining in the ground, the land requirements of a still unknown technology, the likely impacts of that technology on surrounding uses, and the relative importance of competing uses which might foreclose access to the fields. One strategy for preserving access to oil fields is consolidation, through which small islands are preserved for oil activities while most of an oil field's surface area is used for other purposes.

However, in many cases, the developer and the oil company view consolidation from two different perspectives which are not always integrated into the project. The developer typically sees oil islands as places where moribund wells can finish their productive lives. On the other hand, the oil company may envision islands as critical preserves which provide access to the underground field and from which new technologies may be applied in the future. Companies, for example, are concerned that oil islands are large enough to accommodate new pumps, tanks, injectors and drilling rigs. Trucks and pulling units must be able to get to the island. This requires street access and turning space for large vehicles. Pipeline routes must avoid crossing several lots, so that future rework does not disrupt surrounding uses. In addition, islands should be adequately screened and buffered so that long-term oil activities and new extraction methods do not disturb or endanger surrounding uses. These dual objectives of access and compatibility should be recognized and accommodated as much as possible in future projects involving consolidation and a combination of uses on the surface.

B.5.2.2 AESTHETIC COMPATIBILITY

Oil wells and related facilities can conflict with surrounding land uses in two ways: 1) the wells and related equipment can pose safety problems or 2) they may aesthetically degrade an area of mixed uses. The following sections discuss aesthetic impacts.

B.5.2.2.1 VISUAL COMPATIBILITY

The most important aesthetic consideration is visual compatibility. Pumping units, separators, tanks and other equipment can detract from a surrounding residential, recreation or commercial area. The beach, which is primarily a resort/recreation area, is especially susceptible to visual impacts from oil-related activities.

In discussing the compatibility of oil extraction activities with surrounding uses, the facilities in Huntington Beach can be usefully divided into four categories, each presenting different kinds of problems: 1) the wells and other equipment located on the large Aminoil and Chevron leases east of the Coast Highway between Goldenwest and the Bolsa Chica City limits, 2) the series of wells on the ocean-side of the highway north of the pier, 3) unconsolidated facilities located on other large parcels, and 4) all the remaining facilities which are set on small parcels or islands and sited among other uses.

The greatest concentration of oil extraction facilities is in the Aminoil and Chevron leases from Goldenwest to the City limits between the Coast Highway and the Seacliff developments. The encroaching residential developments to the northeast are now screened from oil activities by a dense row of trees. Later Seacliff phases will also use walls, mounds and more plantings to screen the residences from the oil facilities. The oil activities are screened from Goldenwest Steet by fences, vegetation, office buildings and warehouses. Future developments in this area and just east of the Chevron offices might be visually impacted by oil activities nearby.

Aminoil's facilities are currently visible from Pacific Coast Highway through a slatted fence. This company has plans to replace the fence during 1980 to better screen the oil activities from the highway and to improve the appearance of the lease.

One related visual problem is the view south-easterly from the Coast Highway just before the City limits. Here, tanks and other facilities are located on a small bluff, high enough so that road-side screens are ineffective. The topography precludes most screening strategies, except perhaps tall trees.

In this same area, the highway affords views into the low-lying Bolsa Chica. Oil facilities in this area, which is not within the City, detract from the wetlands setting. This is especially true near the State ecological preserve. Improving visual compatibility will largely depend on removal or consolidation of these facilities.

The wells on the ocean side of the highway constitute an unfortunate visual blight. Aesthetic compatibility is, ultimately, a subjective criterion. Yet there is little doubt that these oil wells detract from the visual experience that could be afforded by this area's beaches.

The appearance of these well sites could be improved by decorative fencing, planting and landscaping. Removal of the wells at this time would be very expensive; relocating a single well would cost between $200,000 and $500,000. The existing wells will probably remain there for several years. However, the beach is inappropriate for new oil-related uses, whether for new wells or redrilling, considering the degradation this equipment imposes on the visual and recreational value of the strand.

The wells and equipment in other relatively large areas used solely or primarily for oil present a stark, industrial picture to travelers on nearby roads. These are generally located north of Clay, outside of the coastal zone. Some of the parcels are successfully screened from nearby roads by walls. Most are quite open. Examples of both can be seen from Goldenwest just north of Garfield. These sites can be improved now through fencing, planting and landscaping. Additional aesthetic problems will arise as these areas are redeveloped to other uses and better screening and buffering will be needed. In these cases, developers can anticipate likely compatibility problems and can plan mitigation measures into the projects.

Examples of sites where oil activities have been integrated with other surrounding uses, or at least adequately screened and buffered, are the existing oil islands in the Seacliff developments. In other places, especially in the Downtown and Townlot areas, oil facilities are not screened, but sit very close to residential and commercial structures.

There are two ways visual compatibility can be improved: fencing and landscaping. City and State regulations now require that a six foot chain link fence or masonry wall be built around lots used for oil production or, at least, around every pumping unit. The City "Oil Code," the catalogue of municipal ordinances related to oil activities, allows for stricter fencing requirements if public safety considerations so require; but it does not provide for fencing improvements to relieve visual degradation. Nonetheless, attractive fencing can help improve visual compatibility.

Landscaping refers to the use of grading and vegetation to improve the aesthetic experience. The Oil Code requires that pumps and fences to meet setback requirements, but does not mandate grading or planting either within or outside the setbacks. Front yards or other exposed setbacks which are left open could be landscaped and planted to fit better with surrounding uses, especially within residential areas.

Other provisions of the Oil Code help reduce visual degradation: the operator is required to clean up the site after servicing or after any spills or leaks; the site must be kept free of debris; the equipment must be painted and maintained.

Enforcement of the existing Oil Code and, perhaps, new provisions to better consider aesthetic resources would improve visual compatibility.

B.5.2.2.2 ODORS

Noxious odors can arise from oil activities. Possible sources include: 1) hydrocarbon vapors from leaks and normal operations, 2) hydrogen sulfide from pumping units and from gas treatment plants, 3) spills, and 4) drilling mud additives, solvents, lubricants and other chemicals.

Emissions from leaks and normal operations are probably most widespread. Small amounts of oil often escape into pumping unit cellars and into the dikes around tanks and separators. In many of the small-scale operations, tanks do not have floating roofs or vapor control systems. Some clarification systems are completely open to the air.

The hydrogen sulfide smell, which can be quite acute, is strongest on the Aminoil and Chevron leases near gas-related facilities. These sites are far from other uses and odor impacts beyond the oil fields are infrequent.

Spills can result in severe, but temporary, odor impacts. Existing ordinances require clean-up after spills.

Odors from additives and other chemicals may become more of a problem with new advanced recovery methods which may require new compounds. Proper handling of these would probably prevent impacts from extending beyond the oil fields.

The Oil Code helps to reduce odor impacts by requiring setbacks and exhaust system muffling, and by prohibiting liquid discharges and sumps. The Code also allows for further mitigating steps if odors are deemed a public nuisance. The City receives very few complaints related to oil odors.

B.5.2.2.3 NOISE

Noise can be an aesthetic impact when it detracts from surrounding activities or a health hazard when it disturbs sleep or damages hearing. The City receives very few complaints about noises emanating from oil-related facilities. This may reflect public resignation to the existence of exessive noise or it may indicate that noise impacts are not serious consequences of oil activities in Huntington Beach.

Certain oil-related activities generate very loud sounds, especially: 1) drilling operations, 2) compressors. 3) injection pumps, 4) pumping units, especially when several are concentrated together, and 5) helicopter flights to offshore platforms. Under certain conditions these may have serious impacts on other activities, depending on: 1) What other activities are located nearby; some facilities like residences, schools or hospitals, are more sensitive to noise impacts than others, like industrial uses. 2) The proximity of the other uses; the closer the use is to the noise source the greater the potential impact. 3) Barriers between the noise source and the other uses. 4) The time when the noise is emitted; at night, when many people sleep, loud sounds can be more disturbing than during the day.

Mitigation measures manipulate both the source and the surrounding conditions. First, the source itself can be affected to reduce the noise. For example, mufflers can be installed on engines and more noisy gasoline engines can be replaced by electric ones. In addition, frequent inspections and maintenance help ensure that equipment is properly lubricated and in good working order. Such equipment is usually quieter than poorly maintained machines. Second, the distance between noise emitting and noise sensitive uses can be increased by zoning, set backs and facility design. Third, time of operations can be limited. Fourth, walls, berms and other barriers can be installed to reduce noise levels.

The Oil Code provides for several of these measures including time limits, barrier requirements, muffling, and inspection and maintenance, applicable under certain conditions. In addition, more stringent measures can be used if noise levels threaten public welfare.

The City also has a "Noise Ordinance" which is designed to keep noise to acceptable levels. This law prohibits sound levels in excess of certain limits for different uses and at different times of the day.

Careful surveillance, and enforcement of the Oil Code and the Noise Ordinance, can keep noise impacts by oil operations from being a serious problem.

B.5.2.3 AIR QUALITY IMPACTS

Oil extraction facilities contribute to the deterioration of air quality in this area. Their contribution is probably significant, but small, in a regional context.

The engines of drilling rotaries, pumping units, compressors, injectors and other machines release exhaust emissions. Gas transporting and processing facilities, includng the desulfurization units, emit sulfur compounds. Some hydrogen sulfide also escapes from pumping units and storage tanks. Solvents and lubricants, used to maintain the equipment, evaporate hydrocarbons to the air. Other hydrocarbons are released from tanks, basins or cellars which are not equipped with roofs and vapor recovery systems and from spills and leaks. Clearing, grading and trenching operations associated with constructing or removing facilities generally raise dust into the air.

It is difficult to assess the impact these activities have on this basin's air quality. Air pollution is a regional problem and is regulated by regional agencies. The most important localized effects of these emissions are probably noxious odors.

B.5.2.4 WATER QUALITY IMPACTS

Spills are probably the most serious potential water quality problem resulting from oil activities. These were discussed in Section B.5.1.

Runoff from oil well and tank sites is a potential water pollution source. Oil, solids, sulfur wastes, drilling muds and their additives may all be carried in runoff. On the principal Chevron and Aminoil leases, this runoff is collected in basins or sumps and treated in the separation facilities before disposal into public sewerage. Occasionally, these collection systems fail and runoff leaves these sites uncontrolled, usually flowing to the streets and storm water system, the beach, or the Bolsa Chica. On smaller parcels, rainwater is usually held in well cellars or tank dikes, but these sometimes overflow or leak. Despite these containment systems, at virtually any oil site in the City, some oil is leaked or spilled where it can be carried away by runoff.

Runoff from oil parcels often includes large quantities of silt and dirt because the sites are barren of vegetation.

Wastewater resulting from oil extraction is clarified in separation tanks before discharge into public sewer systems. Water can not be disposed of through City sewerage unless it is cleared to 100 mg of oil/liter. Liquid wastes which can not meet this standard must be trucked to approved disposal sites. Aminoil has a permit to use its existing ocean outfall for discharge of treated oil field brines and treated stormwater runoff. Chevron now uses its outfall only in emergencies, but has applied for permission from the Regional Water Quality Control Board to use this facility on a regular basis.

Aminoil dries its used drilling muds in diked areas in the Bolsa Chica. There is some concern that drilling mud additives may have adverse affects on certain organisms.[34] This may be particularly important in the Bolsa Chica because of the limited amount of receiving waters and the minimal ocean flushing that takes place there. Under these conditions, compounds which are harmless when diluted might be concentrated to harmful levels.

Oil wells can contaminate potable ground water. However, this has not been a problem in Huntington Beach. The DOG has strict casing requiremnts to protect aquifers and monitors oil operations to ensure that groundwater is protected.

B.5.2.5 GEOLOGIC IMPACTS

Subsidence, or the settling of the land surface, can occur when underground pressures are reduced by fluid extraction. Parts of Huntington Beach have experienced some subsidence, but the importance of oil activities in promoting this is not clear. Natural events, such as peat oxidation or compaction, may be more important variables.[35]

Further subsidence due to continued oil activities will probably not be an important problem.[36] Injection practices in the principal leases have restored underground pressures there. In areas where injection is not currently practiced, the DOG has the authority to impose repressurization programs, if property or public safety is threatened by subsidence. The need for a mandatory injection program is very unlikely in Huntington Beach.

In some peculiar cases, oil extraction has prompted small earthquakes.[37] For example, relieving underground pressures has occasionally allowed fault blocks to move more easily. On the other hand, increasing pressures through injection has at times reduced friction between fault blocks, easing slippage. Huntington Beach is in a seismically active area and consequently it is conceivable that fault movements could occur more easily from changing underground pressures. However, earthquakes attributable to oil extraction have not been recorded in this field.

B.5.2.6 FIRE AND EXPLOSIONS

Oil, gas and related hydrocarbon products are all highly flammable substances. Facilities which extract, transport, process and store these substances are susceptible to fire and explosion.

Such an accident could have effects beyond the facility site and could threaten public safety. For example, an exploding facility could throw off debris which could injure or kill people and which could damage nearby property. The fire could spread to nearby areas from the heat of the initial conflagration or from burning debris. In a worst case situation, flaming fluids could escape from a well or tank site and flow uncontrolled to surrounding areas.

Fires involving oil-related facilities in Huntington Beach occur infrequently, and fires which result in serious damage are even more rare. The City Fire Department has handled only four oil-related fires since 1977. None was serious.

The actual hazard any facility poses depends on many variables including 1) what substance is being handled, 2) how much is being handled, 3) the nature and proximity of other properties, 4) prevention and detection strategies, and 5) availability and deployment of onsite and offsite fire fighting equipment.

The DOG and the City Fire Department are the principal agencies charged with ensuring oil-related operations are conducted safely. The DOG regulates and monitors all drilling, redrilling, reworking, operation, maintenance and abandonment of wells. The DOG may also take any actions "necessary to protect life, health, property or natural resources."[38]

The Fire Department implements the City Oil Code which addresses the safety of oil operations. The principal safety regulations are summarized below:

The Fire Department requires all tanks holding oil and other hydrocarbons to meet minimum structural standards. All tanks must also be surrounded by a dike system to hold spills or leaks. All wells must be constructed with "cellars" to retain wellhead leaks. Besides limiting the damage from spills, these containment measures also reduce the risk of fire and help prevent fires from spreading. Tanks and wells must be buffered from any electrical equipment and flames. In all these cases, the Fire Department uses standards recommended by the National Fire Protection Association.

Other measures related to fire prevention include: prohibition against 1) uncontrolled discharges, 2) waste gas flaring, and 3) on-site storage of unnecessary materials and equipment. The City requires that "No Smoking" signs be conspicuously posted on well and tank sites and that the site be cleared of any weeds or brush.

In addition, the City inspects all wells and heaters once each year.

Both the City and the State require oil well operators to submit indemnity bonds to insure that regulations are met.

Besides enforcing the regulations set out in the Oil Code, the Fire Department reviews the site plans for the major tank farms and oil extracting areas. The plans include identification of access points and the location of hydrants, hoses and other onsite equipment. The plan also reports the type of flammable substances stored at the site.

The City does not have evacuation plans specific to the major oil handling sites. The Civil Defense Division, in cooperaton with the Fire and Police Departments, has a general evaucation contingency plan which would be employed if a fire or explosion at an oil facility threatened surrounding areas.

B.5.2.7 ACCESS/RECREATION

Oil-related facilities on the ocean-side of Pacific Coast Highway can interfere with safe access to the beach. Pipelines and a service road parallel the Highway. Beach visitors must now walk over the pipes and across the road to get to the beach. Many of the pipes are exposed and raised above the ground. The pipes impose special obstacles to handicapped persons. Strategies to improve access could include removing unused pipes, covering active ones, painting pipes which cannot be covered and clearly marking those which might impose safety problems. In addition, paths could be built from the highway to the beach with bridges or ramps over the pipes at a few locations.

Another conflict between improved beach access and oil operation has arisen over the bike path which the City is proposing between the Pier and the Bolsa Chica. A half-mile section of the path would cross an area leased by Chevron for oil production. Chevron does not want the path crossing its lease unless the State or the City accept liabilty for accidents which might occur. The State and Chevron are currently negotiating the liability question.

B.5.2.8 REVENUE FROM OIL ACTIVITIES

The City collects revenues from oil related activities through several means. These are summarized in Table B.5.3.

The City charges a $100 annual business license fee ($25 due per quarter) for every producing oil well and also collects a "severance tax" or "per barrel tax." In 1978, this tax was 10¢ per barrel for "non-stripper" wells and 8¢ per barrel for "stripper" wells. A stripper well is defined as one producing less than 10 barrels/day. A non-stripper well produces more; however, once a well falls below 10 barrels/day it is always considered a stripper well even if production later exceeds that limit. About 75 percent of the City revenues through the per barrel tax comes from non-stripper wells.

