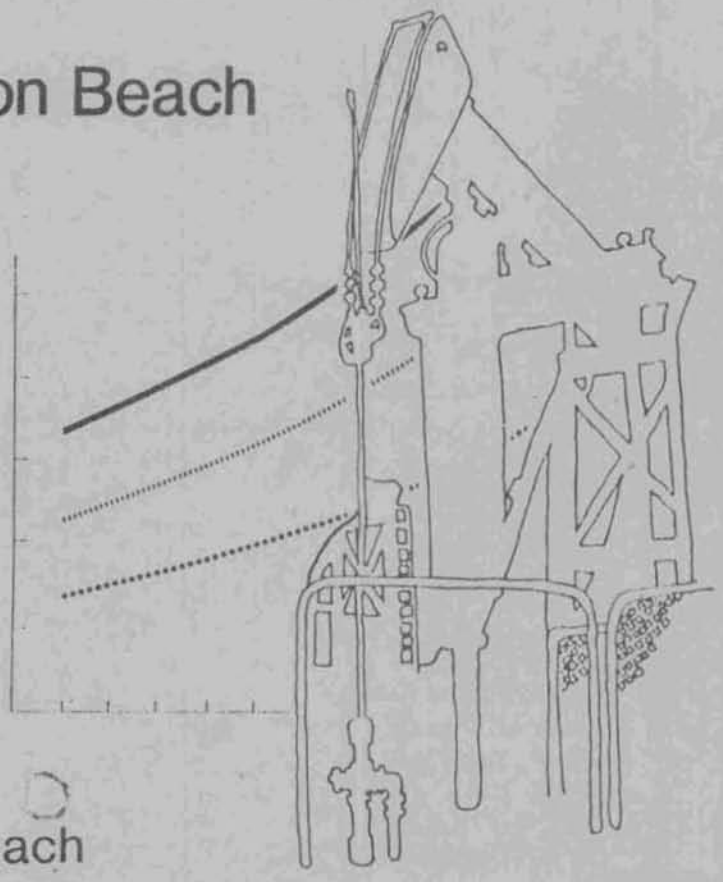
Huntington Beach Energy Series

Report #2

Fiscal Impact of Oil Operations in Huntington Beach



City of Huntington Beach

Department of Development Services

Planning Division

March, 1981

CITY OF HUNTINGTON BEACH

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HUNTINGTON BEACH ENERGY SERIES

REPORT #2

FISCAL IMPACTS OF OIL OPERATIONS IN HUNTINGTON BEACH

CITY OF HUNTINGTON BEACH
DEPARTMENT OF DEVELOPMENT SERVICES
JAMES W. PALIN, DIRECTOR

MARCH, 1981

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Foreword

This is another in a series of discussion papers on energy-related issues prepared by the Planning Division of the City of Huntington Beach. Huntington Beach is a center for many energy-related activities including onshore and offshore oil production, an electricity-generating power plant, and increasingly, solar and conservation technologies. The purpose of these reports is to help the City to accommodate the continued production of so vital a resource as energy while at the same time mitigating as much as possible any adverse impacts on the community that such activities might incur. Other reports in this series include the following:

#1	Preserving Surface Access to Underground Oil Reserves in Developed Areas
#3	Oil Spill Contingency Planning in Huntington Beach
#4	Enhanced Oil Recovery Technology
#5	Solar and Conservation Policies at the Local Level

This publication was prepared with financial assistance from the U.S. Office of Coastal Zone Management, National Oceanic and Atmospheric Administration, under the provisions of the Federal Coastal Zone Management Act of 1972, as amended, and from the California Coastal Commission under the provisions of the Coastal Act of 1976.

Definitions

This report necessarily discusses some technical aspects of the oil industry and of fiscal impact analysis. Consequently, some terms are used which may not be familiar to the reader. The following definitions section was prepared to help clarify the meaning of some of these terms. To ease reference, all words defined in this section are italicized the first time they appear in the report's text.

Enhanced Recovery: Any production method which is used to recover more oil from a petroleum reservoir than could be obtained by natural reservoir energy or simple pumping. Includes water flood, steam flood and other techniques involving injection of fluids into the reservoir to recover additional oil.

Expenditures: Monies spent by the City to provide goods and services to the landowners, residents, workers and visitors of the City.

Fiscal Impacts: In this report refers to revenues received and expenditures incurred by the City as a result of particular land uses or activities occurring in Huntington Beach.

Net Revenues: The revenues remaining and available to the City after total expenditures are subtracted from total revenues.

Opportunity Cost: Costs associated with choosing one option over other ones when that choice precludes the alternatives. By making that choice, benefits that might have resulted from the precluded alternatives are lost.

Primary Production: Oil driven up through wells by natural pressure in the formation or by pumping units, without injecting water or other fluids to help force the oil to the surface.

Recycling: In this context, refers to the redevelopment of the surface area of an oil field for uses such as housing or commerce.

Revenues: The monies or income the City receives; sources include taxes, fees, rents and franchises.

Scenarios: In this report, refers to a set of events or conditions possible in the future; a future possibility.

Unitization: The process of forming a "unit"; a unit is an entity composed of several oil operators which work a common oil pool in order to share equipment and mineral interests to produce the reservoir as a single party. When the interests in the pool are fragmented, units are essential for the use of most enhanced recovery methods which can best be applied on a coordinated, non-competitive basis.

Waterflood: An enhanced recovery program through which water is injected into a reservoir in order to force more oil from the pores in the rock.

Water Injection: Another term for "waterflood".

1.0 Introduction

Numerous energy-related facilities occupy significant land area in the City of Huntington Beach, especially in and near the coastal zone. These facilities include onshore and offshore oil production operations, a tanker unloading terminal, a power plant, pipelines, and electricity and natural gas distribution systems. All of these have fiscal impacts on the City.

In this report, *fiscal impacts* refer to the revenues the City receives and the expenditures it incurs as a result of particular land uses. *Revenues* are the funds generated for the City through various taxes and fees (for example, property taxes, production taxes and license fees) paid by the owners and users of land in the City. *Expenditures* are the monies spent by the City to provide services for these land uses (for example, fire and police protection).

The principal purpose of this study is to estimate the fiscal impacts of energy-related facilities and especially of oil production operations. The report focuses on oil operations because they occupy a great deal of very valuable land in Huntington Beach. In addition, the City faces important decisions regarding land use as the oil in the field continues to be depleted and pressure increases to abandon parts of the field and to redevelop the surface. Fiscal impacts are important factors in determining the best use of the land and the City's policy toward continued oil operations.

The City's other major energy facilities--the power plant and marine terminal--are, practically speaking, permanent facilities which will continue to serve regional and state interests. City actions are not likely to significantly encourage or discourage continued operations of these facilities. Thus, they do not present significant land use options to the City at this time.

This study has been carried out in conjunction with the development of a City-wide computer model which assesses the fiscal impacts of various land uses. While the City-wide model may be useful for analyzing most activities, it does not take into account certain peculiarities of oil operations.

For example, oil revenues are more closely related to the amount of oil produced by the wells than the acreage they occupy. The City-wide model, however, is largely based on developed acres, and generally does not relate changing revenues to changing production levels. Thus, a better way of computing the impacts of oil operations has been developed as part of this study. (See Appendix A).

The following section discusses the revenues and expenditures related to oil operations in Huntington Beach for fiscal year 1979-80.

Section 3.0 projects the fiscal impacts of continuing oil operations through 1990 under four different *scenarios*. Special attention is given to the Townlot/ Downtown and Garfield/ Goldenwest areas where the status of oil operations is likely to change.

Finally, Section 4.0 discusses issues besides fiscal impacts which are also important for making decisions about land uses in the City.

2.0 Current City Revenues and Expenditures Related to Oil Operations in Huntington Beach

Table 2.1 summarizes the revenues and expenditures attributable to oil production in Huntington Beach for fiscal year 1979-80. Oil activities generated ***net revenues*** (revenues exceeded costs) of approximately $800,000 for the year.

TABLE 2.1

City Revenues and Expenditures Related to Oil Operations for Fiscal Year 1979-80

Revenues		Expenditures	
Property Taxes	$ 382,068	General Government and Administration	$203,340
Oil Production and Business License Fees	1,076,996	Public Works	135,465
Royalties and Easements	120,000	Police Department	
Inspection Fees	73,000	Directly Assignable	14,360
Wastewater Permits	9,660	Not Directly Assignable	150,903
Drilling/Redrilling Permits	6,500	Fire Department	
Pipeline Franchises	4,253	Directly Assignable	28,309
		Oil Inspector	45,800
		Special Equipment and Personnel	210,000
		Not Directly Assignable	82,816
TOTAL REVENUES	$1,672,477	TOTAL EXPENDITURES	$ 870,993

$1,672,477 (Total Revenues) - $870,933 (Total Expenditures) = +$801,484 (Net Revenue).

Refer to Section 2.2 and 2.3 for discussion and calculation of these figures.

The following sections explain how these expenditures and revenues were estimated.

2.1 Expenditures

Local governments provide a wide range of vital public goods and services. In 1979-80, for example, the City of Huntington Beach spent over $30 million to provide businesses, industry, residents and visitors of Huntington Beach with fire and police protection, streets, sewers, garbage disposal, animal control, building inspections, consumer protection, and many other important services. This section discusses the City's expenditures related to oil operations.

Directly Assignable Expenditures: A key problem in this kind of fiscal analysis is determining what portion of the total City budget should be attributed to different land uses. In only a few cases is it relatively easy to measure the amount of public services provided directly to certain kinds of land uses. The principal examples of these directly assignable costs are those related to police and fire calls. The City keeps records of the number of such calls and also notes, among other data, the land uses located on the site of each call. We then assume that the proportion of calls generated by each land use category is a reasonable estimate of the proportion of the City's costs in responding to all calls that should be attributed to each land use type.

Table 2.2 shows the distribution of Fire Department calls by land use type. It indicates that only .6 percent of all calls were related to oil operations. The total City expenditures on the budget items related to Fire Department emergency calls were $4,718,248 in 1979. Those items are Fire Control (account number 302)* and Medical Aid Paramedic (304). Considering the discussion above, oil uses then should be assigned .6 percent of the total, or $28,309.

TABLE 2.2

Distribution of Fire Department Calls by Type of Land (Calendar Year 1978).

Type of Land Use	# of Calls (1)	% of Total
Residential	2,937	34.5
Streets & Highways	537	6.3
Industrial	269	3.2
City Beach & Pier	257	3.0
Commercial	240	2.8
Oil	51	.6
City Parks	126	1.5
Miscellaneous	520	6.1
Other Unassigned (2)	3,588	42.0
TOTALS	8,525	100.0%

(1) Includes all fire, emergency/ medical assistance, and non-fire and non-emergency/medical incidents.

(2) These are emergency/medical incidents that could not be assigned to a particular land use.

Source: City of Huntington Beach Fire Department and Planning Staff.

* Paranthesis indicates the account numbers in the City budget for these items.

Table 2.3 shows the distribution of Police Department calls among land uses in the City. Note that oil operations are not broken out into a separate category; they are included in the "industrial" group. All industries accounted for only .2 percent of police calls. Because there are other industries in Huntington Beach besides oil, the share of the expense of these services attributed to oil facilities must be some fraction of .2 percent. For the purposes of this analysis, however, the full .2 percent is assigned to oil activities to ensure that their share is not underestimated.

TABLE 2.3

Distribution of Police Department Calls by Type of Land Use (Calendar Year 1978).

	# of Calls	% of Total
Streets & Highways	29,386	40.2
Residential	23,917	32.7
Commercial	13,457	18.4
City Beach & Pier	908	1.2
City Parks	446	.5
State Beach	129	.3
Industrial (including oil)	125	.2
Miscellaneous	4,717	6.5
TOTALS	73,085	100.0%

Source: City of Huntington Beach Police Department and Planning Staff.

The following budget items were considered related to the costs of responding to criminal activity: Crime Analysis (330), Vice and Organized Crime (328), Investigative (329), Scientific Investigation (331), Patrol (332), Traffic (335) and Aero (337). The City expended $7,190,105 to provide these services in 1979-80. Oil's share, .2 percent of the total, is $14,360.

A very large proportion of fire and police calls are included under "streets and highways," "miscellaneous" or "unassigned" categories. Expenditures in these categories cannot be assigned to specific land uses directly. This is true for most other City expenditures as well. These will be discussed again below.

