THE IMPACT OF OFFSHORE OIL PRODUCTION ON SANTA BARBARA COUNTY, CALIFORNIA

Susan M. Wilcox

Walter J. Mead

February, 1973

This work is a result of research sponsored by NOAA Office of Sea Grant, Department of Commerce, under Grant No. 2-35208-13D. The U. S. Government is authorized to produce and distribute reprints for governmental purposes notwithstanding any copyright notation that may appear hereon.

THE IMPACT OF OFFSHORE OIL PRODUCTION ON SANTA BARBARA COUNTY, CALIFORNIA

Oil production offshore from Santa Barbara County (SBC) has an impact on the economic life of the County. On the one hand, oil production generates income for County residents, and tax income for County government. On the other hand, the County must provide certain services as a result of oil exploration and production requiring expenditures out of the tax base. Further, oil production may affect County income and expenditures through interaction with other economic activities such as tourism and fishing. This study is concerned only with identifying and measuring where possible the impact of oil activity directly or indirectly on Santa Barbara County revenues and expenditures. We seek to identify the net gain or loss to County government due to offshore oil production.

The first section will discuss incomes such as wages and expenditures accruing in SBC. Then tax receipts and governmental expenditures will be compared. The interrelationship of oil and other SBC economic sectors is the next question addressed followed by consideration of environmental changes due to oil production and spills.

I. INCOMES TO SANTA BARBARA COUNTY

Income to the County includes payments to employees working on the platforms and expenditures made in SBC as a result of the offshore operations. We will first consider the labor requirements and resultant wage bill during various phases of offshore related activities. Other expenditures within the County will then be explored.

A. Wage Incomes

1. Exploration. Offshore oil production in the Santa Barbara Channel currently comes from 13 platforms, 8 in leased State tidelands and 5 in leased Federal lands; and 42 subsea completions (unmanned, underwater producing sites connected by pipelines to platforms, onshore storage or transporting facilities). Initial activity is by survey crews operating in the area. Surveying requires specialized equipment and knowledge. As a consequence, crews are often imported into the channel area and establish only temporary residency. The men may live at sea and, in general, their incomes do not contribute substantially to the SBC economy. They may spend part of their wages in the county and some of their supplies may be purchased

locally. Assuming $25 per man-week in wages are spent on personal consumption by five men in the survey crew, an approximate expenditure of $500 per month would be contributed to the SBC economy by the survey crew.

2. Platform Installation. A platform is usually installed before drilling occurs. If a platform is not utilized, a drill ship or jack-up rig may be the operational base for drilling activities. Our cost estimates will reflect those costs associated with platform usage. The platform structure is purchased from firms outside of SBC (for about $4 million) and requires approximately 6 to 8 months to install. The installation of the platform requires about 25 men per 8 hour shift working 16 hours per day, seven days a week. This represents 50 men, or 1,500 man-days per month for the seven-month period.

3. Drilling. Drilling crews start operating after the platform is set up. While two holes may be drilled simultaneously, normal procedure has one drilling crew operating on a platform at a given time. One month is required to drill each hole. Drilling crews operate over an extended period (up to 5 years). When a successful well is drilled, production operations must begin and supporting onshore and/or transporting facilities must be operative (see discussion below).

Drilling and production is carried on simultaneously after the first hole is completed. While the average platform is designed with a capacity of about 42 wells, the average number of operating wells on a Santa Barbara Channel platform is only 30. Some holes are drilled and then capped so that the number of holes drilled generally exceeds the number of producing sites.

The drilling crew consists of 5 men per 8 hour shift, operating continuously with a drilling foreman (1 per shift) and 2 roustabouts. The drilling operations involve about 24 men per day and 720 man-days per month for a five year period.

4. Production. Technical progress has been utilized in the productive stages of offshore oil operations to minimize labor requirements. The automated production process on a platform requires 1 operator and 1 electrician per 8 hour shift at all times. Two men working 1 shift per day, 5 days per week take care of the required maintenance and a supervisor is usually designated for the area, overseeing operations of one or more platforms. The production phase of offshore operations requires only 9 men accumulating 240 man-days per month.

Production begins about 1 year after the arrival of the platform structure and continues throughout the productive life of the platform. For this analysis we will assume that the lifetime of the platform and reserves is 20 years.

5. Reworking. A well is usually reworked once in its lifetime (after about 10 years of service). This requires about one month of activity utilizing the same labor as the drilling phase, less one man. If the average platform has 30 wells, this would require 30 months of work after a 10 year period or another 630 man-days of work during the life of the platform.