In 1978, the City tied the per-barrel rates to a cost-of-living index. Thus, the rates are adjusted annually according to changes in the Index. For example, in 1979, the rates were raised to 11.05¢ per barrel and 8.84¢ per barrel for non-stripper and stripper wells, respectively, reflecting a 10.5 percent increase in the cost-of-living from the previous year.

The business license fee is considered a credit against the per barrel tax; that is, only the per barrel tax exceeding the $25 quarterly license fee is due. Any tax less than $25 per quarter is not included.

The oil produced on the offshore platforms in state waters are subject to the business license fees and per barrel tax.

The City expects to collect close to $1.0 million dollars from these sources in 1979-80. This money is budgeted in the City's general fund.

The City also charges an annual inspection fee of $50 per well which is due in July. The City charges $30 per year for each well hooked into the City wastewater system. In 1978, Aminoil removed most of its wells from the City system which accounts for the sharp decline in revenue from the wastewater permits apparent in Table B.5.3.

The City also charges a $500 fee for permits to drill, redrill or reactivate wells, and collects pipeline franchise revenues through a complex rate system on the volume of oil and gas flowing through pipelines in the City.

The City also collects a share of the property tax on the surface lands of oil fields, the equipment on the lands and the mineral rights. Each of these is assessed separately and the owner of each is charged the tax. A typical case might involve the following: The Huntington Beach Company owns the surface area; Chevron owns the equipment and underground mineral rights while leasing the surface space; the Huntington Beach Company receives royalties on the oil extracted below. The Huntington Beach Company then pays tax on the surface property and on its share of the mineral rights as reflected in the royalty agreement. Chevron pays the property tax on the equipment and on its share of the mineral rights by the royalty agreement.

Assessment and collection practices have made it very difficult to determine how much of the City's property taxes comes specifically from oil-related operations. However, initial research by the Planning Division indicates that the total property tax paid to the City from oil uses is about $500,000 annually.

CITY OIL REVENUES - SUMMARY TABLE

all figures in '000's

ACCOUNT #	NAME	RATE	ACTUAL 1977/78	ACTUAL 1978/79	ESTIMATED 1979/80
A0204	Pipeline Franchise	Several	$21.3	$27.2	$30.0
A0302	Per Barrel Tax	1977/78 8¢/ barrel 1978/79 8¢/ stripper 10¢/non- stripper 1979/80 8.84¢ stripper 11.05¢ non- stripper	$903.3	$969.2	$990.0
A0304	Oil Well in- spection fee	$50/well	$75.4	74.0	$74.0
A0310	Waste Water Permits	$30/well In City System	$22.0	$13.0	$13.00
	Drilling, Re- drilling per- mits	$500	u.a.	$12.5	u.a.
Property Tax	Mineral Rights		u.a.	$200.0*	u.a.
	Surface Land & Equipment		u.a.	$300.0*	u.a.
		TOTAL		$1.585.0*	

* rough estimates

Table B.5.3 Revenues from Oil Activities
Source: City Finance Department and Planning Division

An analysis of the fiscal impact of oil operations must compare the revenues generated by the oil uses to the costs incurred by the City in providing services to those operations. The Planning Division is currently developing a computer model which can assess the fiscal impact of different land uses. Data related to oil operations have not yet been collected; however, an analysis of these specific activities may be available later this year.

B.5.2.9 EMPLOYMENT

Oil operations, most notably those of Aminoil and Chevron, generate a large number of jobs in the City.

Aminoil employs directly approximately 250 persons who work on its leases, platform and at its administrative offices near the Civic Center. In addition, Aminoil contracts with as many as 50 other companies to provide services on its leases. These include drilling rig services, truck transportation, sandblasting, painting, welding, electrical services, general construction, maintenance and various technical services. Many of these contractors and service companies are local. This contract work amounts to full-time jobs for 150-200 persons. Thus, in total, up to 450 persons work in the City directly or indirectly for Aminoil.

Chevron employs about 70 persons in its Huntington Beach operations and hires 12 additional full-time workers from well-service companies. Like Aminoil, Chevron also contracts with numerous other service companies.

B.5.3 OTHER IMPACTS FROM DRILLING MUD DISPOSAL FACILITIES

B.5.3.1 BOLSA CHICA SITES

The Bolsa Chica is not within the City limits and has not been studied as carefully as sites in the City. However, the continued use of the Bolsa Chica as a site for depositing and drying drilling muds and other solid wastes has been the focus of considerable attention recently. Drilling muds are treated with chemicals to adjust certain physical characteristics. These additives can contain barium, chromium and lead, which in certain compounds and in high concentrations, may be harmful to plants, animals and people. These chemicals can escape from the disposal sites from leaks or spills or through leaching underground. The Bolsa Chica contains a relatively small amount of water with minimal tidal flushing. Thus, some parties are concerned that these chemicals, which are harmless when diluted, might be concentrated over a long time period to dangerous levels. No ill-effects from the existing facilities have been documented, however, and an analysis of the wastes have found them non-toxic.[39]

The California Water Quality Control Board has recently determined that portions of the Bolsa Chica are wetlands and, thus, Aminoil must apply for a permit under the provisions of the Federal Clean Water Act to continue operations at its disposal facility. The staff report by the Regional Board regarding the operations found that the solids were not toxic. It also recommends monitoring and sampling procedures to ensure that the resources of the area continue to be protected. Final hearings on this permit application are scheduled for February 29, 1980. Aminoil's current permit to operate this facility also prohibits the deposition of toxic or hazardous materials.

Tertiary recovery methods might involve using new chemicals. In such cases, the deposition of solid wastes in the Bolsa Chica should be reviewed to ascertain that the new chemicals do not impose adverse impacts on the habitat.

B.5.3.2 ROTARY MUD DUMP

Increasing attention has been drawn to sites formerly used for depositing industrial wastes because some of these wastes are potentially dangerous. For approximately twenty years, the rotary mud dump accepted wastes from oil operations. The presence of harmful substances in this dump has not been documented. To protect public health and safety, however, an analysis of the contents should be performed before new uses which might increase public exposure to the site are approved.

Substances can now leave the site through two processes: underground leaching and leaks after dike damage. Evidence of the former has not been found. But after heavy rains in 1978, part of the dike system was damaged and runoff from the site entered the public storm drain system. The Regional Water Quality Control Board analyzed these waters and found nothing which would endanger public health.[40] These findings, however, do not necessarily imply that deeper deposits are not a matter of concern.

The facility poses some other impacts. During the dry season, dust is raised by trucks and dumping activities. Truck traffic generates noise and may congest nearby roads. The site appears unattractive from nearby residences; however, it is a part of an industrial area located near the Edison plant and the tank farms.

B.5.4 OTHER IMPACTS FROM TANK FARMS

B.5.4.1 AESTHETICS

The two large tank farms in Huntington Beach contrast markedly from each other on visual aesthetic grounds. Both facilities are visible from the Pacific Coast Highway and from nearby residences and streets. The Gulf tank farm appears harsh, imposing and unattractive. On the other hand, the Edison facility has been landscaped with low berms and vegetation, and it is aesthetically acceptable, even pleasing. Both facilities are visually overpowered by the Edison power plant, which sits between the tank farms. The Gulf facility accentuates the industrial nature of the scene, while the Edison tank farm helps relieve that picture. Landscaping might make the Gulf facility more compatible with nearby non-industrial activities.

B.5.4.2 NOISE

Tank farms are relatively quiet facilities. Pumps, heaters and tanker truck traffic may have noise impacts on surrounding areas. These have not produced unacceptable noise levels near the Huntington Beach facilities. If new equipment is installed at these sites in the future, techniques can be used--including siting, buffering or equipment muffling --to mitigate possible impacts.

B.5.4.3 ODORS

Odor impacts from tank farms have been largely reduced by using floating roofs and vapor recovery systems, which help to keep emissions from escaping. The most serious odor impacts would result from spills or leaks.

B.5.4.4 SPILLS, FIRES, EXPLOSIONS

Spills from the tanks could impose very serious impacts on surrounding uses, especially if the fluids explode or catch on fire. Most of the materials that are stored at the Huntington Beach facilities are flammable.

Major spills could occur from several possible, but rare, circumstances: severe earthquakes, floods, liquefaction, or accidental equipment failure.

The tanks are near active faults. The existing tanks are not in a known subsidence area, but they are in a flood area.

In most cases, any spills would be contained in the dikes surrounding the tanks. However, it is possible that the catastrophic events that could result in a severe spill, might also damage the dike system. In that case, spilled liquids could flow off the site damaging surrounding areas.

The problems of a major spill would be dramatically compounded if accompanied by fire or explosion. These were discussed in Section B.5.2.6.

B.5.4.5 AIR IMPACTS

Air emissions can occur from the storage tanks, from pumping and heating equipment and from leaks or spills. Tank farms must meet State air quality standards. Emissions from the tanks have been reduced by equipment improvements.

B.5.4.6 WATER IMPACTS

There are no significant water impacts apart from spills. Runoff from the tank farms is collected in sumps, where the oil or other hydrocarbons are separated from the water by gravity. The hydrocarbons are returned to storage and the water is discharged into the sewer system.

B.5.5 OTHER IMPACTS FROM PIPELINES

Spills, leaks, fires, explosions, and the special problems of pipelines on the beach were all discussed in earlier sections.

Most pipelines are buried and, consequently, their installation, replacement and maintenance usually entails disruptions along the route. This fact suggests that new or "dual" uses of oil fields should be carefully planned so that: 1) active pipelines remain accessible after the new uses are built, and that, 2) later work on the pipeline route will create minimal disruption to the new uses.

Pipeline franchises between the City and the oil and gas companies generate revenues for the City. The existing agreements tie payments to numerous variables like the size of the pipe, the length of the pipe, the volume flowing through the pipe, and proceeds from the sale of the products. The resulting franchises are complete. Unfortunately, most are also unfavorable to the City compared to the arrangements worked out by other municipalities. In 1977, the City administration suggested renegotiation of the extant agreements to improve the City's position. The private parties which benefit from the current terms were, understandably, reluctant to renegotiate before the franchises expire. New agreements will be possible when the existing franchises are renewed. Table B.5.4 lists the existing agreements, their expiration date and their annual fee.

PIPELINE AND UTILITY FRANCHISES

CLASSIFICATION	FRANCHISE	LENGTH OF TERM	MONIES TO CITY FY 76-77
Utility	So Cal Gas	40 yrs ending 2007	$268,887
Utility	So Cal Edison	Indeterminate (adopted in 1949)	$146,813
Pipeline	Union Oil	25 yrs ending 1989	$416
Pipeline	Atlantic Richfield	25 yrs ending 1988	$1,401
Pipeline	Texaco	25 yrs ending 1988	$2,592
Pipeline	Gulf	50 yrs ending 1983	$1,958
Pipeline	Gulf	50 yrs ending 2006	$1,268
Pipeline	Gulf (tank farm)	25 yrs ending 1980	$2,400
Pipeline	Standard Gas	50 yrs ending 2006	$156
Pipeline	So Cal Edison	Indeterminate (1958)	$3,401
Pipeline	Pacific Lighting Service Co.	40 yrs ending 2010	$6,123
		TOTAL	$435,415

Table B.5.4 Pipeline and Utility Franchises
Source: Huntington Beach City Administrators Office

B.5.6 OTHER IMPACTS FROM OFFSHORE OIL ACTIVITIES

Offshore oil activities can have other impacts on the City and its nearby waters besides those resulting from oil spills. These potential impacts are summarized below.

B.5.6.1 WATER QUALITY IMPACTS

Discharging drilling muds, drill cuttings, and other platform wastes can temporarily impair water quality.

Aminoil currently barges all its cuttings and spent muds to shore for disposal in a landfill.* Water impacts could occur if some of the wastes were spilled during barge loading or by some other accident. These would likely be minor.

Shell plans to clean its cuttings and dump them from the platform. These may destroy bottom dwelling creatures when they sink to the bottom. Spent muds are cleaned of oil and are also discharged into the ocean. The muds temporarily increase turbidity and this can affect plankton and other animals. The muds eventually settle to the bottom, where they may bury benthic communities. Any oily or contaminated cuttings or muds will be barged to shore.

There is some concern that drilling mud additives in certain concentrations may harm marine organisms.

Drilling mud discharges can also affect the salinity and pH of receiving waters.

In general, the effects of these discharges are expected to be minor, short-term and localized.[41] Trace metals like chromium and lead could be public health problems if concentrated in edible fishes or in areas used for swimming. Offshore oil activities are unlikely to create such problems because the amounts of chemicals used are small and the dilution potential of the receiving waters great.

Dredging trenches for pipelines affects water quality by re-suspending bottom sediments in the water column. For the most part, the principal impact is a temporary increase in turbidity. However, pollutants like trace elements, pesticides, oil or grease which may have settled to the seafloor could re-enter the water. Proposed pipeline routes should be analyzed to avoid areas where dangerous contaminants may be redistributed to the water by dredge activity.

Wastes from supply and service boat bilges and from platform kitchens and toilets are not likely to create significant problems.

B.5.6.2 AIR QUALITY IMPACTS

Emissions from the engines of boats and barges, from the motors of drilling rotaries, pumps, compressors and other equipment, and from gas flaring are minor pollution sources which will not have a noticeable impact on the City's air quality. All air emissions are subject to State and federal standards.

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* Aminoil has applied to the State Lands Commission for a permit to dump its cleaned drill cuttings from the platform, a practice already allowed in the federally regulated OCS.

B.5.6.3 MARINE TRAFFIC AND SAFETY

Oil activities increase the risk of an accident occurring off Huntington Beach. These could result in property damage, injury or loss of life, uncontrolled discharges, fires or explosions.

The proximity of the Shell platform to major traffic lanes was discussed above.

Another possible safety hazard occurs when pipelines are laid across traffic lanes. The trenching and laying barges may pose obstacles to ships during this activity.

The general increase in traffic from crew and supply boats may occasionally interfere with recreational or commercial boat activites, but this impact is probably minor.

B.5.6.4 GEOLOGICAL IMPACTS

Slumping, subsidence and increased seismic activity could conceivably result from offshore activites.[42]

The weight of a platform could cause underwater slopes to "slump" or collapse. The platform could also compress unconsolidated soils. In either case, the platform could be damaged. At the existing and planned platform sites, these possibilities are remote because of the terrain and geology.

Subsidence could be a problem offshore from Huntington Beach, but re-injection will maintain subsurface pressures and should mitigate this potential impact.

As discussed in Section B.5.2.5, extraction programs have been known to facilitate fault movement. Because of the large number of fault zones in this offshore area, earthquakes could be triggered by changing underground pressures.

Increasing pressure through injection in subterranean strata could accelerate natural seepage from seabed cracks or faults. This could exacerbate a potential source of uncontrolled oil emissions.

B.5.6.5 THERMAL IMPACTS

The oil is usually heated to facilitate its transmission through pipelines. Heat lost through the submarine pipes raises the temperature of nearby waters slightly. Water used to cool engines on the platform is discharged into the ocean, raising the temperature of the receiving waters. In neither case are serious ill-effects anticipated.[43]

B.5.6.6 BIOLOGICAL IMPACTS

As discussed above discharges and dredging activities might 1) harm benthic communities, 2) increase turbidity and 3) introduce pollutants to the water column.

Fish and marine mammals may be disturbed by increased activities. Consequently, they might temporarily avoid areas where these activites are taking place. In general, though, no serious adverse effects have occurred or are expected. In fact, fish are attracted to platforms which serve as man-made reefs.

B.5.6.7 AESTHETIC IMPACTS

The principal aesthetic impact is the visibility of the platforms from the shore and from recreational boats. The man-made structures contrast with the natural offshore islands. The platforms are clearly lighted at night to help avoid collisions and are easily seen from the shore.

B.5.6.8 ECONOMIC IMPACTS

Oil extracted from the platforms on State leases are subject to the City per barrel tax (see Section B.5.2.8). Barring a spill, offshore platforms use few City services. Aminoil does use the City water system in emergencies when their own water system fails. Union uses City sewerage to discharge its waste water.

B.6.0 CONCLUSION

Huntington Beach will remain a center for oil extraction activities for at least the next two decades. The above discussions reveal the great number of potential impacts, both beneficial and costly, these activities can produce. Part E recommends policies and actions for the City's Local Coastal Plan which try to mitigate the adverse impacts and to encourage the beneficial ones.