Another group of City expenditures which can be reasonably assumed to be directly related to oil operations are the costs of the City's oil inspection and regulation activities. The City Oil Inspector, who works in the Fire Department, enforces the City Oil Code, inspects every well annually, responds to oil-related emergencies and performs other duties related to oil operations. The Fire Department estimates that oil inspection costs (including inspector's salary and overtime, benefits, car, uniforms and office support) were approximately $45,800 in 1979-80.

Finally, because there is a potential petroleum fire hazard associated with the oil production facilities, pipelines and tank farms in Huntington Beach, the Fire Department has an engine company that is specially trained and equipped to handle oil fires. If not for its oil field responsibility, the Fire Department would not maintain this company. Therefore, the cost of this protection, estimated at $210,000 for 1979-80, is added to City expenditures on oil activities.[1]

Not Directly Assignable Expenditures: Most expenditures cannot be directly assigned to particular land uses. Many of these represent the City's "overhead" or the cost of having services available, should they be needed. Economist George Patterson helps clarify this point:

> ". . .the basic purpose of a fire department is protection, which is available to all whether or not they actually have a fire. It is not logical to assume that a fire department is paid only when it is fighting a fire."[2]

Thus, while expenditures on fighting fires can be reasonably attributed to different users, the costs of having the equipment and personnel ready to fight any fire are not, but are borne by all members of the community.

The City has developed an expenditure model as part of the preparation of this report for estimating the "fair share" of these costs that can be reasonably attributed to different kinds of land uses. A detailed discussion of this model and of alternatives that were examined by the City for this study is included in Appendix A. A brief summary of the model and its assumptions follows:

The model takes into account several factors in assigning the appropriate share of City expenditures to different land uses, including the amount of acreage in the City each land use type occupies and the intensity of use on that acreage (that is, the number of residences, businesses or oil facilities per acre). The assumption utilized in the model is that more intensively developed areas tend to require more services (and, thus, more expenditures) per acre then less densely developed areas. This approach, called the "Weighted Average Model", estimates that oil operations can account for about 2.3 percent of the City's budget (for items which cannot be directly traced to specific land uses). See Table 2.4.

TABLE 2.4

Distribution of Costs
Using Weighted Average Model

	% of Acreage in City	% of Total Expenditures Assigned by Model
Residential	65%	87.3%
Commercial	9%	5.2%
Industrial	6%	2.3%
Oil	3%	2.3%
Vacant	17%	2.9%
Total	100%	100.0%

In 1979-80, expenditures on budget items which cannot be directly traced to specific land uses totaled $24,982,308.* Oil's share of this, 2.3 percent, equals $572,523. Table 2.5 lists all the budget items included in this analysis.

2.2 Revenues

Oil operations generate significant revenues for the City from a number of sources, including the following:

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* Library, Parks & Recreation, and Harbors and Beaches are not included in the analysis because these three groups of services are attributed primarily to residential uses and are not considered in the calculations of expenditures attributable to oil operations. Water Department expenditures and revenues from water sales are also excluded, because oil activities consume relatively small quantities of water and the estimated revenues are not important to this analysis.

BUDGET ITEMS FOR "UNASSIGNED" EXPENDURES

General Government and Administration

(100) City Council
(101) Non-departmental
(102) Civic Promotions
(109) City Administrator
(110) Internal Auditor
(111) Budget and Research
(112) Council Support
(113) Public Information
(114 Economic Development
(115) Civil Defense
(116) Data Processing
(117) Purchasing
(118) Central Services
(119) Word Processing
(120) Chashier
(121) Risk Management
(122) Animal License
(130) City Attorney
(140) City Clerk
(141) Elections
(160) Personnel
(170) Finance
(171) Accounting
(172) Business License

(230) Development Services Adm.
(231) Current Planning
(232) Advance Planning
(233) Land Use
(234) Plan Reveiw

Pubilc Works

(410) Administration
(412) Surveying
(415) Traffic Engineering
(420) Maintenance Administration
(430) Mechanical Maintenance
(462) Vehicle Repair
(560) Sewer Maintenance
(561) (591) Sewer Pump Station
(431) Mechanical Fabrication
(433) Pool Car Maintenance
(453) Special Repairs
(450, 460, 470, 480, 482, 487, 489, 490) Building Maintenance

Police Department *

(320) Administration
(321) General Support
(322) Personnel
(323) Public Affairs
(324) Records
(325) Training
(326) Research
(333) Communication

Fire Department *

(300) Administration
(301) Fire Prevention
(304) Joint Powers
(485) Fire Station

* Also includes percent of "assignable" items attributed to "streets and highways", "Miscellaneous" and "unassigned". Refer to Tables 2.2 and 2.3.

Summary for 1979-80 Unassigned Expenditures

General Government	$8,840,880
Public Works	5,889,762
Police	6,560,980
Fire	3,600,868
Total	$24,892,308

TABLE 2.5

1) property taxes (including tax on surface areas, mineral rights and improvements), 2) business license and oil production license fees, 3) inspection fees, 4) pipeline franchises, 5) wastewater permit fees, 6) drilling/redrilling permit fees and 7) royalties and easements.[3]

Property Tax: The City's property tax revenues are primarily dependent on three key variables, 1) the assessment or valuation of property in the City, 2) the tax rate applied to those valuations or assessments, and 3) the percentage of the total property taxes collected in Huntington Beach which actually go to the City.

Proposition 13 "rolled-back" property valuations to 1975 levels and limits re-assessment to two percent per year. However, if a property is sold, it is re-assessed at that time at its selling price. Generally, because of the two percent annual limit, valuations do not keep pace with inflation. The frequency at which properties "turn-over" (are sold), and thus are re-assessed, greatly affects how closely the overall valuation for properties can keep pace with inflation.[4]

Proposition 13 generally limits property tax rates to one percent of market value. Voters in any tax rate area can approve additional taxes beyond this base rate. Table 2.6 below shows the distribution of oil holdings among tax rate areas, the rates for each area and the tax collected by the county.

Many jurisdictions other than the City (such as the school districts) are also funded by property taxes. Thus, only a fraction of the total property taxes collected in Huntington Beach actually go to the City. The share of the property taxes which went to the City was 20.7 percent in 1979-80.

The most difficult problem in estimating the City's property tax revenues related to oil is determining how much surface area of an oil field or oil parcel is considered in use for oil production, and how much could reasonably be considered vacant and available for other uses. In many cases, a parcel is so densely populated with wells and tanks that the entire area can be considered oil production land. In other instances, however, open spaces between wells are large enough to permit development of other uses. For example, it would be unreasonable to think of a ten-acre parcel with three oil wells on it as devoted entirely to oil. Vacant portions of such a parcel could be developed for other uses. This has happened in areas throughout the City.

In order to accurately estimate the surface area of the City used for oil activities, the characteristics of the oil fields and parcels in the City were analyzed to determine if the land around the wells and tanks could be developed for other uses. Those areas which could be considered available for other uses were counted as vacant land. The remaining portions of oil fields and parcels were counted as oil areas. Through this process, staff estimated that about 472 acres are actually used for oil production in Huntington Beach. The estimated assessed value of this surface area for 1979-80 is $4,901,666 (See Table 2.6).

Besides the surface land, property taxes are also assessed on mineral rights, secured improvements, and unsecured improvements. The assessments on each of these in 1979-80 were the following: $23,788,080 for mineral rights; $9,227,480 for secured improvements; and $701,160 for unsecured improvements.

The City receives a 20.7 percent share of the total property taxes on oil operations in Huntington Beach collected by the County, which amounted to $382,068 for 1979-80.[5]

Business License and Oil Production License Fees: The oil production fee is a fee charged for each barrel of oil produced. It is linked to the

Assessed Value of Oil Properties in Huntington Beach, 1979-80

Tax Rate Area	Land *	Mineral Rights	Secured Improvements	Unsecured Improvements	Total	Tax Rate	Tax Collected
001	4,255,667	20,653,010	8,974,280	457,970	34,340,927	4.7767%	1,640,363
007	13,742	66,690	1,940	207,360	289,732	4.8309%	13,997
010	47,053	228,350	13,270	9,450	298,123	4.8426%	14,437
013 & 014	585,204	2,840,030	237,990	26,380	3,689,604	4.7884%	176,673
Totals	4,901,666	23,788,080	9,227,480	701,160	38,618,386		1,845,740

* Land surface was distributed among tax rate areas in the same proportions as mineral rights.

Source: Orange County Assessor's Office.

TABLE 2.6

consumer price index, and, thus, increases as the cost of living rises. The oil production license fee rates for 1979-80 were 11.05¢/barrel for "non-stripper" wells (wells that produce more than ten barrels per day) and 8.84¢/barrel for "stripper" wells (wells that produce less than 10 barrels per day). Each oil operator also pays an annual $100 business license fee per well.

The oil production fee is paid quarterly, and the operator may deduct up to $25 per quarter as reimbursement for the license fee. In other words, the first $25 of the quarterly oil production fee is paid in advance, in the form of a business license fee. The total revenue collected from this source was $1,076,996 for 1979-80.[6]

Oil Well Inspection Fee: Each oil well is inspected annually for compliance with the Huntington Beach Oil Code. The oil inspector must approve each well before a business license is issued. There is a $50 inspection fee per well. Total revenue from oil well inspections was $73,000 for 1979-80.

Wastewater Permits: Every well that uses the City's wastewater system must pay an annual $30 wastewater fee. There are 322 wells using the system. Total revenues were $9,660 for 1979-80.[7]

Drilling/Redrilling Permits: In order to drill or redrill an oil well, an operator must secure a permit from the oil inspector. There is a $500 fee for each permit approved. In 1979-80, 13 drilling/redrilling permits were issued, generating a revenue of $6,500.[8]

Pipeline Franchises: Oil companies that have pipelines in Huntington Beach pay franchise taxes whose rates are established by contracts with the City. The term of the contracts vary from franchise to franchise. Revenues from this source were $4,253 for 1979-80 for pipelines directly related to oil production in Huntington Beach.[9]

(Some pipelines are not related to oil production here - that is, even if there were no oil production in Huntington Beach these pipelines would continue to be used. They are used for transporting crude oil delivered by tanker or for carrying gas or refined products.)

Royalties and Easements: As a result of legislation in the 1930's, the City receives royalty payments from the sale of oil produced on offshore lease Public Resources Code 392. The royalty is approximately .25 percent of those sales, and therefore, contingent on oil prices and the amount produced - two variables that are very difficult to predict. In 1979-80, the City received $120,000 from this source.[10]

2.3 Conclusion

The analysis for 1979-80 indicates that oil production contributes significant revenues to the City, totaling approximately $1.67 million. Approximately two-thirds of these revenues come from the oil production fee (per barrel) which is tied directly to production. This fee also increases annually with an index of the inflation rate; thus, this revenue source can keep pace to a significant degree with rising expenditure levels.

The estimated City expenditures related to oil production for 1979-80 were approximately $.87 million. Three departments--fire, police and public works--account for about two-thirds of these; expenditures by all other departments combined for the remaining one third of the total.

Clearly, oil production activities currently generate net revenues to the City. The next section analyzes how this fiscal situation might change in the future, considering variables such as changing production levels, inflation, and pressures to redevelop the oil fields to new uses.

3.0 Fiscal Impacts of Continuing Oil Operations

Estimates of the fiscal impacts of continued oil activities in Huntington Beach depend largely on the predicted future of those activities. This can be a problem because many variables important to a fiscal analysis, such as the number of barrels produced, the number of wells, the actual acreage devoted to oil facilities and the inflation rate, are difficult to foresee.

3.1 Predicting Future Oil Operations

The lack of available open space in this area and the growing housing shortage create pressure to abandon oil fields and to redevelop them for housing. At the same time, rising oil prices and the relaxation of price controls on domestic oil make continued oil production, even at low levels, increasingly attractive. Higher prices may also make more expensive production techniques (such as *water injection*) profitable in parts of the field where they have not yet been applied. Further, while production in the Huntington Beach field has been declining, new technologies are being tested here which might rejuvenate the field.*

In light of these changing variables and different possibilities, several "scenarios" of oil operations over the next decade have been analyzed. The first assumes, overall, that the number of wells, acreage and production levels remain relatively unchanged. This could come about if the decline of production in some parts of the field are balanced by new *waterflood* projects and other *enhanced recovery* programs. Production among small independents is assumed to continue dropping, but the "recycling" of their parcels to new uses would proceed very slowly, largely due to the increasing price of oil. Thus, the number of wells, acreage, and overall oil production would remain relatively constant for the next ten years.