6. Supporting Personnel. In addition to the personnel actually on the operating platforms, employees are necessary to maintain and coordinate onshore facilities and operations supporting the offshore activity. It is necessary to have onshore storage, separators and transportation facilities operative beginning with the completion date of the first well. Labor requirements for the onshore activities include: 2 men per shift for continuous operation of an associated gas plant (which may serve more than 1 platform), a plant foreman, 2 men per day for 1 to 2 shifts manning pier operations (wharf rental fees would be a comparable cost if piers are not owned by the company), 1 man supervising storage facilities and approximately 2 office personnel per platform in charge of accounting and other associated activities. The operation of several platforms by one company would involve shared costs for onshore supporting personnel. An estimated 350 man-days per month is therefore considered indicative of the supporting personnel requirements for an average offshore platform.

B. Note on Subsea Completions

The onshore facilities discussed above would also be required for the support of subsea completions. Survey and drilling (from a temporary barge) would be similar to platform development. Installation of the platform would be replaced after the drilling stage with the installation by divers of producing facilities, guide bases, wellheads, christmas trees and pipelines on the ocean floor. Subsequent operations require minimal supervision as the oil/gas products are piped from the ocean floor to onshore facilities or nearby platforms. Subsea completions in Santa Barbara Channel total 42 and comprise about two-thirds of the world's subsea completions.[1] The depth has not required diving in excess of 250 feet in the Santa Barbara Channel, but a recent operation was completed in Louisiana at a depth of 375 feet.[2]

In the Santa Barbara Channel, these subsea completions have proved successful for gas wells and require little attention, but they are not in wide use for oil production. Due to problems that may occur during the producing life of the subsea well, an offshore oil field utilizing sea floor completions is not likely to be developed for another five to ten years.[3] The Santa Barbara Channel subsea completions are often connected with adjacent platforms. Production reports subsequently attribute the production to the platform.

Economic data concerning subsea completions are not readily available. Reworking a subsea completion would require relocating the drilling ship or jack-up rig over the well and proceeding in a manner similar to original installation. The total cost of one well in a subsea completion is approximately the same as the total cost of one platform well when the platform total cost is divided among the wells on the platform. Development of subsea completions with multi-well capacity will generate shared costs for subsea wells and may, in the future, prove more economical than utilization of platforms for offshore oil production.

This report will combine production by subsea completions with platform production in order to estimate the impact on the County. However, visual pollution from subsea wells ends after the drilling barge has been relocated.

C. Other Expenditure in Santa Barbara County

During the exploration phase, local boats might be utilized. Local crew and supply boats are normally contracted annually at rates near $650 per month. The local contractor supplies the boat, crew, insurance and maintenance while the oil concern pays for the gas and dictates the use of the boat. Contracts received by SBC firms generate additional employment and mooring fees and promote other economic activity in the County. Total expenditures in the county for the exploration phase would include the $500 per month personal consumption figure noted earlier, $650 per month for the boat lease and approximately $2,000 per month for food and supplies purchased locally for the survey project.

Installation and production operations involve local SBC companies through boat rental and small purchases of supplies and services. We will assume that 1 boat is leased for each platform to transport supplies and personnel. An additional $2,000 per month is assumed to be spent by the oil company for local supplies and services.

Independent personal consumption expenditures will not be calculated for employees engaged in installing, drilling or producing offshore petroleum. These expenditures will be accounted for by the assumption that 75 percent of the employees working during these stages reside in SBC and spend a proportion of their total income in the County.

The utilization of Santa Barbara County resources during drilling operations is extensive. Information on two platforms indicates that 2 boats and a helicopter (for safety reasons) were contracted locally. Marine transportation resulted in expenditures in SBC of approximately $20,000 per month. Most large supplies are purchased outside of SBC; however, a token amount, $2,000 is again added to allow for small expenditures made by the oil companies in SBC during the drilling phase.

Summary

The total direct wage income to SBC can be calculated through the assumption that 75 percent of the oil company employees working on the platform (or onshore facilities) live in SBC. In the following analysis, total expenditures are tabulated with the multiple .75 representing that proportion accruing to SBC. If each man represents a different family, offshore operations on the typical platform would involve approximately 115 families in the area. The wage income received by these employees, evaluated at $50 per man day, would total $10,710,000. This income would be distributed over a 20 year period with an average of $535,500 per year incorporating all offshore oil operations together with supporting onshore operations. If 75 percent of the labor force lives in Santa Barbara County, then $8,032,500 in wages would accrue in the County, averaging $401,625 per year. The highest contribution to wage income over a single (monthly) period would be during the platform installation stage. A total of 1,500 man days per month are utilized with a wage bill of $75,000 per month (see Table 1). Offshore oil activities are more labor intensive in the developmental stages. Labor requirements reduce to minimal supervision and maintenance in the production stage (see Table 2).