In many cases, especially regarding offshore facilities, direct regulatory power over oil activities is held by regional, State or federal agencies. Nonetheless, the City can provide input to these agencies and can help to ensure that the interests and concerns of the community are addressed in the decisions of those agencies. Among the actions recommended in Part E are ways for the City to increase its participation in the decisions made by these agencies which affect the community.

In other cases, such as the siting of onshore facilities like wells, tanks and pipelines, the City holds substantial regulatory power through its planning, zoning and permitting authority. In Part E, policies and actions are recommended for energy-related activities through which the City can exercise its authority to try to serve both local needs and regional concerns.

B.7.0 NOTES

1. California Division of Oil and Gas; An Introduction to the Energy Resources of California, Sacramento, 1973
2. Ibid.
3. Huntington Beach Planning Department, Conservation Technical Report, 1974
4. References for this section include California Divison of Oil and Gas, Energy Resources, op. cit; and A. McCray and F. Cole, Oil Well Drilling Technology, University of Oklahoma Press: Norman, 1973
5. American Society of Planning Officials, "Anticipating and Planning for the Impacts of OCS Oil and Gas Development", 1977 and U.S. Department of the Interior, Final Environmental Impact Statement, OCS Sale No. 48; Washington, 1978
6. Fuller discussion of OCS activities and facilities can be found in New England River Basins Commission, Factbook: Onshore Facilities Related to Offshore Oil and Gas Development, 1976
7. Regional Water Quality Control Districts Spill Record.
8. State Lands Commission, Environmental Impact Report: Continued Oil and Gas Operations by Burmah Oil and Gas Company, Huntington Beach, 1976
9. U.S. Geological Survey, et. al.; Environmental Impact Report: Shell OCS Beta Development, 1978
10. op. cit. Burmah EIR
11. op. cit. Beta EIR
12. op. cit. Burmah EIR and Beta EIR
13. Ibid.
14. Ibid.
15. op. cit. Beta EIR
16. op. cit. Burmah EIR
17. City of Signal Hill, Hathaway Tank Farm Expansion, EIR, 1978.
18. Reported in Beta EIR
19. op. cit. OCS Sale #48 EIS
20. See Burmah EIR and Beta EIR
21. See OCS #48 EIR and Beta EIR
22. Ibid.

23. Ibid.

24. discussed in Burmah EIR, Beta EIR and OCS #48 EIR

25. Ibid.

26. Ibid.

27. Beta EIR and OCS #48 EIR

28. Ibid.

29. See Beta EIR, OCS #48 EIR and Office of Planning and Research, Offshore Oil and Gas Development, Southern California, 1977

30. Huntington Beach Harbour Traffic Study

31. See: Environmental Protection Agency, Oil Spills and Spills of Hazardous Substances, Washington, 1977

32. See: EPA, Oil Spills and Beta EIR

33. op. cit. OPR, Offshore Oil

34. See Beta EIR OCS #48 EIR

35. op. cit. Conservation Report

36. See City of Huntington Beach, EIR: Seacliff IV and City of Huntington Beach, EIR The Ranch; also discussions with DOG staff.

38. California Regional Water Quality Control Board, "Staff Report regarding NPDES No. CA 0106615", February, 1980.

37. op. cit. Beta EIR

39. California Division of Oil and Gas, California Laws for Conservation of Petroleum and Gas, Sacramento, 1978.

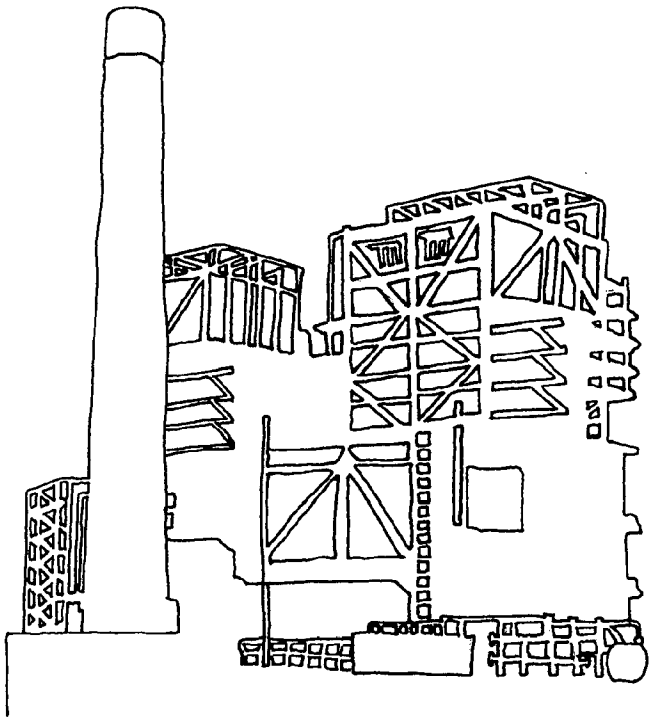
40. Regional Water Quality Control Board Records

41. op. cit. Beta EIR and Burmah EIR

42. Ibid.

43. op. cit. Beta EIR

EDISON POWER PLANT



Part C

The Huntington Beach Local Coastal Program Work Program identifies several tasks which are concerned with or affected by electrical generation activities in the Huntington Beach coastal area. This part of the report will investigate the present impacts of electrical generation, review the possibilities for future expansion, and point out the areas of concern which should be addressed by policies designed to minimize detrimental effects while permitting long-term energy sufficiency.

C.1.0 SOUTHERN CALIFORNIA EDISON FACILITY

Southern California Edison maintains a thermal electric generating plant within the coastal zone of Huntington Beach. The present relationship of this plant to the coastal and regional environments and their planned land uses is the subject of this section.

C.1.1 FUNCTION

An electric power system is designed to produce electrical energy and deliver it to the consumer. Power is produced by generating stations and transmitted at voltages of 220 kv to 750 kv * through transmission lines that travel to major substations in the electrical system. At the transmission substation, power is reduced to an intermediate voltage, usually 66 kv, and then transmitted to the distribution substation where further voltage reduction occurs. This latter reduction is usually to 12 kv and from these substations power is distributed to consumers. A distribution transformer, usually located on private property, further reduces the voltage for use by the consumer.

C.1.2 LOCATIONS

The primary electric facilities that Edison operates in Huntington Beach are the generating station, the Ellis 220-66kv transmission substation, and the Bolsa, Oceanview, Slater, Wave, Recovery, and Hamilton distribution substations. The generation plant, Slater, Recovery, Wave, and Hamilton substations are located in or in close proximity to the coastal zone (See Figure 1-1).

C.1.2.1 GENERATING STATION

The Huntington Beach generating station is located on 103 acres of Edison-owned land within the coastal zone. This one plant is the major source of electric power in Orange County. Supplemented by power imported from outside the county, it serves nearly the total Orange County area with electric power. The generating station presently contains four large fossil-fueled steam turbine generating units and one gas-turbine peaking unit. Steam turbine generating units use oil or gas (or other fossil fuels) to heat water in a boiler, forming steam which drives the generator. Gas turbine peaking units also burn fossil fuels, but electricity is produced when the energy created by combustion is used directly to power the generator. Peaking units are designed to supplement power production during periods of greater than normal demand which would otherwise overtax the capacity of the system to supply electricity.

Generating units 1 and 2, rated at 215,000 kw,* began operation June, 1958 and December, 1958, respectively. Unit 3, rated at 215,000 kw, began operation May, 1961; Unit 4, rated at 225,000 kw, began operation July, 1961, and Unit 5, the gas-turbine peaking unit rated at 121,000 kw, first became operable in April, 1969. Total generating capacity of this facility as of December 1976 was 991,000 kw.

C.1.2.2 SUBSTATIONS

The Ellis 220-66 kv transmission substation provides 66 kv electric power to the distribution substations in the City so that local electric load can be met. The Bolsa, Slater, and Wave substations service the western portions of the city including Huntington Harbour and the Oldtown and Townlot portions of the coastal zone. The Recovery substation specifically serves the Aminoil facilities located in the resource production area of the coastal zone. The Hamilton substation serves the southwestern portion of the City and the western portion of Costa Mesa; Oceanview substation serves the northeastern section of the City, the southern portion of Westminster, and the northwestern portion of Fountain Valley (See Figure 1-1).

C.1.3 ABILITY OF PRESENT SYSTEM TO SERVE COASTAL ZONE

In terms of supplying power, Edison's main concern is provision of the necessary generating capacity to satisfy demand. Power supply is planned on a regional rather than specific area or city basis. An Edison Company representative indicated the Company would have no difficulty in providing service to present or future customers in the coastal zone for the following reasons:

* 1kv = 1 kilovolt = 1,000 volts

1) the electrical requirements of coastal zone are within the parameters of projected load growth which Edison is planning to meet in this area, 2) past predictions were based on an eight to nine percent growth factor; this has dropped to a four-and-one-half to five percent annual growth rate, 3) the rate of consumption has been reduced through more efficient load management techniques (e.g., industries are charged less if they place demands on the system during non peak hours (10 p.m. - 6 a.m.) and pay higher rates if they operate during peak hours). Edison's ability to supply electricity would be constrained by an unexpected shortage in fuel supply or an increase in demand for electrical generating capacity which exceeds its current estimates.

The Edison generating plant in Huntington Beach is part of a 15-county network whose transmission lines are interconnected, forming a complex system which functions beyond the basic task of carrying power in one direction. If line interruptions occur, alternate routes carry the power flow. When local demand exceeds the generating capability of the Huntington Beach plant, additional capacity can be called upon from outside the County.

C.1.4 IMPACTS OF EXISTING FACILITIES

The present activities of the Southern California Edison Company have diverse influences on the local area and the coastal zone in particular. These will be examined separately in the following subsections.

C.1.4.1 AIR QUALITY

The Edison generating plant is located in the South Coast Air Basin which includes Los Angeles and Orange Counties as well as the western portions of San Bernadino and Riverside Counties, under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The facility is monitored by the Enforcement Division, both by surveillance and on-site inspections.[1] The boilers also have electronic stack monitors continuously recording oxides of nitrogen, oxygen and opacity.

The Southern California Edison Company is required to submit monthly reports providing a summary of the monitoring data and to report any monitoring failures or incidents of exceeding a concentration limit within 96 hours. Further, they are required to report within an hour of its occurrence, any equipment breakdown that would cause any violation of District rules.

The boilers are subject to AQMD regulations. Three notices of violation were issued to the Company in 1977 and 1978; one on August 3, 1977 for an opacity violation (Rule 401) and two on June 14, 1977 and January 6, 1978 for stack monitoring procedure violations (Rule 218).

* 1kw = 1 kilowatt = 1,000 watts

The pollutants released into the atmosphere by the generating facility include sulphur dioxide, oxides of nitrogen, particulates, organic gases and carbon monoxide. Although a current Orange County emission inventory is not yet available from the SCAQMD, a comparison of 1978 plant emissions with 1976 Orange County stationary sources shows that the generating station is a large contributor to pollution from sulphur dioxide and oxides of nitrogen from stationary sources.

The Edison Company plans to install an experimental catalytic system (DeNOX) on one demonstration unit to remove nitrogen oxides from the boiler flue emissions as required by AQMD, Rule 475.1. The catalytic NOx Removal System employs a selective reduction process in which oxides of nitrogen are reduced in the presence of ammonia gas and a catalyst forming nitrogen and water vapor. The reaction takes place at temperatures of 570° F to 750° F. The ammonia used in the process is stored as liquid ammonia and vaporized prior to being mixed with the boiler flue gas and injected into the reactor. Construction of the demonstration unit is scheduled to begin September 22, 1980 at an estimated cost of $12 million and to be completed by October 1, 1981.

The system will treat one half of the gaseous emissions from Unit 2 and is expected to reduce nitrogen oxide emmissions by 90%. A six month period of testing is planned to evaluate the results.[2] At this time the system has received preliminary City approval and is in the final design stage. The project is expected to come before the Coastal Commission by Spring of 1980 for a coastal permit. While this system has been successful in Japan, it has not been used on the scale that is being proposed by Edison. Several issues of concern which will require careful analysis, especially during the six month testing period, include:

1. The formation and deposition of ammonium sulfate and bisulphate on the air preheater.

2. The storage of the large amounts of ammonia required by the process and possible escape of this chemical near a residential area.

3. Possible fire danger from the relatively high reaction temperatures (350°-400°C).

4. The sensitivity of the system to inlet particulate levels.

C.1.4.2 STACK FALLOUT

The precipitation of particles from the generating plant's stacks can be an annoyance to nearby businesses and residences. Stack emissions which cause fallout are of three types: rust particles, acid mist and dark smoke. Each has a specific source.

Rust particles are formed on the metal portions of the boilers and the preheater baskets and may be loosened and expelled from the stacks when boilers are brought on line. Precautions are taken when the boilers are cleaned to dry them carefully in order to reduce rusting. The Edison Company has plans to replace the steel air preheaters of the boilers with non-rusting stainless steel, but this program will require 8 to 10 years.

Edison is also experimenting with fuel additives to alleviate fallout problems. Preheating of the air and fuel mixture and injecting it higher into the boilers are other methods being tried to produce cleaner emissions.

Release of dark smoke from the stacks occurs when an oil supply line to a boiler breaks, causing an uncontrolled flow of oil to the burner. Incomplete combustion of oil results in smoke being expelled from the stacks until the unit can be switched to natural gas. It is not known whether or not this smoke causes or contributes to a fallout of soot or grease in the vicinity of the plant. While this does not happen frequently, the Edison area manager, H.W. Compton reports that it has occurred on four occasions between July and December of 1979.[3] Each incident and the density of the smoke generated must be reported to the AQMD. It would appear that the City has no power to effect the reduction of this type of nuisance, and that the Edison plant itself has little control over the situation. Maintenance and preventive inspection is employed to prevent oil line breaks.

Acid mist fallout is a phenomenon that occurs near industrialized areas and fossil-fueled electrical generating stations. Its cause is not well understood but appears to be related to a combination of fuel combustion and local weather conditions which allow the formation of sulphuric acid from oxides of sulphur in the atmosphere. Acid mist can cause discoloration and damage to cars, houses, sidewalks, plants, etc. It is usually confined to within one mile of any major potential source.[4] Studies by the SCAQMD are presently under way to learn more about the magnitude of this problem in Southern California. Until there is additional information available, no conclusions can be drawn regarding the acid mist problem at the plant site. In order to reduce the possibility of acid mist, the sulphur content of the oil burned in the Huntington Beach plant has been reduced from .50% to .25%.

C.1.4.3 WATER QUALITY AND MARINE LIFE

The California Regional Water Quality Control Board, Santa Ana Region, is the agency which has been delegated responsibility under the State Water Resources Control Board for enforcing water quality standards in the Huntington Beach area. The Edison generating plant uses large quantities of seawater in its once-through cooling system. This water is discharged into the ocean through an outfall located approximately 1,300 feet offshore. Thermal pollution and the discharge of chemical wastes or their treated end products may adversely impact water quality and marine life.

C.1.4.3.1 THERMAL POLLUTION

Thermal electric power plants convert heat generated by fossil or nuclear fuels into electrical energy, but do so with efficiencies of only 30 to 40 percent. The heat not converted becomes "waste heat" and is rejected from the thermal cycle either to the atmosphere or to a cooling water system. The system in use at the Huntington Beach generating station involves transferring the waste heat to the cooling water as it passes through a heat exchanger. The cooling water is discharged at an elevated temperature into the ocean.

Thermal discharge is regulated by The California State Water Resources Board through its "Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California," adopted May 18, 1972. Supplementing the general provisions of the Water Quality Control Plan are detailed requirements for specific discharges established by the Regional Water Quality Control Boards.

A study of the thermal discharge from the Huntington Beach generating plant was conducted by Environmental Quality Analysts, Inc. and Marine Biological Consultants, Inc., during a 15 month period between October, 1971 and December, 1972. The final report, issued in September, 1973 found the Huntington Beach Plant to be in compliance with the Water Quality Control Plan.

Since that time additional monitoring studies have been conducted in December 1975, October 1976, October 1977, November 1978 and April 1979. These studies continue to find no appreciable impact on marine life in the study area. There was no evidence that the physical environment offshore from Huntington Beach is undergoing appreciable changes other than those associated with normal seasonal variations. Physical and chemical characteristics of the water column (i.e., temperature, dissolved oxygen) indicated that the quality of the receiving water is being protected.