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* Two other reports in this series are highly relevant to the discussion of new technologies: Report #1 "Preserving Surface Access to Underground Oil Reserves in Developed Areas", and Report #4, "Enhanced Oil Recovery Technologies".

The second scenario envisions a gradual phase-out of oil operations in the Townlot and Downtown during the 1980's, but operations elsewhere in the City continue relatively unchanged. This was analyzed because the Townlot and Downtown areas are especially valuable parts of the City, and pressures for redevelopment there will be stronger than elsewhere. Also, with the completion of the Local Coastal Plan during the early part of the decade, now dormant efforts to develop and redevelop that area should intensify.

The third scenario sees a phase-out of the small-scale independent operations during the next decade, while the major oil companies continue operating near their present levels. In many ways, this scenario may best approximate what will actually happen. Discussions with the major oil companies in Huntington Beach indicate that they expect to continue operating at least another 20 years, and that the application of enhanced recovery technologies may not dramatically increase production, but will offset recent declines and keep production levels up for several years. At the same time, the production of the independents has continued to decline. Generally speaking, they cannot apply the enhanced recovery technologies available to the larger companies. As their production drops and the value of the surface for housing continues to rise, these parcels would gradually recycle.

The last scenario considers the possibility that, rather than abandoning their operations, the small independent oil companies in the Townlot, along with one or more of the majors, join together and form a "unit." By combining the resources of all the participants, the unit has the capital and the surface acreage to apply waterflood and other enhanced recovery techniques. Thus, production increases and the operations continue throughout the 1980's. Report #1 in this series, "Preserving Surface Access to Underground Oil Reserves in Developed Areas," analyzes this possibility in detail.

Before discussing each of these scenarios, some assumptions about how revenues and expenditures will change over time should be reviewed.

3.2 Assumptions about Variables Affecting Future Revenues and Expenditures

Several assumptions about some key variables affecting future revenues and expenditures have been made in this analysis.

First of all, Proposition 13's limits on the property tax rate and property value assessment are assumed to remain in effect. We also assume that most oil properties that remain productive will not change owners, thus limiting re-assessment of the surface areas to annual increases of two percent per year. (See Section 2.3 above.) The City's share of overall property tax revenues collected in Huntington Beach was assumed to remain approximately 20.7 percent.

Changes in the amounts charged for drilling, inspection and waste water permits were not incorporated into the analysis because these fees account for only a small percentage of total annual revenues.

On the expenditure side, the costs to the City for providing services to future oil operations will be a function of how much of the land remains in oil production, the number of wells and related facilities to be served, the level of service to be provided, and the inflation rate. In the following analysis, the level of service is assumed to remain constant; consequently, total City expenditures are assumed to increase according to the inflation rate and the City's overall growth pattern. In the following analysis, total City expenditures over the next ten years were projected

using the City-wide Fiscal Impact Model and the City's General Plan, which helps define the future growth pattern and mix of uses in the City. These total annual expenditure estimates were used to calculate oil's share of City expenditures which are not directly assignable.

A ten percent inflation rate is also assumed.[11]

In summary, the following assumptions have been made for the analysis in Sections 3.2 - 3.5:

- Proposition 13 controls on tax rates and property assessments will apply.
- The City's share of the property tax will remain 20.7 percent.
- Rates on drilling permits and other fees will not change.
- Total City expenditures are estimated using the City-wide Fiscal Model and the General Plan.
- Level of City services stays constant.
- Inflation will average ten percent per year.

3.3 Analysis of Scenarios

In all of the following scenarios, expenditures are calculated two ways. The first method uses the "Weighted Average Model" developed in Appendix A because it is probably the most accurate and reasonable of the available models for calculating oil-related expenditures. Expenditures are also predicted based on the City-wide Model because it is the technique used in many previous analyses and it gives the highest cost estimates of all the models analyzed in Appendix A. Both models were used to plot expenditure curves in all of the figures in this section; thus, each figure shows two expenditure lines. Perhaps the best way to interpret these graphs is to view the Weighted Average Model's expenditure line as our best estimate of what City expenditures will actually be, and the City-wide Model's expenditure line as an estimate of the probable maximum or upper limit of actual expenditures.

Scenario 1 - Oil Revenues and Expenditures, 1980-1990: Oil Operations Remain Relatively Unchanged.

In this scenario, the current number of wells (1460) remains through 1990. The area devoted to oil stays at 472 acres and overall production is constant.

Revenues derived from the oil production fees and royalties rise 10 percent per year which is the assumed inflation rate. Property tax revenues rise at only two percent per year due to Proposition 13 limitations. All other revenues remain the same, assuming that the same number of permits is issued each year, and that fee rates do not change. Overall, revenues increase, but not as fast as expenditures.

Figure 3.1a shows oil revenues and expenditures for 1980-90. Under Scenario 1, oil operations are a net revenue generator for the City under the assumed conditions primarily because the oil production fee, which makes up two-thirds of the revenue, is tied to the Consumer Price Index; therefore, this portion of the revenues keeps pace with inflation.

Figure 3.1b shows the same scenario in "constant (1979) dollars," that is, the revenues and expenditures are adjusted for inflation. This figure shows more clearly that net revenues (reflected in the distance between the revenue line and the expenditure lines) decrease over time. This is because one-third of the revenues generated by oil are not indexed to the inflation rate. In other words, total revenues simply do not keep up with inflation. Despite this decline, oil operations would continue to contribute net revenues throughout the decade.

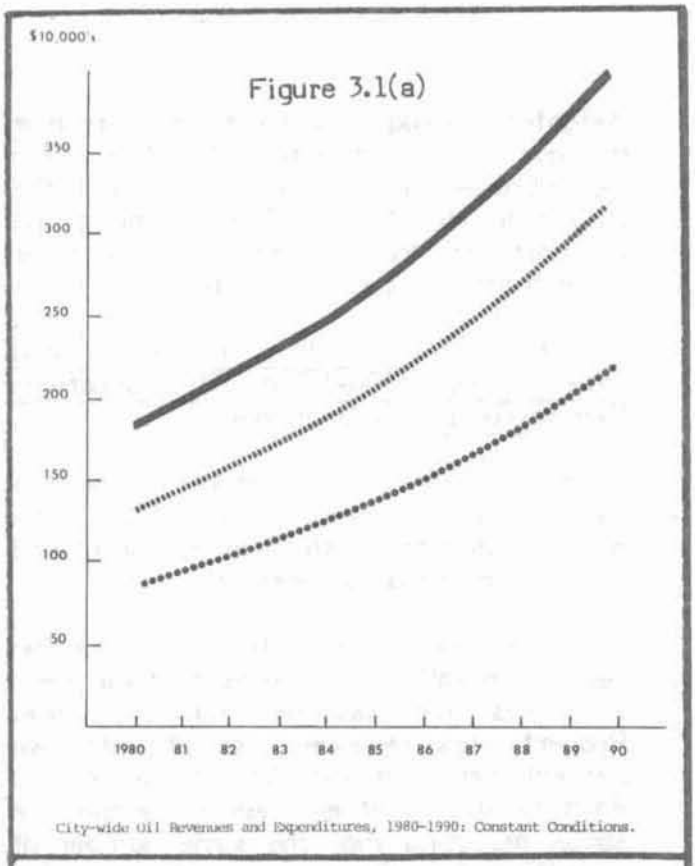

Figure 3.1(a)

City-wide Oil Revenues and Expenditures, 1980-1990: Constant Conditions.

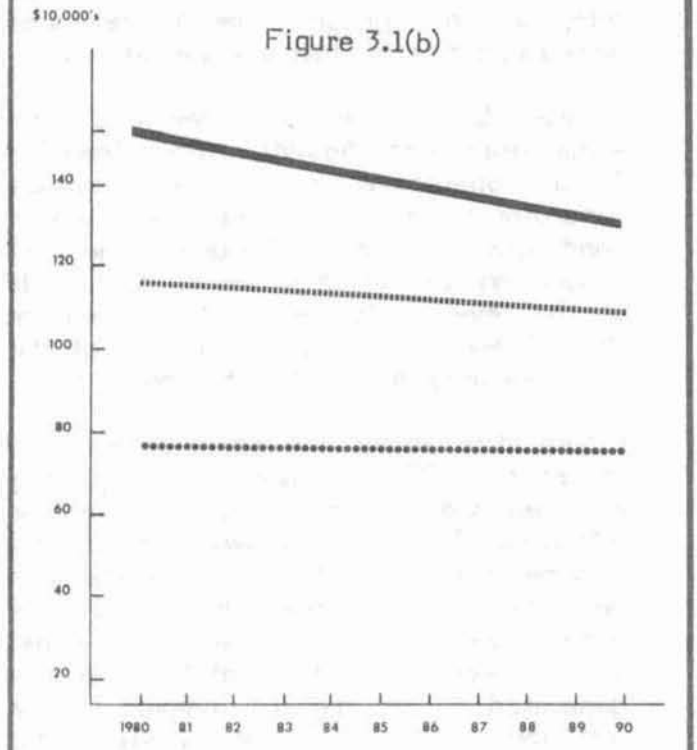

Figure 3.1(b)

City-wide Oil Revenues and Expenditures, 1980-1990: Constant Conditions (1979 Dollars).

key

- Revenues
- Expenditures, Weighted Average Model
- Expenditures, City-Wide Model

Scenario 2 - Phase Out Oil Operations from the Townlot.

The Townlot and Downtown areas include some of the most valuable real estate in Huntington Beach. Currently, they are also among the poorest sections of the oil field in terms of production. A feasible scenario, then, is one where the value of the surface for other uses (e.g. housing) outweighs the value of the oil being recovered. In such a situation, it is reasonable to assume that the oil producers will gradually abandon their wells in this area and sell the land for development.

There are 13.8 acres of oil land in the Townlot. Aminoil owns approximately .8 acres for wells that are directionally drilled under the ocean. Since these wells do not derive their oil from the field under the Townlot, they are assumed to remain. The other 13 acres are presumed to phase out as follows: one acre per year, the first 10 years, and three acres in the last year. The 95 wells are assumed to phase out as follows: Nine wells per year the first 10 years, and five wells in the last year. Conditions in the rest of the City remain unchanged.

As the wells and acreage decrease, oil revenues from oil production fees, property taxes, and permit fees decrease accordingly. It is assumed that every well in this area is paying wastewater fees, but that no drilling or redrilling is done here. The overall City revenues from oil decline only slightly. Very little revenue is currently derived from this part of the field due to its low productivity (see Figure 3.2a).

Expenditures also decrease slightly as the number of oil acres and oil wells in the Townlot decrease.

Figure 3.2b shows revenues and expenditures for this scenario in 1979 dollars (adjusted for inflation).

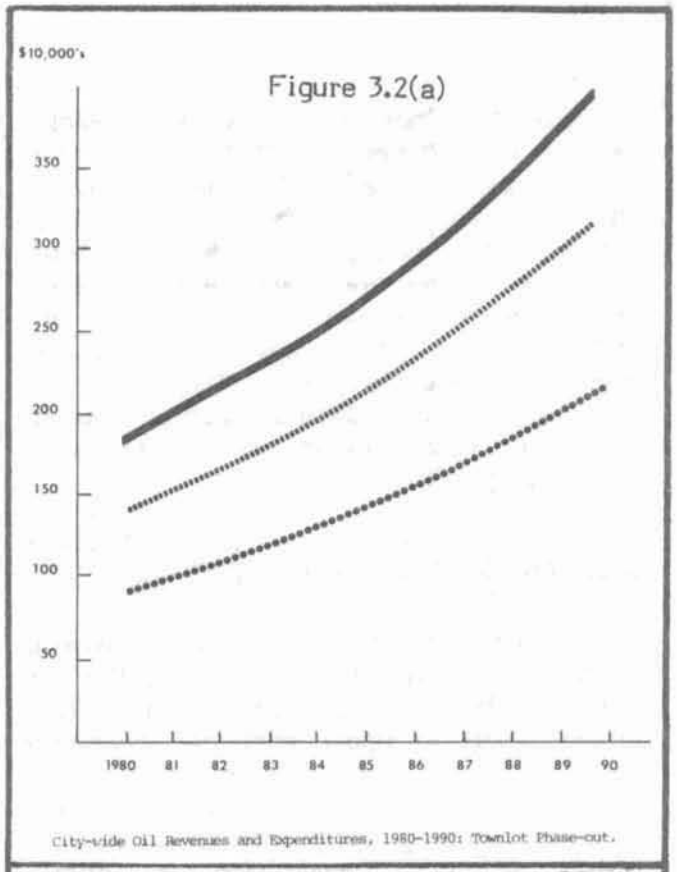

Figure 3.2(a)

City-wide Oil Revenues and Expenditures, 1980-1990: Townlot Phase-out.