Local expenditures can be summarized under the general categories of (1) marine transport and (2) other goods and services purchased. During the years in which an offshore platform is in use, expenditures in the county are estimated as follows:

1/2 of $20,000/mo. for 5 years	= $	600,000	Marine Transport*
$ 650/mo. for 16 years	= $	124,800	Marine Transport
$ 2,000/mo. for 21 years	= $	504,000	Goods and Services
$ 500/mo. for 4 mo.	= $	2,000	Goods and Services (surveyors)
		$1,230,800	

The average over a 20 year span would be $61,540 per year for the platform. Most of this expenditure would occur during the drilling period when annual average SBC expenditures would be $240,000. During the production period when drilling has been completed, the average annual expenditure per platform for SBC goods and services and marine transport would amount to about $31,800.

TABLE 1. Employment and Labor Cost (by function)

Phase	Duration	Number of men	Man-days/ month	Total man-days	Total wages	S.B.C. wages
**Exploration	4 mo.	5	150	750		
Installation	7 mo.	50	1,500	10,500	$ 525,000	$ 393,750
Drilling	60 mo.	24	720	43,200	2,160,000	1,620,000
Production	240 mo.	9	240	57,600	2,880,000	2,160,000
Reworking	30 mo.	21	630	18,900	945,000	708,750
Onshore	240 mo.	11	350	84,000	4,200,000	3,150,000
Totals	20 yrs.	115	3,440	214,200	$10,710,000	$8,032,500

*There are scale economies in marine transport. Two platforms can be serviced by one helicopter, thereby reducing the marine transport costs during the drilling operations on a per platform basis.

**Exploration is assumed to be of a temporary nature and is omitted from the total figures representing local impact.

TABLE 2 . Employment and Labor Cost
(by function and time period)

	Man-days of employment per year					Labor cost per year	
	Expl.	Instal.	Drill.	Prod.	Onshore	Total	Total-SB County
Year 1	600	10,500	720		4,200	$801,000	$600,750
Years 2-6			8,640	2,880	4,200	$786,000	$589,500
Years 6-20				2,880	4,200	$354,000	$265,500

II. TAXES

Offshore oil production generates income for Santa Barbara County through taxation. Taxes may be levied on the income and properties of the individual employees or on oil production and related activities. We will now consider property taxes and other income to Santa Barbara County from taxes paid by SBC residents working on offshore platforms.

A. Employee Related Taxes

1. Sales taxes are collected by the State of California at the current rate of 5 percent of taxable sales. Cities and counties receive 20 percent of State collected revenues (1 percent of sales) less administrative costs. In 1968, 35 percent of SBC per capita income was spent on taxable sales of retail stores in the County.[4] Assuming that the proportion of income spent on taxable sales has remained stable since 1968, taxable sales in SBC would be $140,569 per platform with the County receiving $1,406 per year, per platform.

2. Property taxes are paid to SBC by offshore employees, directly by property owners or indirectly through rental payments. At the same time, the County incurs obligations to supply street lighting, public road maintenance and fire and police protection related to housing, and education for the children of oil company employees. Since property taxes are used to finance county expenditures we will assume income and expenditure levels for the County are balanced.

3. Income taxes are collected by the State and Federal government. The collection and redistribution of income taxes at the State and Federal levels are assumed to be independent of the impact on the County due to offshore oil operations.

One might attempt to analyze the distribution effect in that net, after tax, incomes are lower than gross income and thus less consumption takes place. This would presumably lower taxable sales and the return to the County from sales tax revenues. If the amount of monies returned to the County by the State and Federal governments equals that amount collected, a loss would accrue to the County only if a larger proportion of the redistributed income was directed to non-taxable expenditures. We will assume that this is not so and that at the County level, the effect of income tax collection and redistribution is negligible.

B. Oil Related Taxes

County revenues accruing directly from oil production consist of tide and submerged land revenues, mineral rights and property taxes. County jurisdiction, however, is restricted to the eight platforms in State lands. The leased Federal lands are outside county jurisdiction, as will be discussed below.