C.1.4.3.2 CHEMICAL POLLUTION

Various chemicals are used for 1) maintaining plant water quality, 2) inhibiting corrosion in certain closed loop systems, and 3) regenerating demineralizers. These chemicals include various acids and bases, sodium phosphates and other substances.

In the course of normal plant operation, small amounts of these chemicals are collected via the waste handling systems. The acids and bases are neutralized and the other chemicals treated so that, after dilution with the circulating cooling water, their concentrations are well within those normally associated with seawater. Included in the discharge are traces of metals; these may result from corrosion of the piping systems. However, these metals are not detectable at the point of discharge. Concentrations of all discharge wastes have been within the limitations set by the California Regional Water Quality Control Board, Santa Ana Region at the time these studies were conducted.

The most recent monitoring report prepared by Marine Biological Consultants, Inc. based on data collected in August, 1978, revealed no evidence that the generating station's effluent significantly affected the local fish population.

C.1.4.3.3 ENTRAINMENT OF MARINE LIFE

Entrainment refers to the trapping of fish, plankton and other creatures by the flow of water into the intake structure. At the Huntington Beach site, only the fish and plankton communities are affected by entrainment as clams, mollusks and other bottom-dwellers are typically either non-mobile or are not present in the vicinity of intake.[5]

The intake of fish is an unavoidable consequence of using seawater for cooling. The plant utilizes two devices to reduce fish intake and mortality: one at the intake structure to reduce the number of fish taken in, and the other within the plant to return the fish which do enter the system back to the ocean. The intake structure has a velocity cap installed on it so that instead of drawing in water vertically, the water comes in horizontally. Fish are able to detect and resist a horizontal flow much more readily than a vertical one. This device decreases the number of fish taken in by over 90 percent.

A special pump, installed within the plant to remove fish which have entered the circulating water system and return them to the ocean, successfully returns some 50 percent of the fish not deterred by the velocity cap.

Despite the precautions above, fish mortality does occur. During 1972 mortality was estimated at 113,400 pounds. This represents only 1.3% of the commercial fish catch in the immediate offshore area (8,536,535 pounds in 1971). Since the commercial catch is only a fraction of the total fish population, this is not considered to be a significant depletion.[6]

Plankton is also affected by passage through the cooling system. On average, 20.55% of the zooplankton die after passage through the plant's circulation system, and the productivity of the phytoplankton is reduced about 35%. However, plankton studies reported in the Huntington Beach Generating Station Units 6 - 11 Environmental Report of 1973[7] showed no significant adverse effect on the plankton populations in the surrounding area.

C.1.4.4 ECONOMIC IMPACTS

As of October 1, 1979, the Southern California Edison plant in Huntington Beach employed 88 persons whose salaries ranged from $1,000 to $3,600 per month. Twenty-one of these employees resided within the City of Huntington Beach.

Although the plant itself is not a large employer, the availability of sufficient electrical power enables other industries to locate within the city and the region. These industries provide jobs, attract residents and fuel the local economy. The continued well-being of this economic system, as well as the comfort, convenience, health and safety of the citizens is largely dependent upon the ability of the Edison Company to deliver adequate amounts of electricity at affordable prices. Any changes in either availability or price will be reflected throughout the local economy.

The plant is a very large contributor to the local tax base, and thus to the support of the schools and city government. Table 1-1 shows most of the tax dollars that Southern California Edison will pay on its Huntington Beach facilities in 1979-1980. The total assessed valuation of Edison property in the City amounts to $39,850,960.00. Including assessments for other special districts not shown in Table 1-1, Southern California Edison will pay close to two million dollars in property taxes within Huntington Beach this year. Almost 60% of these taxes support local school districts, a contribution of more than one million dollars. In addition, $137,632.24 of Edison's property taxes help finance City government.

	Total	Amount to school districts	Amount to City of H.B.
Basic Levy of $4.00 per $100 assessed valuation	$1,594,038.40	$907,319.57	$59,046.15
*Extra assessments for city and school bonded indebtedness	$259,255.47	$186,669.38	$78,586.09
Totals	$1,853,293.47	$1,087,988.95	$137,632.24

* Other types of bonds not included: Orange County flood control district, Metropolitan Water District, Orange County Sanitation District, County improvement bonds.

Table C.1.1 Revenues from Edison Company
Source: Southern California Edison Company

C.1.4.5 LAND USE

The Edison generating plant is located within Census Tract 36, which extends from Beach Boulevard on the west to Magnolia Street on the east, and from Atlanta Avenue on the north to Pacific Coast Highway on the south. The plant and rotary mud dump occupy much of the southeast quadrant of the tract. While Beach Boulevard, a major artery on the west, forms a natural barrier, Magnolia Street on the immediate east is a much smaller thoroughfare, and the impacts of the plant tend to spill over on this side to Census Tract 37, which extends east to Bushard Street. In discussing land use impacts, Tracts 36 and 37 will be treated together as the area affected by the Edison facility (See Figure 1-2).

Only the southern half of Census Tract 36 and the southwest quadrant of Census Tract 37 are included within the boundaries of the coastal zone. However, development in the remainder of these tracts is also affected by the proximity of the plant, and should be considered in any discussion of land use impacts resulting from an energy facility within the coastal zone.

The Huntington Beach 1979 Special Census established a population of 8,005 for the two census tracts surrounding the Edison plant. The average median age of the population is 30 and average median household income is $24,367.27. Average median rent and mortgage payments are $291.18 and $340.74 respectively. Household size averages 2.92. This information is presented by census tract in the following table:

	Total Pop.	Household Size	Median Income	Median Rent	Median Mortgage Payment
Tract 36	4417	2.46	$20,336.42	$266.02	$365.15
Tract 37	3588	3.37	$28,398.12	$464.90	$316.33
Total/ Average	8005	2.92	$24,367.27	$291.18	$340.72

The Special Census revealed the following housing characteristics for Tracts 36 and 37:

	Single Family	2-4 Units	5+ Units	Mobile Homes	Total Dwellings
Tract 36	676	176	621	409	1882
Tract 37	1139	-0-	-0-	-0-	1149
Total	1715	176	621	409	3021

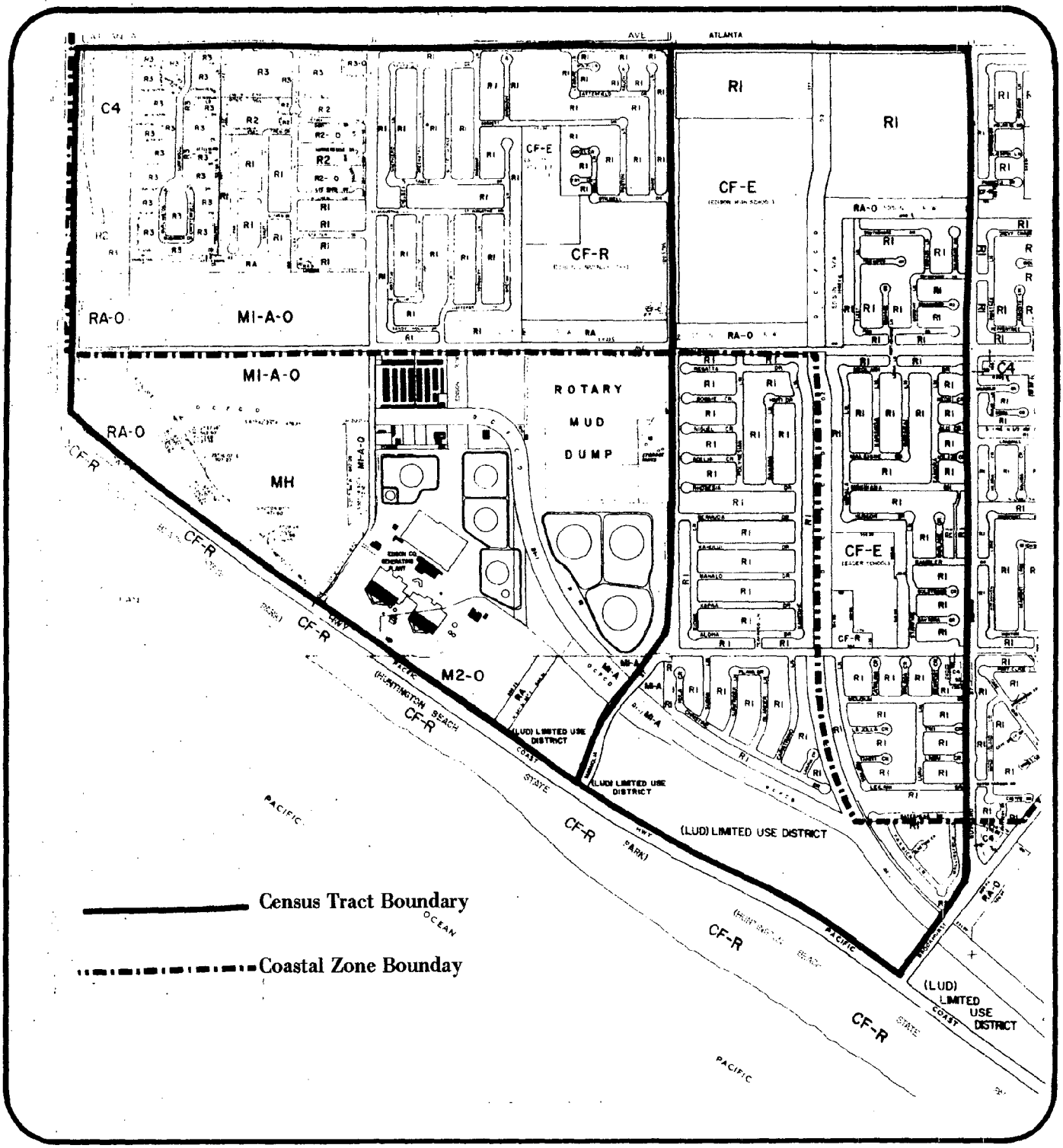


Figure C.1.2 Census Tracts around Edison Plant
Source: Huntington Beach Planning Division

huntington beach planning division

The above tables disclose that the two census tracts are very different in composition. Tract 37 is composed entirely of single family dwellings occupied by larger, more affluent, younger households, while Tract 36 contains a diversity of dwelling types and an older population, with smaller household size and considerably lower family income. One factor in this difference is a concentration of mobile homes in the area immediately west of the generating plant. Many of these are older coaches occupied by senior citizens. The two mobile home parks here pre-date the development of the plant. They were developed as interim uses of potentially valuable coastal land, but have become an important source of low income housing for the coastal zone.

The plant site is zoned industrial combined with oil production. The immediately adjacent parcels, with the exception of the existing mobile home parks to the west, are zoned either industrial with oil or restricted manufacturing combined with oil. Undeveloped land with wetland characteristics to the southeast of the plant is designated Limited Use District. Directly across Pacific Coast Highway is Huntington Beach State Park.

Beyond the buffer area of industrial-manufacturing zoning are developed residential areas. Little vacant residential land remains in the two tracts, with the exception of two low density sites at the north border of Tract 37, and a parcel at Beach Boulevard and Pacific Coast Highway zoned residential/agricultural/oil.

To the north of the generating plant along Hamilton is an undeveloped 6.7 acre parcel zoned for light industrial use. This parcel was recently subdivided into 9 lots. Approval is now being sought from the City for the construction of an industrial building on each lot. The 37 acres between this development and Magnolia Street on the south side of Hamilton has been used for many years as a rotary mud dump for oil field wastes from local drilling operations. Presently such dumping activities have ceased and the property has undergone extensive improvement. It is currently being approved by the County and State as a Class III solid waste disposal site for inert materials. The use of this property as a solid waste facility will probably limit future uses of the site. Between the flood control channel and Edison Avenue to the south lies a parcel of mixed industrial uses, including a sandblasting firm, an auto wrecking company and the Huntington Beach Humane Society's animal shelter.

Recently, a General Plan amendment was proposed for the 107 acres west of the generating plant between Beach Bolevard and Newland Street. The site was to be developed as a Planned Community to include a number of uses. At that time several issues of concern were identified, including the impacts of the adjacent industrial uses, particularly the Gulf Oil tank farm and the generating station. The proposal was denied by the City, primarily to allow the completion of the Local Coastal Plan. In its comments on the EIR for the project, the Southern California Edison Company suggested that its location was unsatisfactory due to proximity to the generating station. Given the demand for housing in the City and the fact that the City is nearly 90 percent developed at this time, the pressure for residential development will probably not be affected by the adjoining industrial uses.

The basic effect on land use created by the generating station is to anchor the immediately surrounding area as an industrial zone of considerable stability and permanence. Any plans to initiate further residential development within its impact area should feature adequate buffering and construction techniques to minimize incompatability. Future commercial or commercial-recreational uses should also carefully assess noise, traffic and visual/aesthetic effects due to the plant's proximity.

C.1.4.6 VISUAL AND AESTHETIC FACTORS

The vertical stacks and massive buildings of the plant have been cited as the dominant visual features of the coastal area between downtown and the Santa Ana River.[8] The plant functions as a visual reference throughout this area. While it has been argued that the Edison facilities have an overall negative aesthetic impact with respect to views, development of nearby residential sites has not been measurably interrupted or discouraged. Land and home values in the area have appreciated at a rate consistent with the growth in the City. There has been little or no problem with the sale or resale of homes due to the presence of the plant.

While public acceptance of the existing facility seems good, perhaps due to the fact that the plant pre-dates most of the surrounding residential development, there are indications that the tolerance of local residents is less than whole-hearted. During public hearings before the California Energy Commission in Huntington Beach on May 12, 1978 citizen input on the proposed expansion of the generating station was not favorable. Reasons given were construction disruptions, (noise, dust, traffic), increased noise from generators and transmission lines and heavy equipment routing near the high school.

A recently proposed expansion by Edison (See Section 2.0) would have included landscaping improvements for the existing as well as the new facility. The addition of rolling berms up to 15 feet in height, textured, curved walls 10 to 15 feet in height, curbs and gutters, a waterfall and reflecting pool, and extensive use of trees and shrubs were planned.

Great improvement in the visual and aesthetic impacts of the plant would have been affected by this treatment. The Energy Commission's rejection of the Huntington Beach site as a location for that expansion, however, means these improvements will not be available.

In compliance with ruling 8209 of the Public Utilities Commission, Southern California Edison has implemented a program of undergrounding existing overhead lines. A sum of $250,000 per year has been allocated by the company for this purpose. Presently, a section of Warner Avenue from Pacific Coast Highway to Bolsa Chica is under improvement. Future funds for undergrounding in the coastal zone will depend upon the priorities chosen by the City.

C.1.4.7 NOISE

A Noise Element Background Report was prepared for the City of Huntington Beach in 1975 by Wyle Research of El Segundo, California. On-site monitoring of sound pressure levels were conducted at two stations adjacent to the generating plant.

At the Newland entrance to the plant, adjacent to the Huntington-By-The-Sea mobile home park, the residual noise level at 4:45 a.m. was recorded at 56 dBA. The residual noise level is defined as the noise level remaining when all single event noises are excluded or as the noise level exceeded 90 percent of the time. A noise level of 56 dBA can be qualitatively described as "Very Noisy Urban Residential."[9] The noise study recommended that for a restful night's sleep, homes near the power plant should have windows on the exposed side closed. Noise levels at this site were dominated by the power plant.

The other nearby monitoring station, located at Newland and Edison Avenue at the animal shelter, recorded sound pressure levels at 9:00 a.m. of 46 to 52 dBA which were dominated by the noise of the shelter animals. Single events (dog barks) were recorded up to 60 dBA.

An additional, but still unmeasured, noise impact from the Edison plant is a low grade electrical "buzz" evident near the power lines' right-of-way. These sounds may affect a large number of people in Huntington Beach since the right-of-way passes for about three miles through a predominantly residential area. These noise impacts may also be significant Countywide because much of the route of the transmission lines lies beyond the coastal zone and the City.

Noise from the generating station and transmission lines was cited by citizens in objecting to the intention of Edison to expand its Huntington Beach Facility.[10] As part of this proposed expansion, Edison planned to rebuild its 220 kv lines to attain greater capacity, utilizing double bundled conductor lines, which would decrease the voltage gradient and result in lower noise levels than those from the present single lines.

C.1.4.8 RECREATION

The Huntington Beach Edison facility could impact recreation in several ways. It might be argued that the looming visual presence of the plant has an aesthetic impact which affects recreational use of the nearby Beach area, making it a less attractive place to spend leisure time. The lack of any softening of the plant's exterior along Pacific Coast Highway by vegetation or landscape features contributes to the unpleasant ambiance created along this important city gateway. The parklike atmosphere on Magnolia Street alongside the oil storage tank area underscores how landscaping and plantings can relieve the visual impact of industrial facilities.