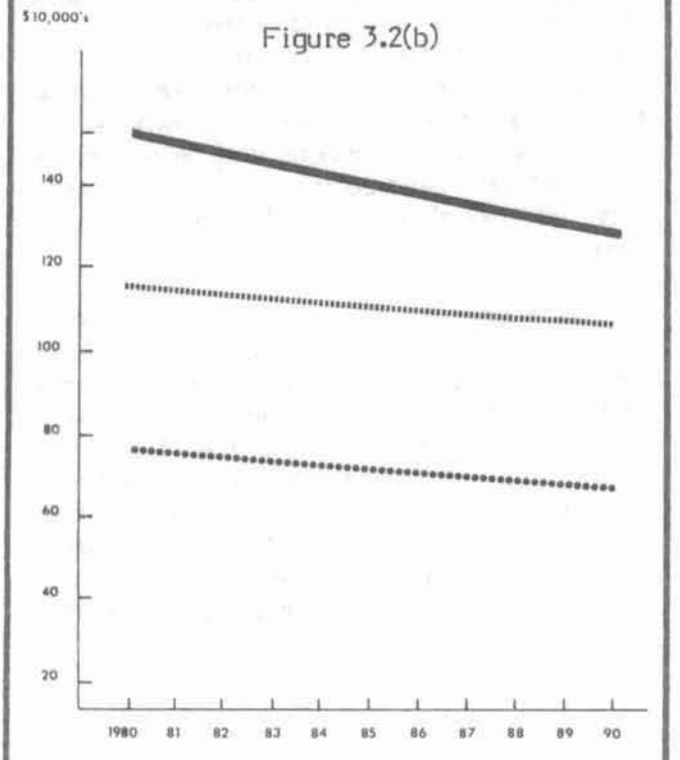

Figure 3.2(b)

City-wide Oil Revenues and Expenditures, 1980-1990: Townlot Phase-out (1979 Dollars).

key

Revenues
Expenditures, Weighted Average Model
Expenditures, City-Wide Model

Note that although both revenues and expenditures decline, net revenues (total revenue minus total costs) are slightly less than under Scenario 1.

From a fiscal standpoint, although net revenues are slightly less in this scenario than in Scenario 1, the City continues to net a high level of revenue from oil. At the same time, valuable land is made available for other uses.

Scenario 3 - All Independents Phase Out; Only Majors Remain.

There are 95 acres containing 268 wells that belong to oil producers other than the three major companies. Scenario 3 could be realized if the value of all real estate in Huntington Beach increases such that oil production by the independents is less profitable than other land uses. Figure 3.3a shows what happens to oil revenues and expenditures if the independents phase out as follows: nine acres phase out per year for the first 10 years, then five in the last year; 24 wells phase out per year for the first 10 years, then 28 in the last year.

Oil revenues from the oil production fees, property tax, and permit fees decline as wells and acreage decrease. All independents are assumed to need wastewater permits, and revenues derived from them are reduced along with the wells. The number of drilling and redrilling permits is not affected. The amount of revenue lost related to total revenue is small because these wells do not, on the average, produce large quantities of oil.

Costs, however, are borne according to number of wells and/or acreage. A well that produces large quantities of oil requires approximately the same City services as a well that produces very little. However, the better producing well generates greater revenues to the City. Thus, the ratio of revenues to costs is greater for highly productive wells.

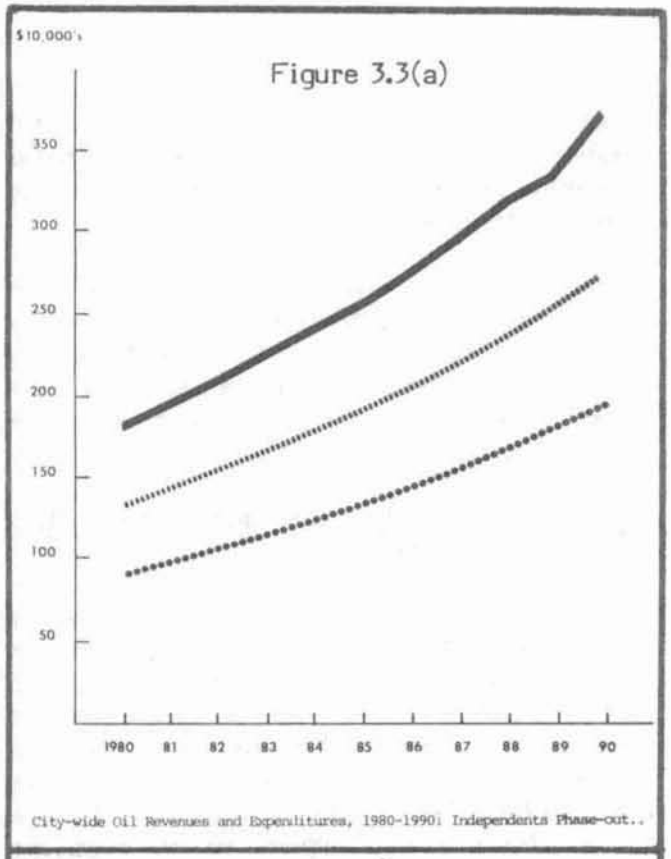

Figure 3.3(a)

City-wide Oil Revenues and Expenditures, 1980-1990: Independents Phase-out..

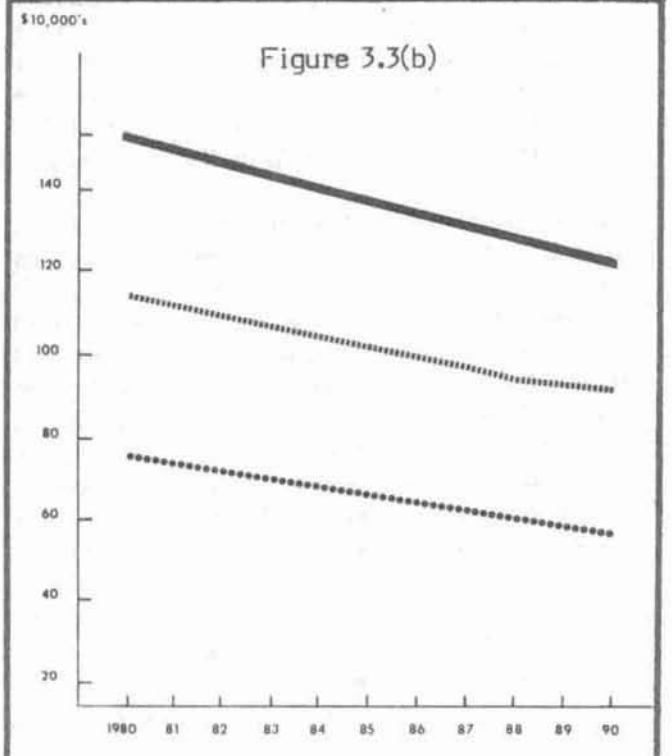

Figure 3.3(b)

City-wide Oil Revenues and Expenditures, 1980-1990: Independents Phase-out (1979 Dollars).

key

- Revenues
- Expenditures, Weighted Average Model
- Expenditures, City-Wide Model

Because the independent wells generally produce less oil per well than those of the majors, phasing them out removes most of the wells with the worst revenue to cost ratios. This means that although total revenues overall are lower because there are fewer active wells, total costs are reduced even more, thus improving the overall revenue-cost ratio. Therefore, net revenues in real dollars decline less in Scenario 3 than in either previous scenario. (See Figure 3.3b).

Scenario 4 - Unitization of the Townlot Area; Other Oil Areas Do Not Change.

Unitization is a method by which several independents can legally join together to act as if they were a single company. This allows them to apply enhanced recovery technologies and increase their production.* Enhanced recovery often involves pumping water into an oil pool in which *primary production* is nearly completed. By injecting water at certain points in the field, oil production in all wells can be dramatically improved. To do this in an area with several owners, all operators must cooperate and help finance the venture. Unitization is often the only way additional oil can be recovered in significant quantities.

In this scenario, unitization takes place in the Townlot area. The number of wells remains the same because while some new wells are drilled, some existing, inefficient wells are abandoned. In the first two years, drilling and redrilling activity increases. Overall acreage drops by five acres because of the abandonment of some old facilities and the consolidation of most new ones. Production levels are unchanged.

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* See Report #1 in the series, "Preserving Surface Access to Underground Oil Reserves in Developed Areas."

Beginnning in the third year, acreage is stable at 8.8, and all other factors are the same except annual production, which increases by one million barrels.

Figure 3.4a shows the jump in revenues caused by the increase in oil production fee revenue from a million extra taxable barrels of oil. Because the number of wells is the same, and total acreage stabilizes at an only slightly lower level than before, costs over the 10 year period are nearly the same as in Scenario 1.

Figure 3.4b shows that in real dollars, net revenue is greater in Scenario 4 than in any of the previous scenarios, while costs actually decline. Clearly, unitization could increase revenues while reducing costs by increasing productivity without increasing the overall number of wells or acreage.[12]

3.4 Summary

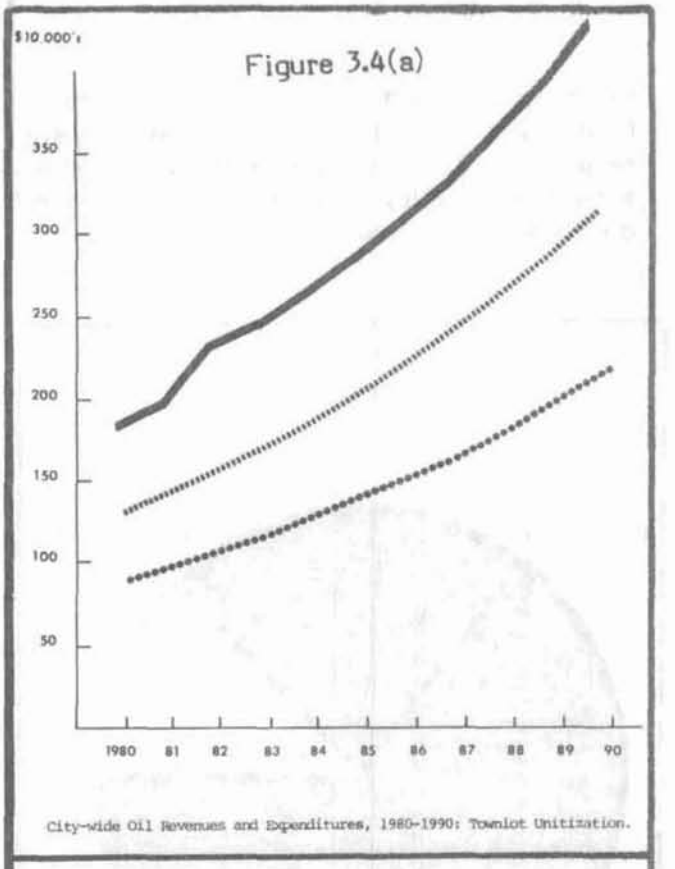
These scenarios represent four possible futures for oil operations in Huntington Beach. It is not known which, if any, of them will take place. Most likely, none of them will occur exactly as portrayed in this analysis. However, some conclusions can be drawn from these scenarios.

First, in any of these cases or combination of them, it is clear that continued oil operations will generate significant net revenues for the City.

Second, if unitization and enhanced recovery projects do occur and are successful, they can help increase the revenues to the City without significantly increasing service costs. In some cases, City expenditures associated with oil operations could even decline slightly, while revenues would dramatically increase.