1. Mineral Rights. The County assessor's office evaluates offshore oil and gas production for taxation purposes using physical structure, lease, production and estimated reserve statistics. The assessed valuation of offshore oil and gas in SBC was a little over $17 million during the 1971-72 fiscal year.[5] This represents approximately 18-1/2 percent of the total Santa Barbara County assessed valuation of oil and gas production. Using an average tax rate of $8.72 per $100 of assessed valuation, this would contribute $1,482,400 in revenue paid to SBC. This figure is for State lands only and would include offshore underwater completions as well as the platform operations. Since some of the subsea completions are connected to the platforms, we will consider $185,300 per platform an approximation for revenues accruing to SBC in tax payments due to offshore oil production. As the reserves are reduced, drilling equipment is removed and production rates decline, the assessed valuation can be expected to drop for any given field. The 1970-71 fiscal year had an assessed valuation for offshore oil and gas production in the County amounting to $12,868,000 with subsequent SBC tax payments of $1,122,000, or about $140,250 per platform.[6]

2. Tide and Submerged Land Revenue. Under Chapter 2160 of the California Resources Code, the Cities and Counties may receive revenues from the State as a result of offshore oil and gas production. This law states that:

> The Controller shall annually as of June 30th of each calendar year apportion for the fiscal year ending on such date to each city or county having within its boundaries tide and submerged lands or such other lands granted to it by the State in which the State has received the rights to the mineral deposits contained therein, one percent (1%) of the revenues paid to the State...from such tide and submerged lands which are in the limits of the particular county or city, except that the total amount apportioned to each city or county in each year shall not exceed seventy-five thousand dollars ($75,000) per mile, or fraction of a mile of ocean frontage within and owned or operated by a park by such city or county and leased by the State Lands Commission for the production of oil, gas,...

Currently in California the counties of Santa Barbara, Ventura and Orange and the cities of Carpinteria, Port Hueneme, Huntington Beach and Seal Beach receive State tide and submerged land revenues. For the 1971-72 fiscal year, Santa Barbara County received $33,234.89 and the City of Carpinteria received $2,959.42.*[7]

3. Property Taxes. The assessed valuation of offshore production includes valuation of the lease, reserves, production and equipment. Property taxes, however, are not paid to SBC since the offshore facilities are in State lands. Property taxes are paid on the land utilized by the onshore buffer acreage, storage and production facilities. We will consider $1,000 per year a representative figure for land tax payments and $10,000 per year for taxes on the structures associated with an offshore platform.

The five platforms in Federal waters (beyond the three mile limit) are exempt from County taxes. Bonus and royalty payments are collected by the Federal Government and placed in the U. S. Treasury under miscellaneous receipts pursuant to the United States Code, Title 43, Section 1338. The outercontinental shelf land under Federal control generates no production or property tax revenues for Santa Barbara County. The impact of the Federal platforms on county revenues is restricted to the tax income derived from employees and onshore facilities supporting the platforms in Federal waters.

---

*The City of Carpinteria only recently (Assembly Bill 1428, May 1971) received rights to revenues from state offshore production. These revenues were transferred from total County jurisdiction to shared county/city jurisdiction so that with respect to total County revenues, a redistribution, not a change, of revenues took place.

Summary. Tax revenues accrue to SBC in the form of sales taxes, mineral rights, tide and submerged land revenues and property tax collections. To estimate the revenue to the County, we assume 75 percent of total wages is spent in the County with 35 percent of the income being spent in taxable sales. One percent of the taxable sales revenue is returned as County revenues, the other 4 percent going to the State. Since some of the SBC expenditures are direct purchases of taxable items it will be assumed that 50 percent of these local expenditures are on taxable items.

To estimate the County revenues from oil production, we assume that $17 million is an accurate assessed valuation of present offshore activities providing taxes of approximately $1.5 million for the 8 State platforms. The tide and submerged land revenues and property tax receipts are added to find the total SBC tax income. The following profile of government tax revenues for SBC indicates the annual receipts:

Sales Tax (Wages)	$ 1,406/plt. for 13 plt. (platform=plt.)
Sales Tax (SBC Expenditures)	308/plt. for 13 plt.
Mineral Rights	185,300/plt. for 8 plt.
Tide and Submerged Land Revenues	4,500/plt. for 8 plt.
Property and Onshore Structures Taxes	11,000/plt. for 13 plt.

This represents $1,683,682 in tax revenues accumulated by the County annually due to oil and gas exploration and production offshore from SBC.

III. GOVERNMENT EXPENDITURES

Just as taxes may be paid by individual offshore employees residing in SBC or levied on oil production related activities, government expenditures can be similarly divided. We will first indicate the SBC expenditure requirements for the individual employees.