A possible impact related to recreation is the potential for dual use of some areas. However, the operations occuring on Edison's property preclude dual uses except for a site in front of the plant and the strips of land along the rights-of-way of the 220 kv power lines.

During the months from mid-May to mid-October, an unpaved area fronting the plant's property along Pacific Coast Highway serves as a beach parking lot. It is operated by "Parking of America" under a lease agreement with the Edison Company and a conditional use permit from the City. This less expensive alternative to the State Beach parking lot appears to be popular with beachgoers. Some circulation problems and traffic hazards occur when entrance or egress is attempted directly to or from the highway, rather than from Newland Street.

Presently, most of the transmission line right-of-way is in dual use. The only portion of the right-of-way that lies within the coastal zone is a section from the power plant north to Hamilton Avenue. This is being utilized as horticultural nursery storage area by two separate concerns under contract with Edison. Because of its location within an industrial area, this section would not appear to be suitable for park or recreational use. The right-of-way north of Hamilton running east to the Santa Ana River is leased to the City for park use and has been developed with landscaping and bicycle trails.

The presently unused parcel of Edison owned land east of the generating station and south of the flood control channel is a wetland. Some overflow parking for Edison employees is accommodated along the border of the plant. Restoration and enhancement of the wetland characteristics of this property could provide a nature study area for use by visitors to the State beach or those passing by along Pacific Coast Highway.

C.1.4.9 BIOLOGICAL IMPACTS

The Southern California Edison generating plant is situated within the flood plain of the Santa Ana River, on land that was once an extensive salt water marsh. Prior to channelization of the Santa Ana River, the adjacent salt marshes were subject to tidal flushing which created a rich wildlife habitat.[11] Seasonal rainfall is now the major source of water in the marsh areas. Leaks in the flood control channel and tidal leaching are supplemental sources. The construction of Pacific Coast Highway also resulted in a restriction of the influx of water to adjacent marsh areas.[12]

The value of marsh land and other wetlands has been well documented from an economic as well as an ecological standpoint. Wetlands are vital to commercial and recreational fishing economies, serving as the spawning and nursery area for many fish and shellfish. They shelter and feed migratory birds and provide nesting and habitat areas for resident species. Wetlands protect against flooding during periods of heavy rains by trapping excess storm waters and help to recharge the groundwater table. They also act to filter pollutants by trapping salt, pesticides, toxic metals and organic matter.[13]

Southern California's coastal wetlands have been disappearing at a rapid rate. Only 25% of the wetlands and estuaries existing in California in 1900 remain today;[14] less than 13,100 acres of coastal wetlands. Therefore, the remaining wetland areas in Huntington Beach have regional as well as local importance.

The land immediately adjacent to the Edison plant on the southeast is part of a wetland area that extends from the plant to the Santa Ana River and is bounded on the north by the flood control channel and the south by Pacific Coast Highway. Pickleweed (Salicornia virginica) is the dominant vegetation on this site, though many other plant species are present. Ponding occurs in wet weather immediately adjacent to the Edison Plant and forms a prime activity area for many shorebirds. Portions of this wetland are used for nesting by the endangered species Belding's Savannah Sparrow (Passerculus sandwichensis beldingi) and as feeding area by the California Least Tern (Sterna albifrens), also an endangered species.

The area's function as a habitat for endangered species and the wetland characteristics of the land adjacent to the Huntington Beach Edison facility have been cited by the California Energy Commission as a constraint to expansion of the plant in its September 1979 draft "Feasibility of Expansion of Existing Coastal Zone Power Plants." At the very least, extensive mitigation measures would be necessary to reduce the impacts of any expanded use of this property. Much of the area adjacent to Edison's facility has been degraded by parking, off-road driving and dumping. Enhancement, and restoration should be considered where possible to increase the level of biological productivity in this area.

C.2.0 POSSIBLE EXPANSION OF THE HUNTINGTON BEACH FACILITY

Section 30264 of the Coastal Act states:

> "Notwithstanding any other provision of this division....new or expanded thermal electric generating plants may be constructed in the coastal zone if the proposed coastal site has been determined by the State Energy Resources Conservation and Development Commission to have greater relative merit....than available alternative sites....". Section 30001.2 says that "The Legislature further finds and says that, notwithstanding the fact electrical generating facilities....may have significant adverse effects on coastal resources or coastal access, it may be necessary to locate such developments in the coastal zone in order to ensure that inland as well as coastal resources are preserved and that orderly economic development proceeds within the state."

The Coastal Commission's LCP Regulations provide that recommended uses of more than local importance, including major energy facilities, be considered in the preparation of LCP's. This section discusses the possible expansion of the Huntington Beach generating plant, the impacts of such expansion and the likelihood of any expansion occurring in the near future.

C.2.1 PROPOSED EXPANSION

In August, 1977 Southern California Edison announced its intention to build a new plant or expand facilities in its Southern California network. Huntington Beach was one of four sites being considered for this project. Under the California Energy Commission Notice of Intention (NOI) process, reviews, studies and hearings were conducted to determine the relative merits of the proposed locations.

C.2.1.1 DESCRIPTION

The proposed expansion as applicable to the Huntington Beach site was a combined cycle plant consisting of three combined cycle units, each with a capacity of 430 mw. Each unit was to be comprised of 5 combustion turbine-generators, 5 heat recovery steam generators and one steam turbine-generator. New 220 kv transmission lines were to be constructed on existing rights-of-way. The proposed addition was designed to increase total generating capacity by 1290 mw, or more than double the existing capacity of the plant.

The site for the proposed expansion was a parcel of Edison-owned property along the southeastern boundary of the existing facility. The site had about 1000 feet of frontage on Pacific Coast Highway and was bounded on the northeast by the Huntington Beach Flood Control Channel.

C.2.1.2 IMPACTS

Results of the extensive studies and hearings that were conducted by the Energy Commission revealed four main impact areas of concern. These are summarized below.

C.2.1.2.1 AIR QUALITY

Although Edison's extensive analysis of the air quality impact of the proposed expansion concluded that no ambient air quality standards would be exceeded by the new facility, the Energy Commission's final report found that "the Huntington Beach site is unlikely to conform to air quality rules for a combined cycle or gas turbine."[15] The Energy Commission's Preliminary Report on the Southern California Edison Company's Notice of Intention (NOI) of December, 1978 found that "the proposed facility will not comply with SCQAMD Rule 475.1" (p. 162). This was an important factor in the Commission's decision that the Huntington Beach site was not acceptable for the proposed expansion.

C.2.1.2.2 BIOLOGICAL RESOURCES

The Huntington Beach expansion site contains significant salt marsh ecosystem characteristics and provides habitat for the endangered California least tern and Belding's savannah sparrow.[16] The ranking of the four proposed sites on this issue placed Huntington Beach last.

The California Coastal Commission proposed as an alternative site for expansion at Huntington Beach the existing rotary mud dump and/or adjacent properties which would avoid destroying the wetlands. The Energy Commission found that this site was neither more feasible nor less environmentally damaging due to its greater noise and aesthetic impacts on nearby residents.

C.2.1.2.3 NOISE

Because the Huntington Beach site is located in an urban area, a large number of permanent residents would be impacted by increased noise levels. This finding made Huntington Beach less desirable than the other sites. However, the noise impacts could be abated, and therefore the site was not rejected on this criterion. It was concluded that the proposed facility would increase the sound pressure level from the current ambient level of 56 dBA to about 58 dBA without mitigation. Since the current ambient level of 56 dBA is already in the "very noisy urban" range, any mitigation measures instituted for expansion might have a beneficial effect on the current noise level as well. Noise and interference impacts from the proposed new transmission lines would actually be less than from the existing ones. This is because two bundled conductors instead of one would reduce voltage gradients responsible for these disturbances.

C.2.1.2.4 WATER QUALITY

The Huntington Beach site was acceptable on the basis of a once-through ocean water cooling system. Although ongoing ocean water monitoring studies conducted for Edison by Marine Biological Consultants, Inc. have disclosed no appreciable negative impacts on the water quality or marine life in the area of the coolant outfall, the effects of increased thermal and chemical effluent need to be closely followed. There is also concern for the mortality of large numbers of fish despite innovations designed to reduce their entrainment at the intake terminal. The Huntington Beach site could not comply with the particulate emission limitation for a closed-loop cooling system using either ocean water or treated wastewater.

C.2.1.3 RESULTS

In its Final Report on SCE's NOI, the Energy Commission declared that the Huntington Beach site was not approved because of its unlikely ability to conform to air quality rules and its land use constraints. This decision was rendered on the basis of existing conditions and technology and does not preclude the possibility of a favorable decision on the Huntington Beach site in the future, should conditions, technology and the proposal combine in such a way as to avoid the negative impacts detailed above, or if no other less environmentally damaging site were available.

C.2.2 SITE EVALUATION FOR EXPANSION

In September, 1979 the California Energy Resources Conservation and Development Commission released for public review the first draft of a study examining the feasibility of expanding existing power plants located within the coastal zone. The study utilized 27 siting factors in the areas of air quality, geology, public facilities and natural resources to evaluate the possibilities for expansion at each site. The feasibility of expansion is considered in terms of five plant types - nuclear, coal, oil or gas fired steam, combined cycle and combustion turbine; three plant sizes - small (70-400 mw), medium (500-800 mw), and large (1200-1300 mw); and six fuel types - nuclear, coal, oil, gas, natural gas and methanol. For each site, the impacts of the different combinations of plant types and sizes and fuel types are considered in terms of the 27 siting factors.

At the Huntington Beach site the nearby coastal habitat was determined to be of major concern, as were the two endangered species which inhabit the area (California Least Tern and Belding's Savanah Sparrow).

The wetlands in the immediate vicinity were of special concern. The report states: "These wetlands must be avoided by any type of facility expansion including the degraded salt marsh in the southern portion of the plant site"[17]

The study concludes that the Huntington Beach site would be feasible for: 1) one or two small (70-140 mw) combustion turbine units, 2) a small (100 mw) coal facility, 3) a small or medium (150-600 mw) steam turbine oil facility, 4) all plant sizes (150-800 mw) coal gas or methanol steam turbine facility or 5) all plant sizes (400-1300 mw) and fuel types combined cycle facility. Additionally, the study found that cooling water supplies from once-through open ocean sources will severely limit expansion due to serious entrainment impacts. The available land was found to provide for moderate expansion opportunities, but would probably require off-site inland expansion. Urban areas and transportation were considered additional severe constraints.[18] It should be noted that the study made different air quality assumptions than the recent SCE combined cycle NOI and therefore reaches different conclusions from those of that regulatory proceeding. The study assumes the opportunity for basin-wide trade-offs as opposed to a 20-30 mile limit on trade-offs in the SCE NOI. In addition, the study assumes a 90 percent reduction by 1985 for oxides of nitrogen emissions and a longer period to on-line than for the SCE NOI.[19]

C.2.3 CURRENT STATUS OF EXPANSION PLANS

On August 6, 1979 the California Energy Commission decided that the Huntington Beach site was presently unacceptable for the particular expansion of the existing generating facility proposed. However, the Edison owned property on or around which the generating station is located has not been designated by the Coastal Commission as unsuitable for the construction of a power plant. While Edison does not presently have plans to undertake such construction in this area, Edison continues to regard this as a potentially viable site for expansion if the circumstances would so warrant.[20]

At present, the most likely type of expansion appears to be peaking units similar to the one already in use at Huntington Beach.[21] These units would run on natural gas or kerosene, a distillate fuel which is currently stored at the site. Peaking units need no water for cooling, thus avoiding an important impact on the marine environment. Since peaking units are used only at times of higher than normal demand, they are not in constant operation, thereby lessening air quality impacts. The design and siting of a peaking facility may lend itself to existing filled areas so that adverse impacts on the adjoining wetlands can be avoided.

C.3.0 AREAS OF CONCERN

The preceeding sections have highlighted some existing and potential areas of concern which will be summarized below. Some of these issues cannot be resolved on the City level. However, they are included so that policies and recommendations may be developed in the LCP which will address these concerns should it become possible to do so in the future.

C.3.1 WETLANDS

The wetland nature of the Edison owned land east of the generating station is likely to preclude any future development on it. Although the Edison company considers this property to be a possible site for expansion should it be required, there is doubt that the necessary permits can be obtained. The Department of Fish and Game and the Corps of Engineers have designated this area as part of an ecologically important salt marsh extending from the Santa Ana River to Beach Boulevard. Despite some vehicular intrusion and other human disturbance, the property supports a viable marsh ecology. The City should recognize and protect this valuable coastal resource with appropriate zoning.

C.3.2 DUAL USES OF TRANSMISSION LINE RIGHTS-OF-WAY

The land under the Huntington Beach/Ellis 2200 kv transmission lines within the coastal zone extends from the generating station north to Hamilton Avenue. All of the property is presently in use as a horticultural nursery area under license agreements. Outside the coastal zone, the right-of-way north of Hamilton running East to the Santa Ana River is licensed to the City of Huntington Beach for park use.[22] At this time the land in the existing right-of-way appears to be fully utilized and presents no further opportunity for dual usage. Should the present licensing agreements be terminated, however, the possibility for other uses may arise. The location of the property within an active industrial area does not lend itself to public access for park or open space/recreation type of uses. Its proximity to the station itself also presents a problem of visual/aesthetic and noise impacts for such use. Therefore, the present type of utilization is probably the most feasible and economically beneficial to the City and should be maintained.

C.3.3 STACK FALLOUT AND ACID MIST

Fallout from the Edison plant is an immediate source of annoyance to some nearby residents. Although the problem is under study and various types of remedies are being tried by the Edison Company, it does not appear that the City can hasten a solution. As the results of acid mist studies now under way shed more light on the cause of this phenomenon, it is likely that the AQMD will promulgate regulations to reduce its occurrence. The City should do all it can to encourage Edison to hasten their program of replacing rust-prone boiler parts with stainless steel and to prevent oil line breaks. The City should also remain abreast of current technologies in this area in order to maintain policies that are responsive to the community and realistic as to available remedies. Citizen complaints about fallout should be directed to one department so they can be catalogued and acted upon in a timely and appropriate manner.

C.3.4 VISUAL-AESTHETIC IMPACTS

The visual impact of the power plant on the surrounding coastal area is significant. Improvements to enhance the visual qualities of the original facility were a part of the proposed expansion at the Huntington Beach site, but were dropped when the site was rejected. The company currently has no plans to make improvements to the site. However, improvement in the appearance of the plant, with landscaping, walls, berms or screening of the exterior would be in the interest of the entire City. The City should encourage Edison to make some exterior improvements that might mitigate the harsh visage the plant presents to neighbors and especially to passers-by along Pacific Coast Highway.

C.3.5 ENTRAINMENT OF MARINE ORGANISMS

As pointed out in Section 1.4.3 the entrainment of marine organisms, particularly fish, in the cooling water system of the generating plant, occurs in considerable quantity. The loss of hundreds of thousands of pounds of fish each year seems to be a regrettable waste, especially since the dead fish are not used for other purposes. Although the reported fish loss presumably does not unduly deplete the local fish population, a reduction in this loss would be desirable if economically feasible. New technology may be available to reduce the loss (see Section 2). In addition, it may be possible to coordinate policies with the Department of Fish and Game, which monitors the amount of fish lost, to permit some beneficial uses of the unavoidable mortalities -- for example, to make fertilizer.

Continued monitoring of the plankton populations in the area of the intake and outfall pipes should be conducted to assure that plankton concentrations remain within normal limits.

C.3.6 WATER QUALITY

To date, it does not appear that the quality of the ocean water in the area of the plant's outfall has been adversely affected by thermal or chemical discharges. Regular monitoring studies conducted in compliance with the Regional Water Quality Control Board should continue. The City should attempt to maintain contact with the Board to confirm that water quality remains unaffected, and if possible, obtain copies of the water quality and biological survey reports so that an updated file is available for any future assessments.

C.3.7 ALTERNATIVE FUEL SOURCES

With oil and gas becoming increasingly scarce and expensive, alternate energy sources may become economically viable in the future. The most likely alternative fuel for the Edison facility would be a product of coal gasification. An experimental energy facility and coal gasification plant being developed in the Barstow area will provide more information on the feasibility of this fuel source, as well as the problems associated with its use.[23] Coal gasification products which would be used at the plant may have a higher sulphur content than the currently used fuels. Their use would probably require the installation of scrubbing equipment to meet air quality standards. Storage of the fuel would present another problem, since the existing oil storage tanks would probably not be suitable. Direct delivery by pipeline with no onsite storage may be one solution. Coal gasification products may generally be more highly combustible and dangerous to store than oil.