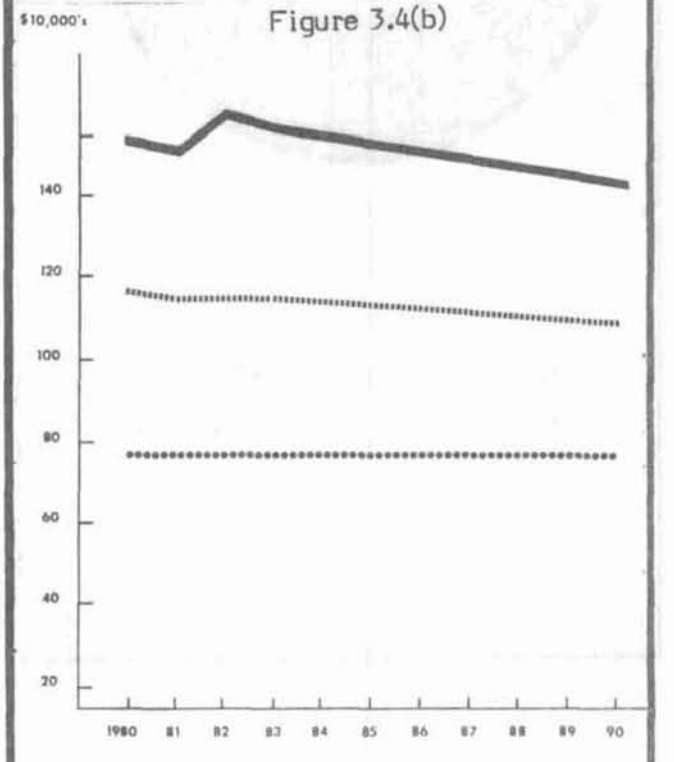
Third, the independent operators do not contribute a large portion of the revenues generated by oil operations, and unless unitization takes place, they will not in the future. The three major oil companies in

Figure 3.4(a)



City-wide Oil Revenues and Expenditures, 1980-1990: Townlot Unitization.

Figure 3.4(b)



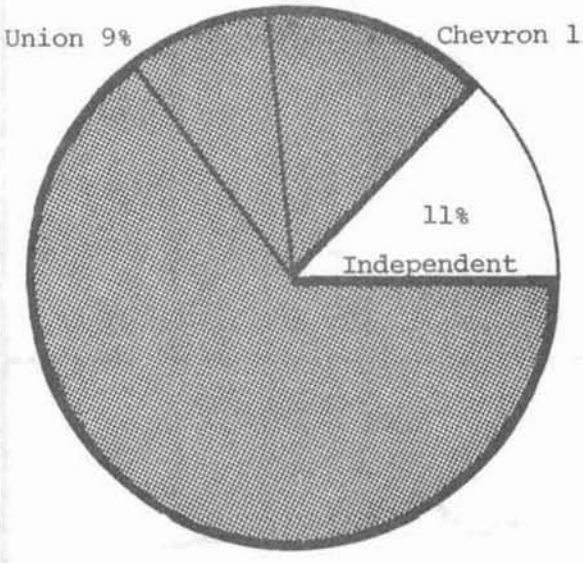
City-wide Oil Revenues and Expenditures, 1980-1990: Townlot Unitization (1979 Dollars).

key

Revenues
Expenditures, Weighted Average Model
Expenditures, City-Wide Model

Huntington Beach -- Aminoil USA, Chevron USA and Union Oil -- are chiefly responsible for the significant net revenues afforded the City by current and continued oil operations. (See Figure 3.5 .)

Figure 3.5



Oil Revenues, 1979-80;
Majors vs. Independents.

3.5 Garfield/Goldenwest and Townlot/Downtown Areas

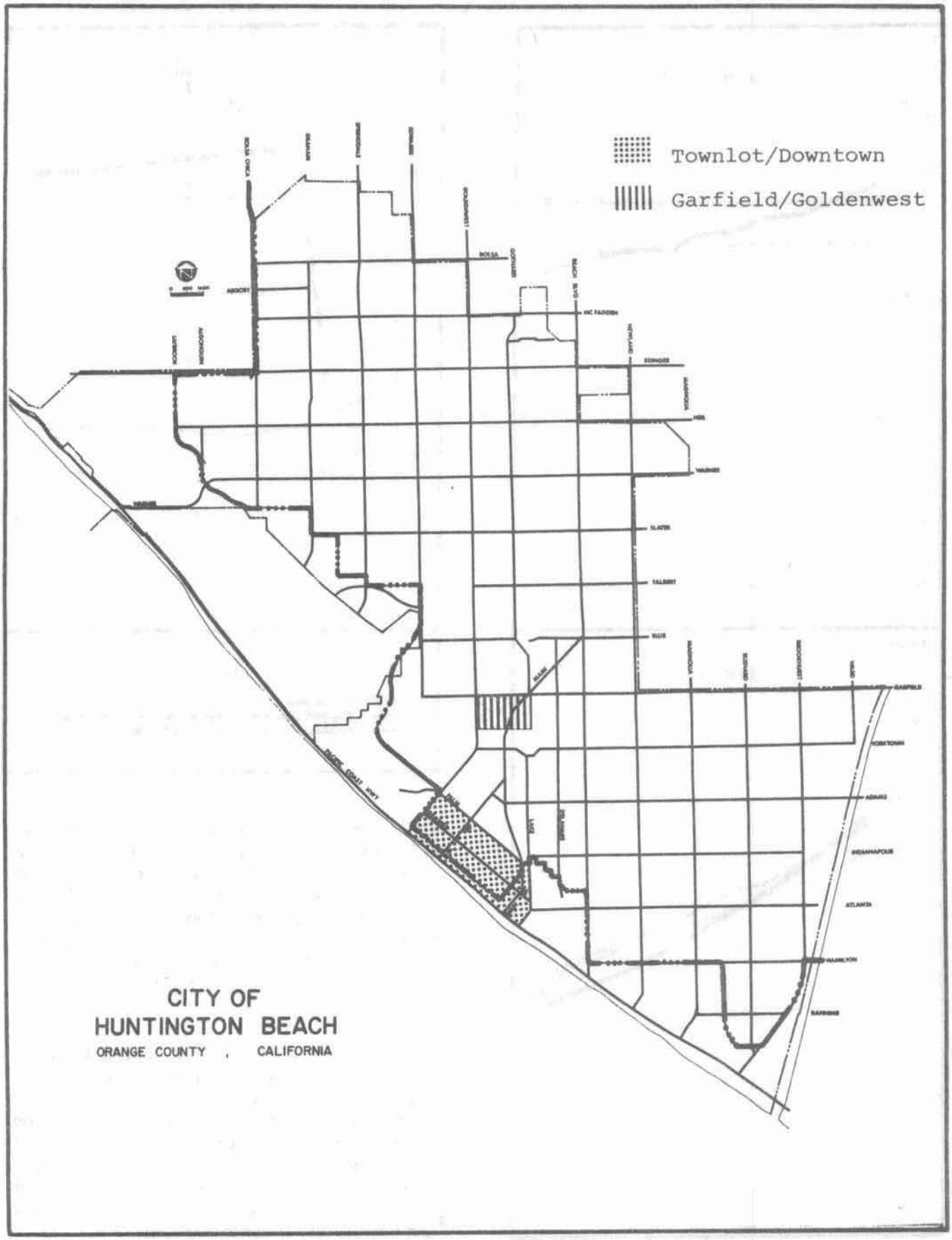
The Garfield/Goldenwest and the Townlot/Downtown parts of the City were analyzed specifically because they are examples of areas where the existing oil operations may be changing (See Figure 3.5a). Both of these areas are of great interest for future development other than oil.

Downtown/Townlot: As mentioned above, the Townlot/Downtown area is especially interesting in light of the possiblity of it recycling to new uses and its potential for unitization and enhanced recovery. These possibilities were analyzed in Scenarios 3 and 4. This section simply separates out the Townlot/Downtown from the rest of the City to help highlight the fiscal impacts specific to that area.

Figures 3.6a to 3.6c illustrate the following possibilities: 1) the existing oil operations remain active during the next decade, 2) the oil operations gradually phase out during the 1980's and 3) a unitization and enhanced recovery program is undertaken.

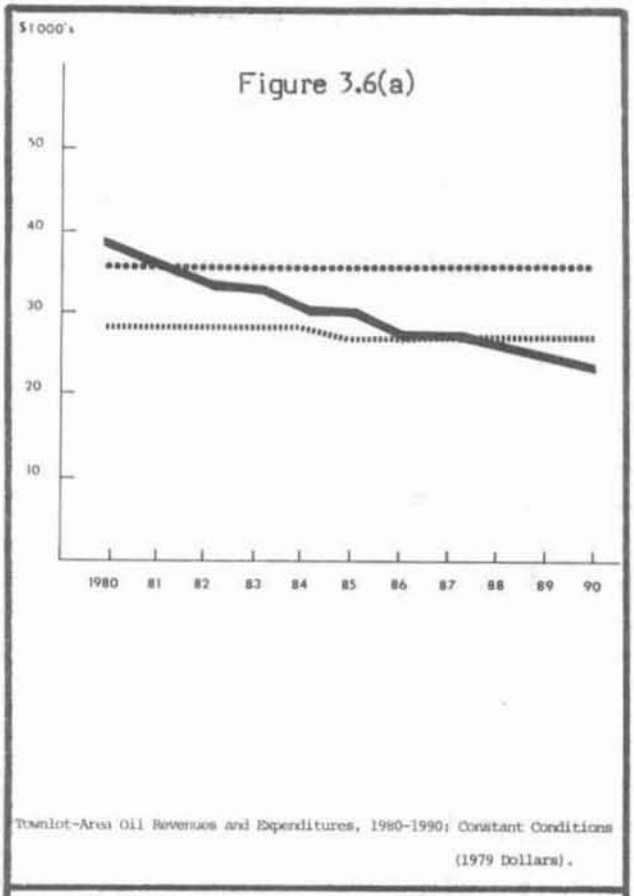
The analysis indicates that oil operations in this part of the City currently generate net revenues. However, rising service costs, and the fact that total revenues cannot keep up with inflation, will make these smaller operations net "losers" sometime during the 1980's, even if production remains at today's level. However, if a unitization program is undertaken and is successful, the oil operations would become significant net "winners" throughout the decade.

Garfield/Goldenwest: The future use of the Garfield/Goldenwest area has been the subject of considerable debate in the City. One factor which could be considered in any decision about the best use of this land is the fiscal impact of continued use as