1. Government Expenditure on SBC residents. Goods and services provided by the County for its residents include expenditures for public protection (judicial, police, etc.), road construction and maintenance, health and sanitation, public assistance, education and recreation. We assume that the County expenditures are made on a non-discriminatory basis for all residents. At the margin, however, it should be noted that "there is increasing evidence to suggest that increased population does not increase the tax base in proportion to the cost of additional services required, but, rather, leads to higher taxes."[8]

The total expenditure for SBC for the fiscal year 1970-71 was $58,395,012.[9] With the 1970 population at 264,324 per capita County expenditures were $220.92. We assume that all goods and services provided by SBC are distributed in a manner that is independent of the occupation of the recipient, i.e., additional SBC residents engaged in offshore oil operations do not constitute a greater or lesser drain on County resources than any other resident.

2. Expenditures Related to Offshore Production. The offshore platforms have no direct county fund requirements. Onshore supporting facilities require use of County properties, but do not generate large county expenditures. Police protection has been limited to patrols which follow a set pattern so that observation of onshore facilities occurs, but no police activity directly related to the offshore petroleum industry is apparent.[10] Fire protection on the platform is provided by the oil companies and SBC fire services are only indirectly, if at all, required by the offshore operations.[11] Similarly, legal matters concerning oil companies may be considered as utilizing County supported judicial facilities, but only at a minimal level during normal offshore activities.

Offshore oil production might prove a negligible expense to the County through sanitation expenditures. The SBC dump does not have the required classification to dispose of chemical refuse and, as a result, these materials would be transported from the platforms to Ventura (or other qualified plants) for disposal.[12] Normally, accumulated garbage can be brought ashore and disposed of with SBC receiving payments on a tonnage basis for utilization of County disposal facilities. This aspect of offshore operations is assumed to take place on a self-supporting basis.

During a major oil spill, County expenditures may increase. The 1969 oil spill led to County expenditures of $57,200.[13] Most of this ($45,000) was spent on legal counsel and activities of the County Supervisors. Offshore operations in the Channel had existed more than eleven years with no major spills and many wells had been drilled before the one well on Platform A blew out. These expenses, then, cannot be expected on a regular basis and will be assigned a cost to the County of $300 per platform per year for an expected SBC expenditure of $6,000 for oil spills during the life of a platform.

3. Government Expenditure on Non-SBC Residents. Those offshore employees living outside of SBC do not significantly affect County receipts or expenditures.

Their impact would be restricted to their consumption of goods and services while in the County (purchases of gas, food, etc.) and the subsequent utilization of SBC roads and related services. It is assumed that the expense to SBC of those employees residing outside the County is totally offset by the County's tax income resulting from their personal expenditures within the County. That is, we assume that the impact of non-resident oil company employees on County expenditures (approximately 30 men per platform) is negligible.

Summary. The total expenditures of SBC funds to support offshore petroleum activities is limited to $300/yr/plt. as the expected County expenditure due to oil spills. A total County government expenditure figure for the 13 platforms, each with a 20 year lifetime, would be $78,000.

IV. INTERRELATION WITH OTHER ECONOMIC SECTORS

A 1970 analysis of the income to SBC reveals that in percentage terms the largest economic base element contributing to SBC income was Vandenberg Air Force Base (21%) followed by manufacturing (19.1%), property and pension income (18.2%), tourism (13.2%), agriculture (11.8%), UCSB (10.2%), other (4.3%) and mineral production (2.2%).[14] Since offshore oil production in State lands offshore SBC represents only about 14 percent of total SBC mineral production, it appears that the offshore oil and gas production, independently, is not a significant factor of the county's income base.[15] The question to be answered in this section is whether or not offshore oil production significantly interacts with other sectors to alter SBC economic activity.

1. Tourism. Tourism is ranked as the fourth largest sector contributing to the economic base of Santa Barbara County. Offshore oil production has been said to affect tourism by reducing the visitor's utility (enjoyment) derived from beach visits due to the oil deposited initially on the beach and ultimately on the feet, clothing and bodies of tourists. These effects may be realized during oil spills, but normal offshore production does not cause excessive quantities of oil to be distributed on the beach. One opinion is that normal production from the offshore area may tend to reduce natural seepage through lowering the pressure in undersea oil pools.

Those tourists arriving in Santa Barbara to utilize the harbor may find the marina congested. With the oil industry utilizing only 13 boats, locally owned, it cannot be assumed that the cause of congestion is the presence of offshore oil operations. In addition, sports-fishermen visiting Santa Barbara may be encouraged by the apparent growth in the fish population near the platform structures.