Any change to an alternate fuel source should be carefully investigated to insure that the health and safety of the surrounding community is well protected. At the same time, the most cost-efficient method of producing electric power should be utilized.

C.3.8 DE NOX SYSTEM

The demonstration project of the catalytic system (De Nox) for removing oxides of nitrogen from the flue gas of Unit 2 of the Southern California Edison generating station should be closely followed. The equipment and procedures for storing the ammonia used in the process should be carefully checked and monitoring should be conducted for emissions of ammonia. Information from any research programs conducted by Edison to improve the system ought to be shared with the City. At the end of the 6 month test period, the City should re-evaluate the benefits of the project in light of any costs or risks it entails, so that recommendations can be offered to the SCAQMD regarding the system.

C.4.0 CONCLUSION

The foregoing discussion of electrical energy generation in the coastal zone of Huntington Beach illuminates a number of issues that need to be addressed if the goal of energy sufficiency is to be compatible with the health, safety and economic well-being of the City's residents and the proper safekeeping and conservation of valuable coastal resources. In many instances the City has no authority to take actions that it may deem desirable since the power to act often lies with a higher regional or state agency. This does not mean, however, that the City should not be cognizant of all the ramifications of existing and proposed regulations; their scope and the rigor with which they are enforced; their effectiveness and the steps which might be taken to make them more so. The City should develop and utilize its own policies designed to accomplish these ends so that day-to-day decision making reflects the City's long term goals and priorities and so that changes of policy or procedure at other levels of authority may be guided toward an integrated approach consistent with City interests.

Policy recommendations related to electrical generation are developed in Part E with those relating to oil and gas and other energy resources. It is hoped these recommendations will result in a comprehensive strategy to develop, conserve and protect energy, people and the unique environment that is the City of Huntington Beach.

C.5.0. NOTES

1 Letter of May 31, 1979 from Arthur H. Segal, Director of Enforcement.

2 Edison Company Fact Sheet, May 1979

3 Telephone Communication with H. W. Compton, are manager SCE, January 29, 1980.

4 Draft EIR 77-9, Westec Services, Inc., March 1978

5 Environmental Report for the Huntington Beach Combined Cycle Project Units 6-11, Southern California Edison Company, April, 1973 p. 5-34.

6 Ibid, p. 5-35

7 Ibid, p. 5-37-38

8 Huntington Beach Coastal Study, Clair Curtiss and Lynne Deane, Laboratory for Experimental Design, Cal Poly Pomona; June, 1978.

9 Wyle Research Report WCR 74-19 Noise Element Report for the City of Huntington Beach. Wyle Research, El Segundo, California, April 11, 1975 p.74

10 Hearings before the California Energy Commission in Huntington Beach, May 12, 1978.

11 op. cit. Curtiss and Deane

12 Sensitive Habitat Areas Background Report, City of Huntington Beach, 1979

13 Peter Sullivan Conservation News "Versatile Wetlands on Endangered Resources", October 15, 1976.

14 op. cit. Curtiss and Deane

15 California Energy Commission Final Report on the Southern California Edison Company's NOI July, 1979 p. 65

16 Ibid, p. 60

17 Feasibility of Expansion of Existing Coastal Zone Power Plants, California Energy Commission, Sacramento, California, Sept. 1979, p. 59

18 Ibid, p. 102

19 Ibid, p. 103

20 Written communication from H. W. Compton, area manager SCE, October 17, 1979

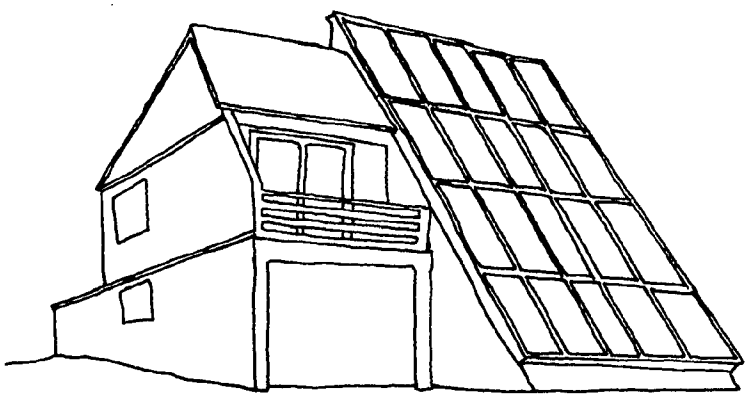
21 Oral communication with H. W. Compton, area manager, SCE October 23, 1979

22 Written communication from H. W. Compton, area manager SCE, October 17, 1979

23 Telephone Communication with H. W. Compton, area manager SCE, November 14, 1979

SOLAR ENERGY AND CONSERVATION

Part D



SOLAR ENERGY AND CONSERVATION

D.1.0 NATIONAL ENERGY TRENDS

Americans have continued their dependence upon foreign sources of energy at the same time that a volatile political climate throughout the world makes the reliability of foreign supplies increasingly uncertain. The reliance on foreign suppliers for so vital a resource as energy has constrained our international political options and may affect our national security.

The nation imports more than 50 percent of the oil it consumes. These massive imports have caused a major imbalance in trade between the U.S. and other nations, which in turn has caused a substantial reduction in the value of the dollar in the world marketplace.

To counteract this, the past three Presidents have pursued policies aimed at energy independence -- policies that have been clearly unsuccessful.

Nonetheless, Americans have begun to change their energy habits because of the rapidly escalating costs of energy. It is increasingly apparent that conservation and the use of "unconventional" energy sources will be important to our energy future. Recent changes in the State Public Utilities Commission's definition of the role utility companies are to play in energy supply reflect the emphasis on new approaches to energy supply. Recognizing the exorbitant costs of building new power plants and high fuel costs, the Commission has begun to direct utility companies to support conservation and the use of renewable energy sources, like solar.

D.2.0 SOLAR ENERGY TECHNOLOGIES

Solar technologies are usually applied to individual structures rather than at a centralized regional facility like a power plant. This decentralized approach to energy supply is quite different from traditional strategies which involved large-scale, centralized energy sources, managed by the utility companies. Because solar technologies are applied at such a dispersed level, local governments can play substantial roles in encouraging their use. Cities traditionally regulate land use, building set backs, structure design and other factors relevant to the siting and construction of buildings. As will be discussed again below, these factors are crucial to the use of solar energy.

A significant amount of solar technology in individual homes has already been demonstrated in California.[1] In coastal areas of the State, very little additional energy is needed for heating and cooling if, through proper design and construction techniques, builders maximize use of the sun for heating and natural breezes for cooling. "Passive solar design" refers to buildings designed to use the sun for heating and other natural methods for cooling without special solar structures.

"Active solar design" refers to special mechanical equipment for the collection and distribution of heat (eg. solar panels, pumps, etc.). This has gained increased popularity with builders and consumers due to the burgeoning costs of conventional heating and cooling systems.

The solar water heater is proving to be one of the most cost effective applications of solar energy. It is estimated that domestic water heating consumes four percent of the total national energy budget. In California, solar water heating systems can supply 50 to 100 percent of the energy necessary for water heating, depending upon the local climate.[2] The climate in coastal areas of California provides ideal conditions for utilization of solar water heating systems. This is reflected by the growing number of cities and counties along the coast that have recently implemented ordinances mandating the use of solar water heating systems.

In anticipation of future electricity and natural gas shortages it is in the best interests of local governments to encourage the utilization of both passive and active solar systems. There are a variety of reasons for the growing popularity in the use of solar energy. Certain passive space conditioning designs and active water heating systems are technologically mature, readily available and cost effective when compared to the use of electricity and natural gas from new supply sources.

In addition, solar technology provides a number of less quantifiable economic and social benefits which were recently listed in a joint publication of the League of California Cities and California Energy Commission.[3] They are as follows:

> Solar energy is a renewable resource. Unlike oil, natural gas or coal, solar energy will always be available. The use of solar systems will allow the state to reduce its dependence on nonrenewable resources and allocate those scarce resources to applications for which there are no adequate substitutes.
>
> Solar energy is an exceptionally clean, safe and environmentally sound resource. These attributes represent a powerful advantage over nonrenewable fuels and must be considered in decisions to commit resources to solar energy. Increased use of solar energy would reduce dependence upon those conventional energy sources which cause serious environmental and safety concerns.
>
> Once a solar system is installed, the user is less subject to unpredictable fuel price increases. With the possible exception of maintenance and replacement costs, solar systems provide cost stability for their users. This cost stability is important to consumers and businesses and particularly beneficial to citizens on fixed incomes. The economic health of the state can be greatly improved if such a secure source of inflation-free energy is provided.
>
> Since the end use of applications of solar thermal energy are decentralized, it creates few of the cost and environmental problems which are associated with large-scale development of new oil and gas supplies or electric power plants. In addition, when solar thermal energy is substituted for electricity or natural gas, the thermodynamic quality of the energy is closely matched to its end use and additional peak period transmission and generation costs are reduced or eliminated.

The widespread development of the solar industry has significant potential to create jobs for Californians. This industry is relatively labor intensive (per unit of delivered energy) when compared to conventional energy delivery systems. Studies of solar job potential have been performed by the Lawrence Berkeley Laboratory, the Employment Development Department and the California Public Policy Center and these studies are in general agreement on this potential. Moreover, these newly created jobs will generally not require individuals with extensive technical training. Thus solar energy's greatest beneficial impact on the labor market will probably fall in the construction and trade sectors.[4]

D.2.1 PASSIVE SOLAR DESIGN

In terms of residential construction, the greatest opportunity for wide scale use of solar heating and cooling is through passive design.

Since the advent of inexpensive energy, it has been taken for granted that cooling must be done by an air conditioner and heating by a furnace. Before such energy was available, however, structures were built to maximize the use of climatic heating or cooling to maintain comfortable indoor temperatures. This is the principal behind passive design.

Technologies and design knowledge exist today to make every house constructed a "solar house", with little or no extra cost for materials or loss of design freedom.

It has been estimated that in Orange County 85-95 percent of heating and cooling needs could be met by passive solar systems in typical tract-type homes.[5]

The following excerpt from a report by the Western Solar Utilization Network describes the principal ways passive design utilizes solar energy:

> Passive buildings are designed to collect winter sunlight through large areas of south-facing glass (glazing), to store large quantities of heat in interior walls and floors made of dense materials such as concrete or adobe (thermal mass), and to distribute the heat by radiation or convection. Passive systems take advantage of the fact that heated fluids (any gas or liquid such as air or water) rise while cooled fluids sink, thereby creating movement/circulation of the fluids....Passively-cooled buildings utilize the same building design principles as in passive heating....Properly placed windows provide for the circulation of cool evening breezes removing the heat which has accumulated in the storage materials during the day. Overhanging eaves are used to shade south-facing glazing when the summer sun is more directly over-head. Insulated window shutters and shade trees on the east and west sides of the buildings as well as deciduous trees on the south side all contribute to keeping the building cool. Wall and ceiling insulation prevents heat gain on hot days (and heat loss on cold days).[6]

D.2.2 ACTIVE SOLAR DESIGN

Active solar systems collect the sun's energy in one place and then transfer it with pumps or other devices to a separate storage area. These systems are more expensive than passive solar systems, but are cost competitive with electricity and, in some coastal areas of California, even with gas. They are particularly well-suited for space heating in colder areas and for water heating in almost all areas, but they can provide only limited cooling.

D.2.3 SOLAR ACCESS

As interest in solar energy has increased, protection of access to sunshine has become a central issue. A solar system cannot be successfully designed and operated without proper access to the sun. Various elements of site design (e.g., street orientation, placement of vegetation, building setbacks, height restrictions) will influence solar access.

California has passed enabling legislation which allows local governments to incorporate solar access considerations into land use planning and requires that a City provide for such access in its subdivision ordinance to the maximum extent feasible. A number of different regulatory options are presently available to local jurisdictions for protection of solar access.

D.3.0 GOVERNMENTAL SUPPORT OF SOLAR ENERGY

A major contribution to the recent interest in solar energy has been a broad range of programs sponsored by the State and Federal governments. The major programs are outlined below:

D.3.1 CALIFORNIA SOLAR RIGHTS ACT OF 1978

The "Solar-Rights Act" (A.B. 3250, 1978) requires that tentative subdivision maps (except condominium conversions) provide to the extent feasible, for the future natural heating and cooling opportunities in the subdivision. The act authorizes local governments to require by ordinance the dedication of easements for the purpose of assuring each subdivision parcel or unit the right to receive sunlight across adjacent parcels in the subdivision.

D.3.2 FEDERAL ENERGY ACT OF 1978

Among the many provisions in the Act are measures designed to promote solar energy use. These include:

1. Deregulation of natural gas prices by 1985 with gradual price ceiling increases up to that time. This measure is expected to make solar energy much more economically attractive in comparison to gas.

2. Loan programs for solar energy and energy conservation: $100 million will be provided for loans up to $8,000 to individual homeowners and builders to purchase and install solar equipment. Another $5 billion in loan funds will be provided for energy conservation measures.

3. Residential insulation and conservation tax credits covering up to $300, or 15 percent, of the first $2,000 expended on insulation or other conservation equipment.

4. Residential solar tax credits covering 30 percent of the first $2,000 expenditure and 20 percent of the portion of expenditures from $2,000 to $10,000. The maximum federal credit thus available is $2,200 on an expenditure of $10,000 or more.

5. A 10 percent tax credit for businesses that invest in energy equipment including solar heating, cooling, and electric systems.

6. A utility conservation program that requires utilities to offer energy audits to residential customers. These audits will identify appropriate solar energy and energy conservation measures for residences and estimate their costs and benefits. Utilities must also have programs to arrange for installation and financing of these measures.

7. Funding to local public buildings for energy audits; $65 million will be provided to cover up to 50 percent of the cost of identification and evaluation of appropriate energy conservation and solar energy measures.

8. Grants to schools and hospitals for energy audits and installation of energy-saving measures; $900 million will be distributed for up to 50 percent of the audit and installation costs for measures including solar technology.

9. A $100 million expenditure for solar heating and cooling equipment and a $98 million expenditure for photovoltaic solar electric systems for use in federal buildings.

D.3.3 STATE TAX INCENTIVES

The State of California has passed legislation that permits the owner of a single family home that uses solar systems to receive an income tax credit of $3,000 or 55 percent of solar equipment and installation cost (whichever is less).

Commercial and multi-family developments whose solar system costs exceed $6,000 can receive an income tax credit for $3,000 or 25 percent of the solar equipment and installation cost (whichever is greater).

D.3.4 LOCAL GOVERNMENT INITIATIVE IN SOLAR PLANNING

Local governments, particularly those in California, are becoming very active in solar energy planning and utilization. The state's local governments have pioneered a wide range of policy innovations, including local energy commissions and committees; energy advisors and coordinators; solar-related general plan elements; solar policies, codes and ordinances; and public education and outreach programs. Many of the state's local jurisdictions have also incorporated solar designs and systems into their own facilities. All of this, thus far, has resulted in a substantial energy savings for the state.

In 1978 at least 36 cities, 12 counties, and 5 regional agencies in California have undertaken solar-related programs ranging from the adoption of general plan elements encouraging the use of alternative energy sources to ordinances requiring the construction of passive and active solar systems. Some of the major energy programs which have been developed by local jurisdictions in California are briefly described below:

City of Davis: Davis' comprehensive energy conservation performance standards for residential structures have been in effect and continually refined for a number of years. The Davis energy conservation building code is the most widely known feature of a nationally known energy program. The city is the site of two privately developed "solar" subdivisions, and is involved in the development and construction of seven demonstration solar homes. Davis residents have approved a bond measure which will fund the "solarization" of the city's swimming pools.

City of Santa Clara: The City of Santa Clara has initiated a number of solar use programs. The most successful has been a service offered through its municipal utility which installs solar swimming pool heaters as a special service to its customers . The city owns the solar equipment and maintains it for the customers, charging an installation and monthly service fee.

Santa Clara County: The Santa Clara County Board of Supervisors recently adopted an ordinance requiring solar water heating for all residential domestic use. The ordinance requires solar water heating systems for all new construction. In addition, existing residential buildings must be supplied with solar hot water systems within 100 days after the title has passed on resale.