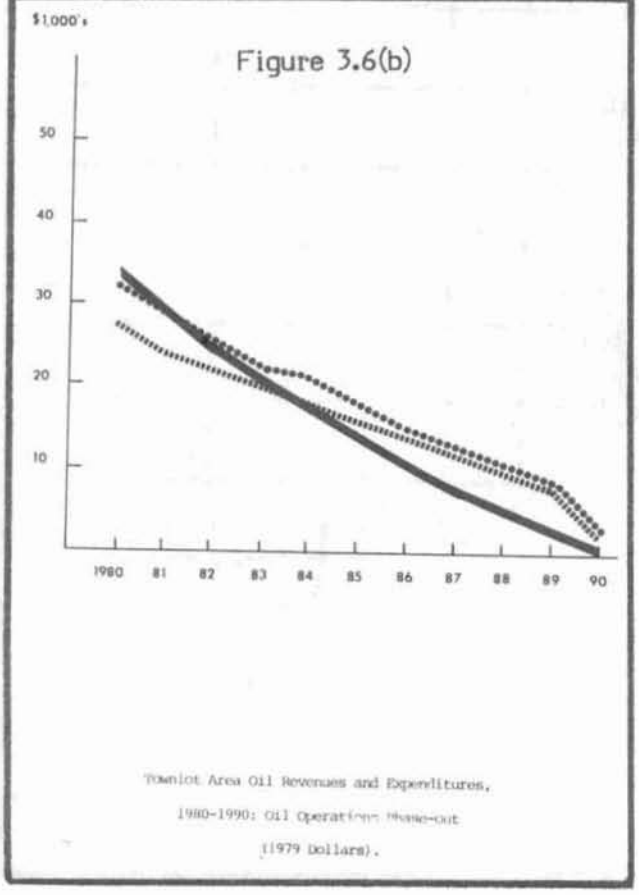


HUNTINGTON BEACH, CALIFORNIA
PLANNING DIVISION

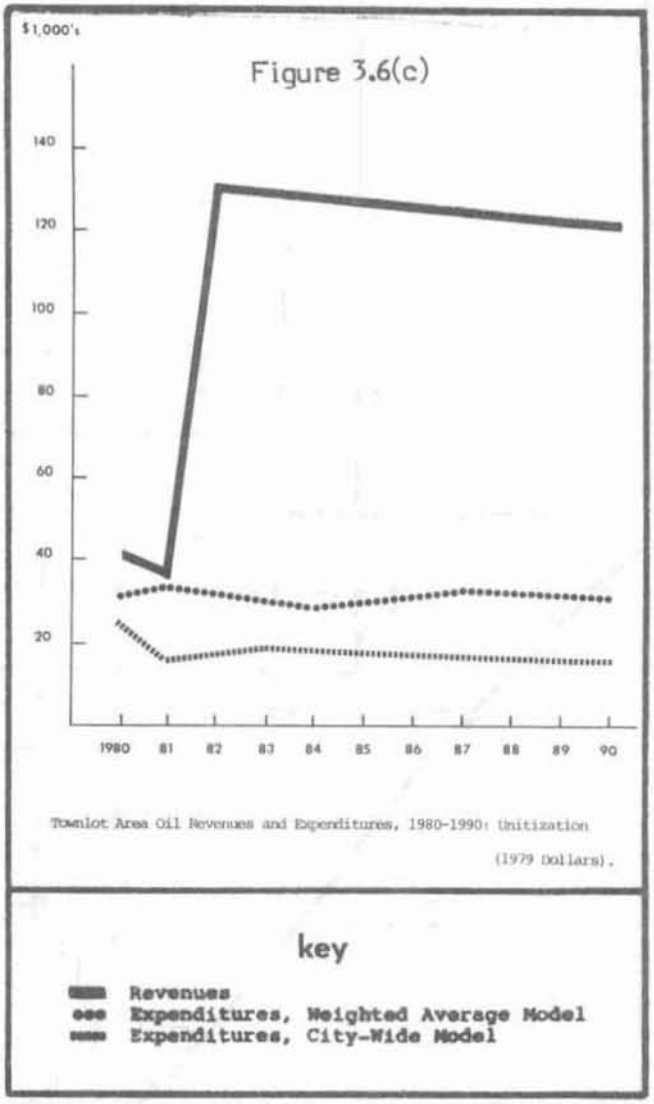
Figure 3.5(a)



Townlot-Area Oil Revenues and Expenditures, 1980-1990: Constant Conditions (1979 Dollars).



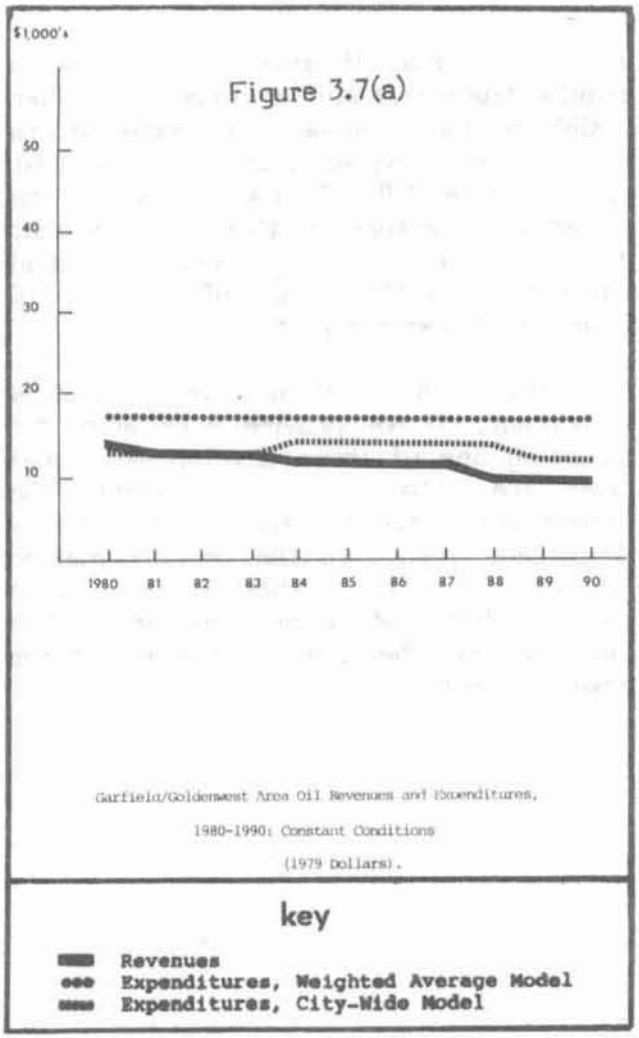
Townlot Area Oil Revenues and Expenditures, 1980-1990: Oil Operations Phase-out (1979 Dollars).



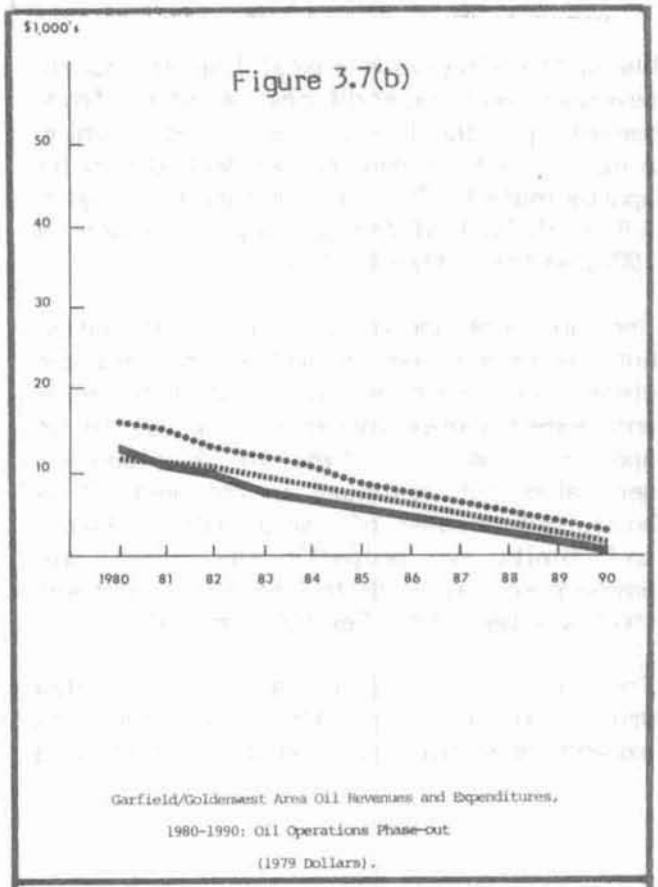
Townlot Area Oil Revenues and Expenditures, 1980-1990: Unitization (1979 Dollars).

an oil production area. Figures 3.7a and 3.7b indicate the probable impacts of 1) oil operations continuing unchanged in this area for the next 10 years and 2) the operations gradually phasing out. At this time, the oil pool under this area does not appear to be a likely candidate for unitization, so such a project was not analyzed.

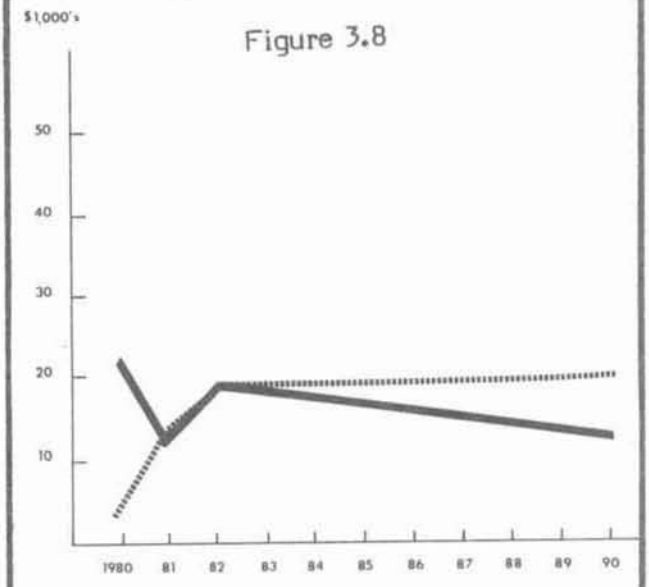
The figures indicate that current fiscal impacts are quite insignificant -- the operations demand few costs but contribute little revenue. During the decade, even if production could be maintained at current levels, the operations tend to become net losers; but again, the impacts are so small that they are essentially inconsequential.



Garfield/Goldenwest Area Oil Revenues and Expenditures, 1980-1990: Constant Conditions (1979 Dollars).



Garfield/Goldenwest Area Oil Revenues and Expenditures, 1980-1990: Oil Operations Phase-out (1979 Dollars).



Townlot Medium-density Residential Revenues and Expenditures, 1980-1990: Phase-in Thirteen Acres (1979 Dollars)

Alternative Development in the Townlot/ Downtown Area: Another aspect of the question of whether oil production should be encouraged to continue centers around the development that should replace oil operations. This section compares the fiscal impacts of oil operations in the Townlot/ Downtown to those of likely alternate uses there.*

The Townlot/Downtown area is predominantly medium-density residential, and oil lands are zoned to recycle into the same kind of use. This, combined with an acute housing shortage, make it very probable that any oil land in this area that recycles will become medium density residential.

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* The Garfield/Goldenwest area is a special case. A study is now being conducted to determine the best future use of the land in that area.

Using the City-wide Fiscal Impact Model, revenues and expenditures resulting from recycling of the 13 oil acres in the Townlot area to medium density residential can be approximated. This is illustrated in Figure 3.8, with half of the acreage recycling in 1980, and the other half in 1982.

The numbers shown are rough estimates, but the trends and general magnitudes are clear. As time goes on, revenues decrease and expenditures increase slightly. It is apparent that this type of development generates net revenues in the year it is built, but because of rising costs, inflation and limits on property tax rates and assessments, it tends to become a net loser shortly afterward. (See Section 2.3)

The most revealing aspect of this projection is that the revenues and expenditures from oil operations remaining in the Townlot (Figure 3.5a) follow a similar trend at a similar magnitude (after 1988) as the revenues and expenditures from medium density residential in that area (Figure 3.8). Further, it should be noted that neither of these development types has a very large negative fiscal impact -- in the range of five to 10 thousand dollars per year.

The conclusion is that fiscal impacts, while important, do not provide a criterion for choosing one of these development types over the other. This underscores the limitations of fiscal analysis -- it is a very important input into the decision-making process -- but there are other considerations of great importance that are involved. Section 4.0 discusses these issues more fully.

4.0 Beyond Fiscal Impacts

Previous sections have discussed the importance of fiscal impact analysis in land use decisions. Although knowledge of fiscal impacts is important, that information alone is not sufficient for the decision-maker. The effects of a land use on the City's budget must be balanced with other possible impacts brought about by choosing one land use over another. This section, while not intended to discount the value of fiscal analysis, underlines its limitations by briefly presenting some major "non-fiscal" costs and benefits.

Certain aspects of oil production are known to have impacts on the quality of life that are difficult to express in terms of dollars. Market forces alone do not usually recognize these effects and fiscal analysis is not intended to account for them. They must be recognized and introduced into the discussion through some other mechanism (e.g. the political process).

Some of these "unpriced" costs and benefits associated with oil production are discussed briefly below.

4.1 Non-Fiscal Costs

Aesthetics: Oil wells impose adverse visual, noise and odor impacts. Pumping units and tanks impose the negative visual impacts associated with onshore oil production. They are large, unattractive facilities that give an "industrial" look to any area in which they are located.

Occasionally, oil wells emit gases that have a sulphurous odor. Although the odors may not occur daily (and depend, of course, on the direction of the wind), when they are present, the smell can be offensive.

Finally, the pumping units, injectors, compressors and drilling rigs can be noisy. The severity of noise impact varies with one's proximity to the equipment and the type of equipment.

The costs associated with these kinds of adverse impacts include the diminished enjoyment of recreation areas, lowered property values and reduced visitors to nearby commercial areas.[13]

Some extreme odor and noise impacts can also impose adverse health effects on persons near the offending site.