Tourist attractions advertised by the Santa Barbara Chamber of Commerce include Santa Barbara's Old Mission, County Courthouse, the Child's Estate, Botanic Gardens and the availability of motels with swimming pools, restaurants and shopping facilities. Also attracting the tourists are the many special events; Old Spanish Days Fiesta, horse and flower shows, symphonies and theatrical events. Santa Barbara County's offshore oil industry is independent of these tourist attractions. It should be noted, too, that the offshore oil activity would only be considered as it affected tourism along the coastal areas. Inland SBC tourist attractions would also be independent of the offshore oil.

An oil spill, in contrast to normal production, may contribute to a reduction in beach use, both by local residents and tourists. Tourists' expenditures may be diverted to activities outside of SBC. Although little effect on SBC tourism as a whole was found in a recent study of the Santa Barbara oil spill, a net loss of tourist services of $150,000 was established as representing inconveniences and the necessity of some people to choose alternate (less preferred) vacation plans as a result of the oil spill.[16] Later court settlements returned $1,050,000 to motel and apartment concerns from oil companies in compensation for losses to those businesses during the oil spill.[17] The County lost bed tax and sales tax revenues due to the transfer of tourist expenditures outside SBC. Since the County does not collect any revenues from imputed social costs or benefits, we will assume that a proportion of the court settlement ($1,050,000) will be spent in the county generating sufficient tax income to offset that income lost during the spill.

A study of oil spills occurring throughout the world in the 14 year period, 1966-1969 indicates that 75 percent of all major spills originated from vessels; three were from refineries and only two were attributed to offshore drilling.[18] More stringent offshore regulations and improved spill prevention equipment, indicate that SBC may have a low expected tourism loss from future oil spills. To represent the oil spill potential, we will assume a cost of $1,000 per year for the 13 platforms as tourist losses from delayed expenditures and utilization of judicial facilities.

2. Research and Development. Oil production and development is a concern to SBC as evidenced by this study. Spill prevention and containment devices have been designed and other studies have been conducted relating to the oil industry. To the extent that funds have been provided for local firms and institutions to research the problems associated with SBC's offshore oil industry, a direct relation is maintained between research and development and the offshore industry.

SBC has encouraged research and development oriented industries. The growth of this segment of the SBC economic base between 1960 and 1970 was 207.2 percent. Oil production and spill research has been conducted by firms and institutions locally and from outside of SBC. U. C. Santa Barbara has received $24,500 in Federal funds for oil spill studies.[19] Clean Seas Incorporated, a non-profit co-op formed by 15 companies has its approximately $500,000 annual expenses paid by the oil companies.[20] These are additional revenues entering SBC as a result of the oil operations. Other institutions, such as USC, are also receiving Federal funds to do research in the Channel area. A portion of their funds is subsequently expended in the County. These expenditures, if resulting directly from the Santa Barbara oil spill, could be considered diversions of economic resources from alternative uses. The social benefit of additional research may be offset by the social cost of neglected alternative projects which could have utilized those funds. For the County, additional tax income is created by the research and development expenditures. One-half of the annual Clean Seas Incorporated budget, $500,000, is assumed to be spent on taxable goods resulting in revenues of $2,500 to Santa Barbara County from research and development.

3. Retirement. Retirement, combined with property income, makes up the third largest contribution to the net SBC economic base with a growth rate between 1960 and 1970 of 92.7 percent. The Santa Barbara environment influences the development of SBC as a retirement area, but the relationship between offshore oil production and this economic segment is difficult to assess. Offshore oil production, if it contributes to SBC revenues with a positive net gain, may lower the tax burden for those retiring in the area. Pollution caused by offshore oil production or spills could affect the environment and in turn reduce the attractiveness of SBC as a retirement area.

Under normal production operations, we consider the offshore oil impact on retirement to be restricted to visual (platforms, barges) and, perhaps, congestion. The evaluation of this cost to the County through reduced expenditures for retirement is limited to personal preferences. For example, one resident may compare the platforms to warts on the ocean's surface while another may find the harbor view more interesting due to the night lights on an otherwise dark horizon. Retirement in Santa Barbara County is related by the Chamber of Commerce to climate, cultural events, and adult recreation and education opportunities, with no relationship to offshore oil operations. This study, therefore, suggests that offshore oil production is independent of the retirement income to SBC.

4. Fishing. The fishing industry in SBC was interrupted by the 1969 oil spill. The commercial landing of fish products at Santa Barbara during February - July, 1969 was lower than similar periods from 1968 to 1969, with the greatest reduction occurring in February when the harbor was closed because of the oil spill.[21] Concurrent landing statistics at Oxnard showed increased landings indicating that some of the fishing industry previously contributing to the SBC economy was transferred to Ventura County.