To complete its energy program, Santa Clara County is also working on the following:

1. An Energy Element to the General Plan.

2. A Solar Access ordinance for new development.

3. An ordinance restricting the use of natural gas heating for residential swimming pools.

4. An ordinance requiring an energy audit of residences at the time of deed transfer and the use of minimum energy conservation measures.

San Diego County: The San Diego County Board of Supervisors adopted the nation's first solar water heating ordinance, which requires that solar water heating be used in all new subdivisions, even if natural gas is available. San Diego County's energy program also includes a new energy element to the general plan and a solar access ordinance defining a "solar envelope" around each piece of property to protect solar access.

D.4.0 CONCLUSION

The escalating cost of conventional fuels is making the use of solar energy economically viable, especially for residential energy needs. As one home builder noted in regard to a "solar house" he had recently constructed in Huntington Beach: "The (solar) system takes care of 60 to 100 percent of the home's heating needs...I feel solar is definitely the wave of the future..."[7]

Some of the most attractive solar technologies are applied to individual homes or other structures. They require "access" through the orientation, location and spacing of structures. Local governments generally regulate these kinds of planning considerations. Thus, local governments can play an important role in accommodating and encouraging the utilization of solar technology. Many California cities and counties have already begun revising their land use and building regulations to this end. Huntington Beach should review its own regulations to see if they can accommodate the needs of solar technologies and should investigate changes which can further encourage the use of this energy resource.

D.5.0 NOTES

1. See: Western Solar Utilization Network, Capturing the Sun's Energy: Opportunities for Local Governments, 1979; and League of California Cities and the California Energy Commission, Solar Handbook for Local Government Officials, 1978; and California Energy Commission, Solar Access a Local Responsibility, 1978.

2. op. cit. Solar Handbook

3. Ibid.

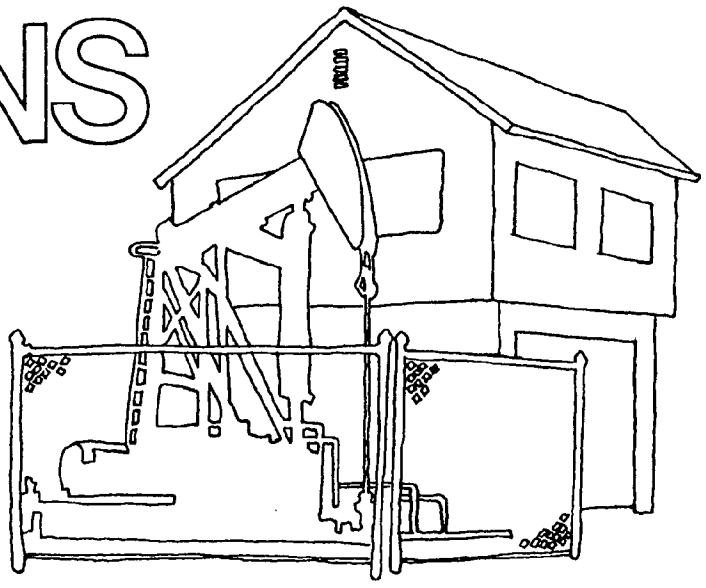
4. Ibid.

5. op. cit. Solar Access

6. op. cit. Capturing the Sun's Energy

7. Perkins, Gail, "The House of the Rising Sun", Southern California Home Buyers Guide, January, 1980; page 29.

RECOMMENDED POLICIES AND ACTIONS



Part E

This part of the CEIP report recommends policies and actions to the City for inclusion in the Local Coastal Plan and summarizes the rationale behind the recommendations.

E.1.0 LOCAL INPUT ON REGIONAL ENERGY ISSUES

Most energy facilities serve greater-than-local communities. Many also involve highly technical processes which local governments cannot continually monitor and evaluate. For both of these reasons, regulation over many energy issues has passed from the local government to State and federal agencies.

Nonetheless, energy facilities can profoundly affect the community in which they locate. The City has a stake, consequently, in participating in decisions about energy issues which affect Huntington Beach.

The following policy and related actions are intended to enable the City to monitor energy issues affecting its interests, and to act more effectively with other agencies in promoting the beneficial effects of energy activities and mitigating their adverse impacts.

E.1.1 GENERAL POLICY AND ACTIONS REGARDING INTERACTION WITH OTHER LEVELS OF GOVERNMENT

Policy I-1: Establish the interaction and coordination with other levels of government as a City function for energy-related issues affecting the City of Huntington Beach.

Action I-1-a: Identify more completely the State and federal agencies with control or influence over energy issues and the role each plays in resolving those issues.

Action I-1-b: Identify the "access points" for local input in the planning and decision-making processes of State and federal agencies involved with energy issues.

Action I-1-c: Monitor energy activities that could affect Huntington Beach by 1) joining mailing lists of relevant State and federal agencies, 2) commenting on EIR's, EIS's, call-for-nominations for OCS tract selections and other reviews, 3) periodically meeting with major energy companies in the City.

E.1.2 OIL SPILLS

Oil spills are among those important energy-related impacts which are largely the responsibility of regional and federal agencies. Nonetheless, very valuable resources in the City's coastal zone can be adversely affected by spills. In addition, City personnel and equipment are often involved in spill clean-up activities either directly or in a support role. The City should review spill contingency plans and identify municipal roles (implied or explicit) in a spill emergency. It should also ensure that the spill plans have adequately considered particularly valuable resources in the coastal zone. The City should continue to cooperate with the Coast Guard in its efforts to protect the beaches of the area from oil damage.

Action I-2-a: Inventory and review existing oil spill plans and identify the role of the municipality (if any) in each.

Action I-2-b: Evaluate spill plans to see if they recognize especially sensitive areas in the City, including Huntington Harbor, the wetlands, the Santa Ana River mouth and the Least Tern Nesting Area, and if they include measures to protect these in case of a major spill; petition relevant agencies to amend spill plans if the plans lack such measures.

Action I-2-c: Cooperate with the U.S. Coast Guard in the Local Response Team by providing personnel and equipment in an oil spill emergency.

Even relatively small spills can threaten valuable coastal resources and can require action by the City and by the regional agencies charged with containment and clean-up. In order for the City and the regional agencies to understand the extent of the oil spill problem and to adequately plan for all spill emergencies, a good monitoring and record-keeping system is needed to provide data such as the frequency, size, source and impacts of spills. Many spills are probably not reported to the Regional Water Quality Control District, which is responsible for compiling information on oil spills in Huntington Beach. In addition, the distance of the regional offices from this area (they are in Riverside) may impede complete data collection. The City should therefore determine whether inadequacies in the current monitoring and record-keeping system are significant enough to warrant a local oil spill monitoring system.

Action I-2-d: Investigate the adequacy of the Regional Water Quality Control District's information on oil spills in Huntington Beach and, if necessary, establish a City monitoring and record-keeping system.

Action I-2-e: Investigate the possibility of obtaining funding or compensation for activities related to the prevention, monitoring and clean-up of oil spills.

E.1.3 OUTFALLS

The waters near the oil company outfalls are periodically tested by the County Health Agency; actual effluent from the pipes is regulated by the Regional Water Quality Board and monitored by the companies. Considering the proximity of these outfalls to heavily used recreation beaches, the monitoring and testing practices should be as comprehensive as feasible.

Action I-3-a: Assess the adequacy of the existing monitoring of the oil company outfalls and, if found inadequate, establish a City monitoring program to help ensure that public health, safety and welfare are not jeopardized by their discharges.

E.1.4 SOLAR ENERGY INCENTIVES

The State and federal governments provide aid to local communities to encourage the use of solar energy. The City should investigate these opportunities and take advantage of them if appropriate. The City should also be aware of incentives to individuals and businesses so that staff can consider them in planning and building review processes and so that the City can guide interested parties to these programs.

Action I-4-a: Inventory existing credits and incentives regarding solar energy and conservation available to individuals, businesses and the City from State and federal governments.

E.1.5 MUNICIPAL INTER-DEPARTMENTAL COOPERATION AND IMPROVED RECORD-KEEPING

In order to increase the City's effectiveness in influencing energy issues, the City staff must coordinate their own activities and improve their data base.

Action I-5-a: Increase coordination among municipal departments charged with different aspects of energy planning and regulation, and establish a common data base for all departments involved with energy issues.

The City's data regarding the location status and ownership of oil facilities in Huntington Beach are contradictory and may be out of date. Research for this report also revealed significant discrepancies between the City and State records of these matters. Considering the potential environmental, safety, and aesthetic impacts of these facilities as well as their potential revenues, improved record-keeping is recommended.

Action I-5-b: Identify the location, status and ownership of all wells and tanks in the City; account for discrepancies between State and City records regarding number, location sand status of wells.

E.2.0 ENCOURAGING ENERGY PRODUCTION AND NEW TECHNOLOGY

Huntington Beach has traditionally played an important role in supplying energy to this region. The importance of energy to the local community as well as to the State and nation argues that these vital energy facilities be accommodated in the future and that new technology which increases energy supplies or makes them less expensive should be encouraged. At the same time, the City must consider adverse impacts on the environment and on the public welfare, and must balance energy goals with other goals, especially in coastal zone.

E.2.1 ENERGY PRODUCTION

Policy II-1: Encourage the production of energy resources as efficiently as possible with minimal adverse impacts.

E.2.2 NEW TECHNOLOGY

Considering how vital reliable energy sources are to the region and nation, the City should encourage new energy technology so long as critical environmental and public welfare considerations are protected.

Policy II-2: Support the research and development of new energy technologies so long as public health, safety and welfare are not jeopardized and environmental impacts are mitigated to the maximum possible extent.

E.2.3 TERTIARY EXTRACTION TECHNOLOGY

Advanced or "tertiary" oil recovery methods are new technologies whose impacts may be different from those of conventional extraction. The City should encourage these technologies, but must also ensure that adverse impacts are anticipated and mitigated as much as possible.

Policy II-3: Require permits for "tertiary" recovery activities to ensure the evaluation of impacts different from those associated with conventional extraction.

Action II-3-a: Study advanced recovery methods likely to be employed in the Huntington Beach field and their potential impacts; consider establishing a permitting system for these new activities.

E.2.4 NEW POWER PLANT-RELATED TECHNOLOGIES

Chemicals used in new pollution control technologies and new fuels at the power plant may pose unanticipated handling and storage problems. Again, the City should encourage better energy-related technology, so long as potential adverse impacts are adequately considered.

Policy II-4: Require the mitigation of adverse impacts from new technologies employed in electricity generation where feasible.

E.2.5 SOLAR TECHNOLOGY

The value of this "non-conventional" energy source and its feasibility in this area warrants efforts by the City to encourage its use.

Policy II-5: Promote the use of solar energy and encourage energy conservation.

Action II-5-a: Study the desirability and feasibility of adding an "energy element" to the General Plan.

Action II-5-b: Study the feasibility of new City ordinances regarding 1) solar access and orientation, 2) solar water heating requirements for new developments, 3) the limited use of conventional fuels for heating swimming pools, 4) requirements for "weatherization" and other minimum conservation measures, 5) energy audits of buildings at time of deed transfer.

E.3.0 COMPATIBILITY AND THE EFFICIENT USE OF COASTAL RESOURCES

Residences, commerce, recreational activities and sensitive environmental habitats are located in the Huntington Beach coastal zone along with energy facilities. The following policies and actions aim to accommodate multiple uses in the coastal zone, to improve compatibility among uses and to increase efficient use of limited coastal resources.

E.3.1 COMPATIBILITY BETWEEN OIL FACILITIES AND OTHER USES

The high price of oil and the development of new technologies will apparently prolong the widespread use of oil equipment in Huntington Beach. As land near the coast continues to be developed, other land uses will be pressed closer to oil activities. The City should develop policies which ensure the compatibility among different activities on safety and aesthetic criteria.

Policy III-1: Promote increased compatibility of oil parcels with surrounding uses.

Action III-1-a: Review the City Oil Code to see that it contains adequate measures to protect public safety; where necessary recommend improvements to the City Council.

Action III-1-b: Review the City Oil Code to see that it contains adequate measures to ensure aesthetic compatibility between oil activities and other uses, and consider additions regarding fencing, planting and landscaping.

Action III-1-c: Review monitoring and enforcement of the City Oil Code and Noise Ordinance as related to energy operations to determine their effectiveness in governing energy operations and where necessary recommend improvements to the City Council.

E.3.2 UNITIZATION AND CONSOLIDATION AND SITING PRIORITIES

Unitization and consolidation help to reduce the amount of land used for oil activities, which is a more efficient use of this valuable coastal resource.

Policy III-2-a: Encourage unitization and consolidation when such activities 1) reduce the area used for oil facilities, 2) are not more environmentally disruptive than existing arrangements and 3) do not jeopardize public health, safety or welfare.

The following siting priority requires consolidation of new oil facilities either in existing islands or on other oil parcels, where possible. This practice concentrates the adverse impacts of oil facilities which tends to make mitigation strategies easier and less expensive. Where consolidation or clustering is infeasible, new sites outside the coastal zone are generally preferred over new sites within the coastal zone. This reflects the special value of the coastal zone for other competing uses. In all cases, environmental impacts, public safety and welfare, and aesthetic considerations must be taken into account in choosing the site for new facilities.

Policy III-2-b: Adopt the following priority for siting new oil-related facilities, provided that in each case a) the new activities are adequately screened and buffered from surrounding uses, b) adverse environmental impacts are mitigated to the maximum extent feasible, c) the activities do not jeopardize public health, safety or welfare, d) there is no other feasible location which is less disruptive:

1) existing consolidated islands (including the entire Aminoil lease)
2) new consolidated islands
3) existing oil parcels
4) new parcels outside the coastal zone
5) new parcels within the coastal zone.

E.3.3 SEPARATION PLANTS

New separation plants should be built only if it is infeasible to utilize excess capacity in existing facilities. This policy encourages unitization and consolidation, which are more efficient uses of land and equipment.

Policy III-4: Approve construction of new separation and treatment facilities only if it is infeasible to utilize the excess capacity of existing facilities.

E.3.4 TANK FARMS AND DIKE SYSTEM FAILURE

It is conceivable that a catastrophic event, such as a flood or earthquake, which could damage tanks, could also damage the diking systems around the tanks. In that case, large amounts of oil could flow off the sites into surrounding areas. The damage could be severe, especially if the oil catches on fire. Although such an event is highly unlikely, the City should investigate the tank farm sites, and determine the likely flow patterns if the dike system failed, and if necessary, establish special evacuation or other contingency plans to help assure public health and safety in case of such a catastrophe.

Action III-4: Review the tank farms and the surrounding areas to evaluate possible impacts in case of dike system failure and determine if evacuation and other contingency plans specific to these areas should be developed.

E.3.5 WELLS ON THE BEACH

The wells and related facilities on the ocean side of Pacific Coast Highway present special compatibility problems. The wells detract from the recreational beach atmosphere; the pipes along the bluff tops impede access to the beach below. New wells or redrilling from existing sites should be permitted only under very restrictive conditions. Removal of the existing wells is economically infeasible at this time, but the City should investigate ways to improve the aesthetics of these facilities and to improve access over the pipelines to the beach.

Policy III-5: Approve new wells or redrilling on the ocean-side of Pacific Coast Highway only if 1) the resources are not recoverable from any other onshore location or existing platform, and 2) the site is improved to become compatible with recreation uses of the beach, and 3) public health, safety and welfare are not jeopardized, and 4) adverse environmental impacts are mitigated to the maximum extent feasible.

Action III-5-a: Pursue strategies with the State and the oil companies to improve the appearance of existing oil wells and related facilities on the ocean-side of Pacific Coast Highway.

Action III-5-b: Pursue strategies with the State and the oil companies to provide safe access from Pacific Coast Highway to Bolsa Chica State Beach.

E.3.6 NEW OFFSHORE PLATFORMS

New offshore platforms may be built near Huntington Beach. Platforms detract from the view of the ocean and Catalina Island and may pose obstacles to shipping. For these reasons, the City should discourage new platforms unless existing platforms or onshore sites cannot be used. For the most part, regulation of these platforms lies beyond the local jurisdiction and City action is limited to commenting on EIR's and other reviews. However, the City can regulate pipelines from the platforms if they come ashore in Huntington Beach. The City can use its regulation over landfalls and pipelines to help discourage new platforms, except when necessary. (Of course, this is only a limited "tool"; all platforms may not be connected to Huntington Beach by pipelines.)

Policy III-6: Approve pipelines from new offshore platforms only when it is infeasible to use either existing onshore or offshore facilities or new facilities on the onshore leases.