Opportunity Costs: An opportunity cost is inevitably imposed in any situation where a choice is made between two or more alternatives. By choosing any of the alternatives, the opportunity to have one of the others is necessarily foregone. In the case of oil production in Huntington Beach, an opportunity cost is incurred by using land for oil production rather than some other kind of development.

All land in Southern California is becoming increasingly valuable. Housing is in particularly short supply. In light of this situation, the opportunity cost of oil production may be too high in some parts of the City. On the other hand, developing the surface precludes the opportunity for oil production. Unless it is clear that oil production is less valuable than another use of the land, preserving access to the oil from the surface is quite important. For example, if all oil surface in the Townlot were recycled to other uses, unitization (and recovery of millions of barrels of oil) would no longer be possible. (See Report #1, entitled "Preserving Surface Access to Underground Oil Reserves in Developed Areas", for a detailed discussion of this problem.)

4.2 Non-fiscal Benefits

Reduced Dependence On Foreign Oil: A widely acknowledged problem facing the nation is the uncertainty of our energy supply in an emergency. Every barrel of oil produced in the United States is potentially a substitute for an imported one, and the importance of small fields in contributing to the domestic oil supply should not be understated. For example, the Huntington Beach field is the seventh largest oil producer in California and produces three percent of the state's oil. Thirty-five percent of California's oil production comes from fields even smaller than Huntington Beach.

Improved Balance Of Payments: When the United States spends more money on imports than other countries spend on American exports, there is a net flow of dollars out of the country. This is called an unfavorable balance of payments. The undesirable ramifications of this situation are well known -- it aggravates inflation and weakens the dollar. Because imported oil is our single largest import, substituting domestic oil for imported oil is a significant step to help reduce inflation and strengthen the dollar.

Employment: A third benefit the City derives from oil operations is the employment the industry brings to the area. About 600 persons are directly employed in oil operations in Huntington Beach.[14] In addition, oil operators support local businesses by purchasing goods and services in the City. (This is sometimes called a "multiplier effect".)

4.3 Federal and Local Perspectives on Non-fiscal Costs and Benefits

Interestingly, two of the major benefits of oil production (reduced dependence on imported oil and improved balance - of - payments) are greater - than - local in scope. This means that the City's oil production protects the national interest by helping to improve the economy and contributing to national security. However, many of the costs, such as offensive odors, visual impacts and reduced property values, are local in nature.

The fact that the positive and negative impacts of oil operations are primarily felt at different levels of government, increases the difficulty in assessing them. Coastal Energy Impact grants, such as the one funding this study, provide funding from the federal government, which benefits from increasing energy production, to local governments to help them analyze and mitigate the adverse effects of increased energy production which tend to impact the local community.

5.0 Conclusion

Before concluding this report, two important qualifications to the analysis must be stressed. The first is to reiterate the simplifying assumptions made throughout the report. The second is to emphasize the limitations of fiscal analysis – it is only one important input to the decision-making process.

This report set out to answer the general question, what are the fiscal impacts resulting from oil operations on the City of Huntington Beach? This question was addressed for 1979-80, as well as for the next decade under four different scenarios. Further, specific attention was given to the Townlot/Downtown and Garfield/ Goldenwest areas, including how oil operations might compare to other land uses.

As emphasized by the first qualificaton above, the exact numerical figures may be subject to discussion, but the general trends and magnitudes are clear. Oil activities are a net revenue generator for the City. In 1979-80, the City received about $800,000 in net revenues from oil operations (see Section 2.0).

This trend should continue through the 1980's – oil activities will generate revenues of similar magnitude for the next decade. However, even if production levels stay the same, these revenues tend to decline slightly over the next ten years, because property tax revenues fall behind the inflation rate.

An important finding in this analysis is that most of the oil-related revenues are tied to production levels. Thus, the three major oil companies with operations in the City (Aminoil, Chevron, Union), which account for over 90 percent of total field-wide production, contribute most of these revenues to the City. Even if all the independent oil operators were to phase-out of production by 1990, net revenues would remain about the same through the 1980's (see Section 3.3).

Other noteworthy findings are the consequences of unitization in the Townlot. Such a project would dramatically increase the production of many of the less efficient wells and, although net revenues would be declining by the late 1980's, total net revenues

generated for the decade are greatest in this scenario (see Section 3.3).

The study of oil revenues and expenditures in the Garfield/ Goldenwest and Townlot/ Downtown areas are quite revealing. With the exception of a future where unitization of the Townlot takes place, oil operations in these two areas will be net revenue losers for the City. However, the oil activities in these areas cannot be considered a major financial burden to the City. The magnitude of funds gained or lost by the City in these two cases is in the range of $5,000-$10,000 (see Figures 3.5a, b, c, and Figures 3.6a, b). Further, based on the City-wide model's estimate of expenditures and revenues generated by medium-density residential development, it, too, is a net revenue loser of similar magnitude (See Figure 3.7).

Here again, the limitations of fiscal analysis are confronted. Oil activities in the Garfield/ Goldenwest and Townlot/ Downtown areas will probably result in revenue losses for the City. Medium-density residential developments in those areas are likely to involve revenue losses as well. On the basis of fiscal impact, neither land use option is necessarily preferred. Although the fiscal impacts of both uses are important, a decision to encourage one over the other will depend on other considerations beyond fiscal analysis (See Section 4.0).

This is not true, however, if the Townlot is unitized and enhanced recovery is successful. In that case, the City may gain significant revenues from oil activities in the area (See Figure 3.5c).

As a result of Proposition 13, property tax revenues, which have been the traditional financial base of local governments, will not easily keep pace with inflation. Consequently, for some land uses, the costs to the City in providing services will tend to exceed the revenues generated by those uses. This study indicates, however, that at least for the next decade, City-wide oil operations will not fall into this category and will continue to generate significant net revenues to the City of Huntington Beach.

APPENDIX A

Models for Distributing City Expenditures to Different Land Use Types

An important part of fiscal impact analysis is trying to determine what proportion of City expenditures can reasonably be attributed to the different land uses and related activities in the City. As discussed in the text (Section 2.2), a few types of expenditures can be traced more or less directly to different land uses. Examples were expenditures on police and fire calls where the City keeps records of the locations of the calls. We assumed that the percentage of total calls generated by each land use category was a reasonable measure of the percentage of total expenditures on those calls that each land use category generated. Another example was the expenditures for the salary and benefits of the City oil inspector. We assumed that his duties were tied directly to oil production activities in the City and that those expenditures could be "assigned" to oil production uses.

The great majority of expenditures, however, cannot be traced to particular uses. Consequently, a model for estimating the proportions of expenditures, among different land uses, which are not otherwise directly assignable to those land uses, was developed.

EXPENDITURE MODEL

A Word on Models

Models are approximations of reality. They are tools for making complex problems comprehensible. This necessarily means that simplifying assumptions must be made about the problem to be modeled. It is very important, therefore, to make reasonable, defensible assumptions.

The key to building a good model is to maximize its accuracy without making it too complex. A good model is accurate enough to be useful, and simple enough to be clearly understood. The expenditure model used in the analysis was designed with this as a goal.

Some important issues were considered in constructing the model. The first is the information required by the model, because the available data limit the range of models possible. The model sought is the most sensitive possible with information that is readily available.

Secondly, the expenditure model must distribute costs among the various types of land uses in a way consistent with expectations formed by reasonable assumptions and informed opinion. Although the purpose of this model is to estimate unassignable expenditures attributable to oil activities, it cannot be used for that purpose unless it distributes costs among all land use types in a way that is reasonable.

Finally, the model and analysis should be reproducible.[15] Any reader should be able to understand "where the numbers came from," and another analyst should be able to accumulate the data and use the model at some time in the future. If this is not possible, the usefulness of the study is questionable.

The Expenditure Model for Distributing Unassignable Costs

Two major assumptions were made in designing a model to distribute unassignable costs.

First, unassignable costs should be borne by all members of the City, according to some determination of each member's "fair share."

Services whose costs are unassignable are treated as "public goods".[16] A public good makes the community as a whole better off, no matter how much of the good each member of the community actually "consumes". Benefits from these goods accrue to all as members of the community, and not solely on the basis of consumption. Therefore, all who live, do business, or own property in the City should contribute their share to the community.

To determine each segment's "fair share", we next assumed that two key factors can be used to estimate the share of City expenditures for each land use type. These are 1) the area of the City a particular land use type occupies, and 2) the number of units of that land use type located in the City.

Area is simply the acreage a particular land use type occupies. It can be argued that as more area in the City develops, expenditures increase, and that the acreage devoted to different uses reflects their share of community expenses.

"Units" are measures of the degree of development of a particular land use. For residential uses, a "unit" is a dwelling unit. For commercial and industrial uses, the number of "units" is assumed to equal the number of business permits issued to that particular use; for oil, it is the number of wells; (obviously, vacant land has no "units"). The logic for this is that each "unit" is an entity that does business with the City, and each unit generates costs to the City. As units increase (i.e., as development increases), costs increase.

The relationship between acreage and units is called "density" and refers to the ratio of units to acreage (e.g.: dwelling units per acre, oil wells per acre, etc.). We assume that as density increases, total City expenditures increased (although the average expenditure per unit may decline). The models analyzed use acreage or units or both (density) as measures of the share of total unassigned costs that can be attributed to different land uses.

Analyzing Historic Data

The first approach for estimating unassigned costs for different land uses was to use a computer to analyze historic data. By using a statistical technique called "stepwise regression", we tried to see how the City's total budget has changed over time and to relate those changes to changes in the units and/or developed acreage of different land use types. Unfortunately, accurate information is available for only the last few years, and despite adjustments for time and inflation, the variables were so similar to one another (highly correlated), that no inference could be made from the results with any degree of confidence.* Therefore, efforts to design a model based strictly on past data trends and regression analysis were abandoned.

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* Residuals and Pearson correlation coefficients were analyzed. The consumer price index was used to adjust for inflation and an attempt to "detrend" the data by using "dummy" variables was made. The variables were too highly correlated to give meaningful results.

Four other models were tried. The first uses only the proportions in total developed acreage to estimate the share of unassignable costs for different land use. The second uses only units. The last two use both acreage and units (density) to estimate the proportion of expenditures for different land uses, one simply averaging acreage and units, and the other relating the two factors by a "weighted average" technique. These are discussed below.

I. Developed Acreage or City-wide Model

Model I determines the fair share of unassigned expenditures by the acreage of each land use type; each land use receives a share of unassigned costs equal to the portion of total developed acreage occupied. This is the approach used in the Ultrasystems or "City-wide" Fiscal Impact Model.[11] For example, since residential use occupy 78 percent of developed acreage in Huntington Beach, 78 percent of unassigned expenditures are attributed to residences. By the same method, 10 percent of unassigned costs are attributed to commercial uses, 8 percent to industrial uses, and 4 percent to oil. Note that vacant land receives no share of costs. This model is considered one extreme, taking only area into account.

Advantages: This model is simple, easy to understand, and reproducible. The data requirements can be readily fulfilled.

Disadvantages: It accounts for only one of the key determinants; it assumes that degree of development is not an important factor in distributing unassigned costs. It also implies that every acre generates costs equally. Further, since it is only concerned with developed acreage, it does not account for vacant land.

II. Units Model

Model II relies solely on degree of development to apportion unassigned costs among different land uses. Recall that "units" are a measure of degree of development, and that residential "units" refer to dwelling units, commercial, and industrial "units" are equated with business licenses, and an oil "unit" is an oil well.[12] Note, again, vacant land is assumed to be costless. This model is considered the other extreme, taking only degree of development into account.

Advantages: This model is also simple, easy to understand, reproducible, and has minimal data requirements.

Disadvantages: It completely discounts area as a cost factor, and assumes each unit generates costs equally, regardless of density. Since there are no units on vacant land (by definition), it is left out of the analysis. Most importantly, the distribution of costs among the uses seems skewed - residential is assigned nearly all costs, while industrial gets almost none.

The next two models try to account for both area and units.

III. Simple Averaging Model

Model III simply averages the first two. For example, residential uses are allocated 78 percent and 92 percent shares by the first and second models, respectively. This averages to 85 percent. By the same process, commercial receives 7.3 percent, industrial 4.7 percent and oil 3.0 percent.