A study by the Department of Fish and Game pointed out that the entrance of offshore oil operations and subsequent installation of permanent platforms has actually stimulated marine life activity in the area, thereby possibly contributing to the fishing industry.[22] Commercial fishing boats, however, go beyond the channel area and are generally unaffected by offshore oil production during normal operations.

Legal action on behalf of 125 commercial fishermen is in progress.[23] The questions of damaged boats and potential reduction of future fish resources due to the oil spill are being considered. As in the case of tourist costs of the spill, the social evaluation does not indicate revenues or expenditures of the County. Utilization of judicial facilities and the loss of immediate sales tax revenues would indicate a pecuniary impact on the County. Since the amount of the settlement is not yet known, no estimation is available to reflect the impact of the fishing industry's losses on Santa Barbara County.

5. Other Economic Sectors. Interrelationships between offshore oil and some SBC economic sectors, such as Vandenberg Air Force Base and agriculture, would be limited if not non-existent. The oil industry would be a small consumer of SBC manufactured goods. The interaction of the manufacturing and offshore operations was discussed earlier and would be a subset of the $2,000 per year per platform expenditures in the County. Transportation activities in SBC related to offshore activities were similarly discussed above. This relation was generally limited to use of Santa Barbara marine transportation facilities.

Summary. Normal operations of the offshore oil industry appear to be independent of other SBC economic sectors. Significant relationships do develop as a result of oil spills. The change in SBC's economic situation through oil's interrelationship with other economic sectors is approximated as follows:

Tourism	(-) $1,000/year
Fishing	not available
Research and Development	(+) $2,500/year

A net benefit to the County of $1,500 per year is indicated. However, a large variance in the estimation is possible and the fishing industry's impact is not included. Therefore, we will assume that the net effect to the County due to these interrelationships is negligible.

V. ENVIRONMENTAL CHANGES

The environment has become a major concern for SBC residents and the oil companies alike. Pollution is the most publicized instigator of environmental alteration related to the Santa Barbara Channel offshore operations. Unfortunately, the environment does not have an assessed value which may be compared before and after offshore developments take place. In this section we will briefly discuss various aspects of the offshore oil production with reference to visual pollution, water and beach pollution and marine life alteration during normal offshore production activities and during an oil spill.

1. Marine Life. The marine life possibly affected by offshore oil production includes fauna and flora on the sea floor, in the ocean waters and on the nearby beaches. During surveying, platform installation and drilling operations, some

marine organisms may be displaced. However, after the platform structure is installed, evidence indicates an enhancement of the marine environment occurs.[24] Encrusting organisms adhere to the submerged surfaces with the eventual result of expanding marine life in the area.

The danger to marine life arises from the possibility of a blowout or oil leak and subsequent oil spillage from offshore operations. After the 1969 Santa Barbara oil spill, several reports evaluating the impact on marine life were funded. These studies note that the resultant damage to marine life from an oil spill is dependent upon the volume of the oil spilled, the physical characteristics of the oil and the materials used in cleanup operations after the spill.

With respect to the latter influence, it was found that the detergents used to clean after the Torrey Canyon spill had proved lethal to a variety of intertidal organisms, particularly to barnacles and limpets. They had also proved harmful to plankton in the open sea.[25] These detergents resulted in an estimated 10 percent loss of biota over a fairly large area. In Santa Barbara, the number of birds killed by the oil spill is uncertain. Estimates range from 3,700 to 15,000.[26] Other forms of marine life were contaminated by the oil spill; however, one source summarized that "studies of the (Santa Barbara spill) discharge and several large tanker spills have definitely established the fact that such discharges of oil have yet to alter the ecology of the aquatic environment."[27]

A major oil spill does contribute to the death of some marine plants and animals. The potential effect of the crude oil produced in the Santa Barbara Channel was summarized as follows:[28]

(1) Direct kill of organisms through coating and asphyxiation.

(2) Direct kill through contact poisoning of organisms.

(3) Direct kill through exposure to the water soluble toxic components of oil at some distance in space and time from the accident.

(4) Destruction of the generally more sensitive juvenile forms of organisms.

(5) Destruction of the food sources of higher species.

(6) Incorporation of sublethal amounts of oil and oil products into organisms resulting in reduced resistance to infection and other stresses (the principal cause of death in birds surviving the immediate exposure to oil).

(7) Incorporation of carcinogenic and potentially mutagenic chemicals into marine organisms.