E.3.7 SAFETY OF OIL DRILLING ACTIVITIES

Accidents involving oil drilling and production facilities can result in oil spills, fires and other adverse impacts. For the most part, the safety of drilling activities is the responsibility of State and federal agencies. The City should cooperate with these agencies and support their efforts to ensure the safety of oil activities.

Policy III-7-a: Support efforts by the U.S. Geological Survey and by the State Division of Oil and Gas to ensure the safety of oil extraction and related activities onshore and offshore.

Policy III-7-b: Support efforts by the U.S. Coast Guard and the Army Corps of Engineers to protect marine traffic safety while accommodating offshore oil development.

E.3.8 EDISON EXPANSION AND VISUAL AESTHETICS

The power plant presents a stark industrial picture to the City's coastal zone. The City should require, as a condition for any plant expansion or new construction, a screening plan to improve the visual compatibility of the plant with surrounding activities.

Policy III-8: Require development of an overall screening plan with appropriate landscaping before permitting any expansion of the Edison power plant.

E.3.9 NEW USES ON OIL FIELDS

Vacant land in urban Southern California, especially in coastal areas, is becoming increasingly scarce and valuable. Oil fields will be sources of this valuable land as they "recycle" from oil activities to other uses. Planned development of large oil parcels during this "recycling" process allows for a more efficient utilization of land and energy and better integration of uses (such as oil and housing) than piecemeal development.

Policy III-9-a: Encourage planned development of large oil parcels; discourage piecemeal recycling of oil parcels.

Where possible, dual uses of oil field surfaces areas should be encouraged because, again, this is a fuller, more efficient use of valuable land. Examples of such uses (like the Seacliff golf course around oil islands) exist in Huntington Beach already.

Policy III-10-b: Encourage dual-uses of oil field surface areas so long as 1) new uses and oil activities are compatible, and 2) access to underground zones can be accommodated by the new use.

E.3.10 NEW USES ON THE ROTARY MUD DUMP

The rotary mud dump on Hamilton Street is a valuable property which might be used for new activities which take better advantage of its location in a suburban coastal community. However, there is increasing concern about harmful substances in old disposal sites which can be dangerous to people, playing living or working on the sites after they have been filled and redeveloped. Thus, the City should encourage new and better uses of this property, but only if concerns over harmful deposits have been adequately addressed.

Policy III-10-a: Encourage the conversion of the rotary mud dump to new uses if the contents of the dump are found not to be dangerous to public health, safety and welfare, or if all harmful deposits are decontaminated.

Policy III-10-b: Require an analysis of the contents of the rotary mud dump before new development on the site will be permitted.

E.4.0 ACCESS TO UNDERGROUND RESOURCES

Continued domestic oil supplies carry special greater-than-local significance. New technologies are being developed which will be able to remove more oil from old fields. The escalating price of oil is making these technologies economically feasible, too. However, it will be impossible or very expensive to apply new technologies unless access to the underground resources is preserved and other uses on oil field surface areas are planned with the possibility that oil activities may be resumed in the future.

Policy IV-1: Consult with the oil companies and the State Division of Oil and Gas on development proposals for areas previously devoted to oil extraction to determine the importance of the site for future oil field access; if the importance of the site is fully ascertained and documented, provision to retain access and to compatibly accommodate future oil activities shall be incorporated into the site plan review process.

E.5.0 TANKER OPERATIONS

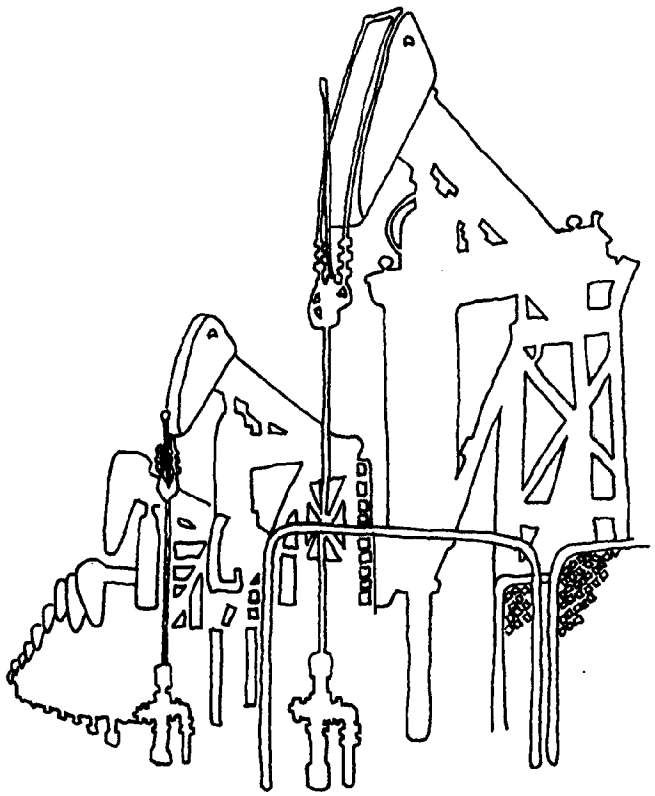
Tanker operations can be a source of many small-scale oil spills; a serious accident could result in a major spill. Frequent loading and unloading of tankers tends to spill more oil than when the oil is transported by pipeline.

Considering the high recreational value of this area's shoreline and the vulnerability of special environmental habitats, increased tanker operations should be encouraged to locate in other areas which do not have such sensitive recreation and environmental resources.

Policy V-1: Discourage the expansion of existing tanker unloading operations because of the threat increased activities pose to recreational activities and sensitive habitats in the area, and encourage the use of Long Beach and Los Angeles ports for new tanker operations.

Policy V-2: Encourage the use of pipelines rather than tankers, where feasible, to transport OCS products to shore.

CONCLUSION



Part F

F.1.0 NEXT STEPS IN COASTAL ENERGY PLANNING

F.1.1 COMPLETING THE LCP

For Huntington Beach, the next step in coastal energy planning will be the completion of the City's Local Coastal Plan (LCP). The LCP will include an "Energy Section" which will summarize the issues raised in this background report. These energy-related issues are considered with other coastal concerns such as recreation, environmental protection and new development in the context of the opportunities and constraints in the City's coastal zone. In this way, an integrated plan is being developed which attempts to accommodate diverse coastal goals within the limits of the City's coastal resources.

The land use plan and related policies of the LCP will be finished early in 1980. The remainder of the year will be spent conducting the more specific studies recommended in the background reports, and preparing the zoning changes and new ordinances needed to implement the plan. Many of these studies and new ordinances will be related to energy activities. For example, the City will prepare reports on several subjects including: the role of the City in regional energy issues, ways to increase compatibility in Huntington Beach between oil facilities and other nearby uses, and the impacts of tertiary recovery methods. The existing Oil Code and Noise Ordinance will be reviewed. Very likely, recommendations will be made to improve these ordinances and to incorporate the policies of the LCP into the existing permitting procedures. In addition, a new permitting process will probably be recommended for tertiary extraction methods, so that the City can more closely monitor the impacts of these new activities. By January, 1981, all of these implementing measures will be completed. In the future, the LCP should be the principal tool through which the City will regulate land uses, including energy activities, in the coastal zone.

F.1.2 BELLWETHERS FOR THE FUTURE

Huntington Beach will remain a center for oil-related activities for at least two decades. However, the intensity of these activities during that time and their actual longevity will depend on whether higher oil prices and new technologies can rejuvenate the oil field. At this time, it is especially difficult to predict the future of oil activities in this area. However, the City can expect certain "bellwether" events to occur during the next few years which will help indicate more clearly the facilities which will be used to develop the field further and how long they will remain here.

Later this year the Department of the Interior will announce the tentative tract selection for OCS sale #68; the actual lease-sale will be held in 1982. In the early 1980's, production from Shell's Beta Unit will begin and exploration in the San Pedro Bay will continue. The interest shown for San Pedro tracts in Lease Sale #68, the productivity of Shell's facilities and further OCS exploration activities will help indicate how intensively this offshore area will be developed and whether Huntington Beach will once again be considered as a site for onshore support facilities.

In 1981 or 1982, results from both Chevron's and Aminoil's pilot tertiary programs will be known. The results of these experiments may indicate how widespread tertiary methods will be applied here. This will be a principal factor in determining how long extraction facilities in the coastal zone will be active and how intensively the field can be further developed.

In the early-1980's, the City should begin to monitor Aminoil's offshore steam pilot program. If this program is successful, the company will probably propose another platform for State waters. Also, Union may apply to the State Lands Commission during this decade to redrill wells and begin flooding operations from their offshore platform. This program could involve new pipelines and onshore separation equipment. A successful flooding program in certain offshore zones may not only require redrilling from Union's platform but might even require a new platform.

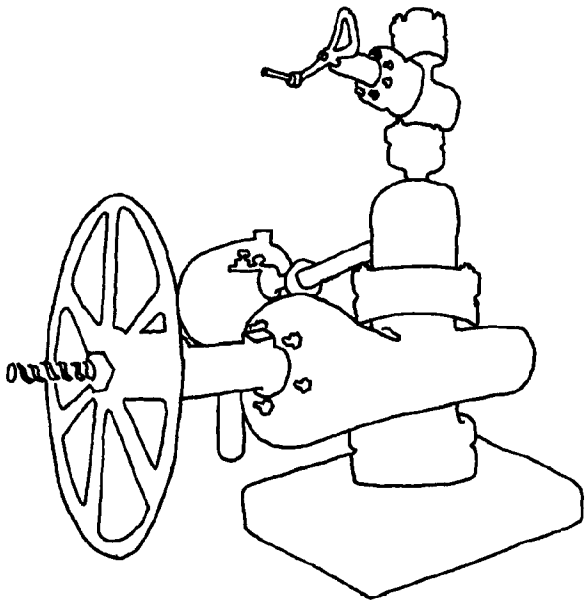
The City should also be aware of possibility for proposals during this decade to establish a "unitization" and water flood program in the oil field south of Goldenwest Street. Such a program could greatly lengthen the lives of "independent" wells in the City.

Although oil extraction will clearly be the most dynamic energy-related activity in the City during the next several decades, new facilities or technologies may be applied at the power plant as well. Recent studies by the Energy Commission indicate that Huntington Beach will probably not be the site of a major power plant expansion. However, other (perhaps less dramatic) changes will take place at that facility. A new pollution control device will be tested at the Edison plant during 1981. Hopefully, this will result in cleaner air; but other possible impacts (for example, from the storage of chemicals used in the device) may occur as well. Also during this decade, fuels derived from coal may be used at the plant. The transportation and storage of these substances may pose problems different from those of conventional fuels. In both of these cases, the City has a stake in monitoring the activities and to ensure that the interests of the local community are adequately considered before changes are implemented.

In still another energy sector, solar technology will probably become increasingly viable in this area during the 1980's. The City can play a crucial role in encouraging the use of this valuable energy source.

In conclusion, the City and its coastal zone will continue to be involved with energy supply. The variables affecting energy activities are especially volatile at this time and there is no clear view into the future. But by carefully monitoring key events, the City will be able to plan effectively for new energy activities and their impacts and can help make continued use of this area for energy activities beneficial to the local community as well as to the region and the nation.

APPENDICES



Part G

G.1.0 COASTAL ACT POLICIES RELATED TO ENERGY FACILITIES

30255. Coastal-dependent developments shall have priority over other developments on or near the shoreline. Except as provided elsewhere in this division, coastal-dependent developments shall not be sited in a wetland.

30260. Coastal-dependent industrial facilities shall be encouraged to locate or expand within existing sites and shall be permitted reasonable long-term growth where consistent with this division. However, where new or expanded coastal-dependent industrial facilities cannot feasibly be accommodated consistent with other policies of this division, they may nonetheless be permitted in accordance with this section and Sections 30261 and 30262 if (1) alternative locations are infeasible or more environmentally damaging; (2) to do otherwise would adversely affect the public welfare; and (3) adverse environmental effects are mitigated to the maximum extent feasible.

30261. (a) Multicompany use of existing and new tanker facilities shall be encouraged to the maximum extent feasible and legally permissible, except where to do so would result in increased tanker operations and associated onshore development incompatible with the land use and environmental goals for the area. New tanker terminals outside of existing terminal areas shall be situated as to avoid risk to environmentally sensitive areas and shall use a monobuoy system, unless an alternative type of system can be shown to be environmentally preferable for a specific site. Tanker facilities shall be designed to (1) minimize the total volume of oil spilled, (2) minimize the risk of collision from movement of other vessels, (3) have ready access to the most effective feasible containment and recovery equipment for oilspills, and (4) have onshore deballasting facilities to receive any fouled ballast water from tankers where operationally or legally required.

(b) Only one liquefied natural gas terminal shall be permitted in the coastal zone until engineering and operational practices can eliminate any significant risk to life due to accident or until guaranteed supplies of liquefied natural gas and distribution system dependence on liquefied natural gas are substantial enough that an interruption of service from a single liquefied natural gas facility would cause substantial public harm.

Until the risks inherent in liquefied natural gas terminal operations can be sufficiently identified and overcome and such terminals are found to be consistent with the health and safety of nearby human populations, terminals shall be built only at sites remote from human population concentrations. Other unrelated development in the vicinity of a liquefied natural gas terminal site which is remote from human population concentrations shall be prohibited. At such time as liquefied natural gas marine terminal operations are found consistent with public safety, terminal sites only in developed or industrialized port areas may be approved.

30262. Oil and gas development shall be permitted in accordance with Section 30260, if the following conditions are met:

(a) The development is performed safely and consistent with the geologic conditions of the well site.

(b) New or expanded facilities related to such development are consolidated, to the maximum extent feasible and legally permissible, unless consolidation will have adverse environmental consequences and will not significantly reduce the number of producing wells, support facilities, or sites required to produce the reservoir economically and with minimal environmental impacts.

(c) Environmentally safe and feasible subsea completions are used when drilling platforms or islands would substantially degrade coastal visual qualities unless use of such structures will result in substantially less environmental risks.

(d) Platforms or islands will not be sited where a substantial hazard to vessel traffic might result from the facility or related operations, determined in consultation with the United States Coast Guard and the Army Corps of Engineers.

(e) Such development will not cause or contribute to subsidence hazards unless it is determined that adequate measures will be undertaken to prevent damage from such subsidence.

(f) With respect to new facilities, all oilfield brines are reinjected into oil-producing zones unless the Division of Oil and Gas of the Department of Conservation determines to do so would adversely affect production of the reservoirs and unless injection into other subsurface zones will reduce environmental risks. Exceptions to reinjections will be granted consistent with the Ocean Waters Discharge Plan of the State Water Resources Control Board and where adequate provision is made for the elimination of petroleum odors and water quality problems.

Where appropriate, monitoring programs to record land surface and near-shore ocean floor movements shall be initiated in locations of new large-scale fluid extraction on land or near shore before operations begin and shall continue until surface conditions have stabilized. Costs of monitoring and mitigation programs shall be borne by liquid and gas extraction operators.

30263. (a) New or expanded refineries or petrochemical facilities not otherwise consistent with the provisions of this division shall be permitted if (1) alternative locations are not feasible or are more environmentally damaging; (2) adverse environmental effects are mitigated to the maximum extent feasible; (3) it is found that not permitting such development would adversely affect the public welfare; (4) the facility is not located in a highly scenic or seismically hazardous area, on any of the Channel Islands, or within or contiguous to environmentally sensitive areas; and (5) the facility is sited so as to provide a sufficient buffer area to minimize adverse impacts on surrounding property.

(b) In addition to meeting all applicable air quality standards, new or expanded refineries or petrochemical facilities shall be permitted in areas designated as air quality maintenance areas by the State Air Resources Board and in areas where coastal resources would be adversely affected only if the negative impacts of the project upon air quality are offset by reductions in gaseous emissions in the area by the users of the fuels, or, in the case of an expansion of an existing site, total site emission levels, and site levels for each emission type for which national or state ambient air quality standards have been established do not increase.

(c) New or expanded refineries or petrochemical facilities shall minimize the need for once-through cooling by using air cooling to the maximum extent feasible and by using treated waste waters from inplant processes where feasible.

30264. Notwithstanding any other provision of this division, except subdivisions (b) and (c) of Section 30413, new or expanded thermal electric generating plants may be constructed in the coastal zone if the proposed coastal site has been determined by the State Energy Resources Conservation and Development Commission to have greater relative merit pursuant to the provisions of Section 25516.1 than available alternative sites and related facilities for an applicant's service area which have been determined to be acceptable pursuant to the provisions of Section 25516.

30232. Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur.

30250 (b) Where feasible, new hazardous industrial development shall be located away from existing developed areas.

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