Advantages: This model does not severely increase complexity, data requirements, or effect reproducibility. It is still comprehensible, and more sensitive to factors that actually affect costs.

Disadvantages: Area and degree of development are given equal importance in determining the share of unassigned costs attributable to each use. This means that costs do not vary according to the density of use and assumes the same average density for all uses. Further, vacant land is unaccounted for.

IV. Weighted Average Model

Model IV accounts for area and degree of development in a different way. It weighs the two factors so that it is more sensitive to density. This is done by adding the number of units assigned to a particular use to the number of acres assigned to that use. This sum is divided by the total of all units plus all acres in the City. This "weighted average" gives slightly more importance to degree of development as a factor than acreage. This means that more densely developed acres are more costly than those less densely developed. (This is true even if average cost per unit is less in more densely developed areas; overall costs tend to be higher in higher density areas.) This model attributes 87.3 percent of unassignable costs to residential, 5.2 percent to commercial, 2.3 percent to industrial, 2.3 percent to oil, and 2.9 to vacant land. See Table A.1 below.

Advantages: This model has the same data requirements and reproducibility as the previous models. It is slightly more complex, but its increased complexity can be justified by gains in sensitivity and accuracy. It is superior to the third model for two reasons. First, it can account for vacant land in a reasonable way. Second, by giving slightly more weight to the degree of development factor, the model is more sensitive to density of use - i.e., higher densities are considered more costly. This is a more realistic treatment of how the type of land use is likely to effect costs.

Distribution of Unassignable Costs Using
Weighted Average Model

		Acres	Units	Sum	% of Total
Residential	65	9,207	62,251	71,458	87.3%
Commercial	9	1,197	3,027	4,224	5.2
Industrial	6	925	965	1,890	2.3
Oil	3	472	1,460	1,932	2.3
Vacant	17	2,410	0	2,410	2.9
TOTALS		14,211	67,703	81,914	100.0%

Source: City of Huntington Beach Planning Division.

TABLE A.1

Disadvantages: Model IV is the least burdened by the disadvantages discussed above. Arguments of a more general nature about the assumptions and level of sophistication of all these models are discussed elsewhere in this section. For the purposes of this analysis, the last model meets the criteria for a good model laid out at the beginning of this section better than the others considered.

Among the models developed, this "Weighted Average Model" is the most accurate, with least confusion and with minimal data requirements. It generates reasonable results. This is the model used to carry on the analysis (although cost calculations using the "City-wide Model" are also presented for comparison).

APPENDIX B

Revenues From Other Energy Facilities

Although this report focuses on oil operations, there are other energy facilities in the City and coastal zone. These include a Gulf Oil Company tank farm and affiliated pipeline franchises; a Chevron USA tank farm; a Southern California Edison Company power plant, tank farm and pipeline and utility franchises; and other pipeline and utility franchises. These facilities are likely to remain in Huntington Beach for some time.

Because of their permanent nature, a fiscal analysis of these operations is much less relevant than a similar analysis of the "less permanent" oil operations. It is important to note, however, that the City derives significant revenues from these facilities. These revenues figures are presented below.

The revenues for 1979-80 are as follows.

Gulf Tank Farm:

Property Tax	$ 6,690
Pipeline Franchise	6,047
TOTAL	$ 12,737

Chevron Tank Farm:

Property Tax	$ 4,281
TOTAL	$ 4,281

Edison Plant and Tank Farm:

Property Tax	$364,263
Pipeline Franchise	4,362
Utility Franchise	198,131
TOTAL	$566,756

Southern California Gas:

Utility Franchise	$529,642
TOTAL	$529,642

Other Pipeline Franchises:

Pacific Lighting	$ 12,540
Standard Gas	$ 108
TOTAL	$ 12,648

Total revenues to the City from these facilities is $1,126,064 for 1979-80.

Pipeline and utility franchise tax rates are set by contracts between the City and the various companies. The major factors that affect pipeline rates are size and length of pipe, and the yearly flow through the pipe. Utility rates are based on gross sales of the product carried by the franchise (e.g. gas, electricity).

Many of the contracts are old, and set rates that are quite low. One strategy for increasing revenues from these sources is renegotiation of the contracts when they expire. A City ordinance passed in 1978 established pipeline franchise rates to be applied in future contracts. The base rates are higher than those set in the past, but more importantly, they are adjusted annually according to the "Wholesale 'Producer' Price" index - a measure of the inflation rate. As the old franchise agreements are renegotiated in accordance with this ordinance, the City can expect increased revenues that will keep pace with inflation.

Finally, some of the contracts are "indeterminate", i.e. they have no termination date. It may be possible for the City to renegotiate these by mutual agreement. Table B.1 shows more explicitly the terms of each franchise.

HUNTINGTON BEACH PIPELINE AND UTILITY FRANCHISES

Classification	Franchise	Length of Term	Monies to City FY 79-80	Commentary Regarding Franchise/Terms
Utility	So Cal Gas	40 yrs ending 2007	$ 529,642	Agreement contains provision that requires a rate of return no less than the highest percentile received by any other city being served by So Cal Gas.
Utility	So Cal Edison	Indeterminate (adopted in 1949)	198,131	The aggregate affect of the fixed minimal rate of return, indeterminate length of term, and the geometrically increasing costs to the City for street lighting has resulted in perhaps the poorest ratio of franchise revenue to energy costs of any city dealing with So Cal Edison.
Pipeline	Union Oil*	25 yrs ending 1989	422	Virtual fixed return to City--unchanged since 1964-- based on 1/2 cent per inch of pipeline diameter/pr lineal foot, or 2% of the gross annual receipts arising per use of franchise, whichever is greater.
Pipeline	Atlantic Richfield*	25 yrs ending 1988	1,249	Same terms as above.
Pipeline	Texaco*	25 yrs ending 1988	2,882	Same terms as above.
Pipeline	Gulf	50 yrs ending 1983	3,647 (Combined)	Present rate of return--fixed since 1933--has been $.04 per barrel X 2%.
Pipeline	Gulf	50 yrs ending 2006		Present rate of return--fixed since 1956--has been $.04 per barrel X 2%.
Pipeline	Gulf (tank farm)	25 yrs ending 1980	2,400	Present rate of return is fixed at $2,400 per annum.
Pipeline	Standard Gas	50 yrs ending 2006	108	Present rate of return--fixed since 1956--has been 2% of the revenue derived from use of Franchise.
Pipeline	So Cal Edison	Indeterminate (1958)	4,362	Current rate of return is derived from 2% of the gross annual receipts arising from use of franchise.
Pipeline	Pacific Lighting Service Co.	40 yrs ending 2010	12,540	Current rate of return is derived from 2% of the gross annual receipts, and/or 1% of the revenues from the sale of gas within limits of City under Franchise.

* These franchises are related to oil production in the City, and were included in oil revenues.

Source: Memorandum from Internal Auditor to City Administrator, July 8, 1977, updated with figures from the City Finance Department, August, 1980.

TABLE B.1

NOTES

1) Although this engine company has a special petroleum fire capability, it is frequently used to fight structural fires, thereby providing extra service to the City as a whole. Further, the tank farms and pipelines that are not directly related to oil production in the City (see Appendix B) require the protection provided by the company. The expenditure figure shown above is a staff estimate of the oil production share of total costs for this company.

2) Patterson, George M., "Allocating Expenditures to Land Use Categories", p. 137, Municipal Finance 36, May 1964, p.p. 136-9. Also see Patterson, George M., "Where Does the City Spend its Money?" Western City, September, 1963, p.p. 46-47.

3) The City receives additional annual revenue from the State of California Lands Commission equal to one percent of state royalties on tideland oil leases. This fund is revenue budget (604) "State Oil and Gas Lease", and was equal to approximately $100,000 in 1979-80. However, these monies are not general fund revenues - i.e. they are to be used for purposes specified by the State. Therefore, they were not included in calculations of oil revenues.

4. The State Board of Equalization rule 468 allows County assessors to reassess mineral rights valuations as oil prices rise. Since Proposition 13 permits assessments of new construction, the rule argues that an increase in the price of oil changes the value of an oil deposit such that it is treated as "new construction". This ruling is currently under litigation and, for the purpose of this report, it is assumed that the two percent limit on reassessment applies to mineral rights. Should the courts rule in favor of the Board of Equalization, City Revenues from property taxes on mineral rights would be higher than those shown.

5) This figure was obtained from Mr. Chuck Kruger at the Orange County Assessor's office.

6) This figure was obtained from Mr. Dan Brennan in the City Finance Department.

7) The number of wells connected to the wastewater system was provided by Mr. Rick Grunbaum, the City Oil Inspector.

8) This figure was obtained from the oil inspector, Mr. Rick Grunbaum.

9) The specific franchises responsible for these revenues are shown in Table B.1, of this report. The figures were obtained from Mr. Dan Brennan at the City Finance Department.

10) In 1933, Southwest Exploration Company began to produce oil from wells in the townlot directionally drilled to deposits under the ocean. When the State discovered (later that year) that Southwest was depleting an oil pool in State tidelands, it obtained a court order restraining Southwest from operating these wells. The 1938 State Lands Commission Act specified terms under which production of tidelands deposits could resume. However, to reach the oil field from the townlot, the wells were drilled under land owned by the City. The City granted Southwest Exploration rights of way under City land in an "Agreement and Easement for Right of Ways" in late 1938. This agreement provides the City a monthly royalty "equal to two percent of total royalties paid to the State of California" for oil production on Public Resources Code 392. The State's royalty is approximately 13 percent of total sales; two percent of this (the City's royalty) is .2642 percent. Aminoil, USA now operates the wells and pays the royalty as specified in the agreement.

11) It should be noted that other analysts may use different inflation figures. However, it is unlikely that a different inflation rate would significantly affect the general conclusions drawn from the analysis.

12) The City owns mineral rights to 125 parcels in the Townlot/Downtown area. If an enhanced recovery project is undertaken there (and is successful), the City will receive additional revenue from royalties earned by its mineral rights interest. The amount of the royalty will depend on the quantity of oil produced, the profit on that production, the portion of the total interest in the project owned by the City and the terms of the unitization agreement. Because these factors are not yet known, the estimate of City revenues shown in this scenario do not include receipts from royalties paid by the unit.

13) Edwin S. Mills, in The Economics of Environmental Quality, W. W. Norton Co., N.Y., 1973, p.p. 141-146, describes a method of estimating the health and property damages from air pollution by using property values. The theory is that rents and sale value of homes will be lower in heavily polluted areas, and that this reflects the value people place on cleaner air. This theory could be applied to the aesthetic impacts of oil operations in Huntington Beach. If it were, one would expect rents and property values of dwellings adjacent to oil wells to be lower than similar dwellings elsewhere. This is a reasonable expectation for which we have some preliminary evidence, and a study of actual property values in Huntington Beach would be most interesting.

14) See "Coastal Energy Impact Program" Report, February, 1980, City of Huntington Beach, Section B.4.0.

15) See Burchell, Robert W., and David Listokin, The Fiscal Impact Handbook, Center for Urban Policy Research, New Brunswich, NJ, 1978, p.p. 1-10.

16) In this particular case, the term "public good" is defined by Charles M. Tiebout in "A Pure Theory of Local Expenditures", Journal of Political Economy 64, 1956, 416-24, as follows. ". . . a public good is one which should be produced, but for which there is no feasible method of charging the consumers." (p. 417).

This definition makes sense in terms of the previous discussion on "assignable" vs. "unassignable" costs, if one reads it as "...a public good is one which should be produced, but for which there is no feasible method of measuring each user's demand." Since "assignable" costs are those which can be measured according to each user's demand, then those which cannot be measured are "unassignable". Hence, by the above definition, unassignable costs can be thought of as expenditures for "public goods".

17) See "Final Report on the Development and Application of a Land Use Fiscal Impact Methodology for the City of Huntington Beach" Vol. I, November, 1979, prepared by Ultrasystems, Inc. Irvine, CA.

18) The wells that are located on the platforms offshore are included in the total counted as oil "units". This is done, because offshore oil operations require onshore support facilities that should be accounted for in the analysis. One example is a separation facility onshore that is used for Union's offshore production. Another example is the helipad located onshore that the oil companies use to carry on their offshore operations. The extent of these onshore support activities is assumed to be reflected in the number of wells offshore. For this reason, the offshore wells are counted as expenditure generating oil "units".

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