(8) Low level effects that may interrupt any of the numerous events necessary for the propagation of marine species and for the survival of those species which stand higher in the marine food web.

The Santa Barbara spill resulted in private costs to the oil companies of $50,910 for materials, facilities and labor for bird treatment and rehabilitation.[29] Assuming one-half of this amount was spent on taxable items, an additional tax revenue of $255 was received by the County.

Normal operation of offshore platforms may have some beneficial effects on the marine life. The spill was detrimental to some degree, but, as economists, we cannot conclude that significant alteration of the marine life in the channel occurred when biologists and environmental specialists have studied the situation without unanimous conclusions.*

2. Visual Pollution. The tangible structures in the Santa Barbara Channel are causes of distress to some SBC residents. Research and development of subsea operating systems would lessen the exposed oil production structures and partially eliminate this cause of concern in the production phase. Until technological advances make this a reality, offshore production facilities are being designed with the objective of making the structures blend as inconspicuously as possible with the surrounding environment.

Given that the platforms might be considered an unnatural addition to the Channel environment, the results of a study by the Harbormaster's Office are relevant. During the period from January 1, 1966 to December 31, 1966, 1 AM, 9 AM and 5 PM observations found that:[30]

77.6% of the day's visibility was 5 miles or more
65% of the day's visibility was 7 miles or more
56.7% of the day's visibility was 9 miles or more

It was also noted that in Santa Barbara (City) an estimated 50 percent of all potential residential property has some view of the ocean. In conjunction with the

*For a summary of oil spill study results, see Mead, Walter J., Philip E. Sorensen and Kenneth J. Saulter. The Santa Barbara Oil Spill: An Economic Appraisal. Unpublished manuscript, p. 90-93. July, 1972.

visibility statistics, this would indicate that the platforms could not affect the view from most SBC homes.

Visibility is probably greater looking from land since the dark structure contrasts with the light grey-blue ocean. The platforms' visibility, however, contributes to easier navigation, serving as points of reference, and, on occasion, as markers for boat races.

Evaluation of the aesthetic properties of any structure is made impossible by the varying individual conceptions of what constitutes an attribute and what is detrimental to the surrounding environment. The platform structures have been a controversial issue in the coastal area; however, the monetary representation of this controversy is lacking, as is a resolution. This study notes that the platforms constitute visual structures in the Channel, but attributes negligible loss or gain to the County due to their visual existence.

3. Oil Pollution. Oil on the beaches is a pollutant which may result from oil spills. Oil pollution was present before the platforms were introduced due to the natural oil seepage in the channel area. To say that oil is observed on the ocean's surface and on the beaches is not to exclude it as a pollutant. However, it cannot be a pollutant attributable to the development of the offshore oil industry.

Apparent oil pollution due to the major oil spill was subsequently removed or covered up by the oil companies and by normal sand movement. The cleanup included the oil spill deposits and other debris on the beach independent of the oil spill. Additional oil pollution during the spill was temporary but did result in a loss of oil ($130,000 net), and later through reduced drilling activities, lowered revenues.

4. Air Pollution. Offshore oil production requires the use of energy generating facilities. As such, it contributes some additional pollution to the atmosphere. We consider these minimal as an environmental alteration in the County since transportation of employees and supplies is required for most industries.

Oil spills, however, may contribute added pollutants to the air. Possible burning of piles of collected oil-soaked debris would presumably be a cause of significant increases in particulates released in the environment. The evaporation

of oil slicks on the ocean might also release additional chemical vapors into the atmosphere. The oil slicks could interfere with normal air/sea evaporation and heating cycles. However, no evidence or studies concerning these effects are available.

The presence of oil may, at times, be noted by nearshore residents without visual proximity to the ocean. Natural seepage has long been noted to produce a strong petroleum odor which may pervade the inland areas. This form of air pollution was evident to a higher degree following the 1969 oil spill.* We assume that the majority of SBC residents exposed to the smells would be unfavorably impressed by the aroma.

5. Onshore Facilities. Air pollution related to onshore facilities would be minimal. Oil refineries are not located in the County and the gas plants are not heavy polluters. Water piped onshore with the oil and gas is separated onshore and passes through a water treatment process before it is released. No information could be found concerning this recycling of the water and it is assumed to contribute no alterations to the environment.

Summary. Santa Barbara County offshore oil industry provides employment to support approximately 115 families. The wage income for these employees generates revenues to the County through taxes. Oil production also provides tax income for the County. Santa Barbara County tax revenues from offshore oil activities are approximately $1,683,682 annually.

County expenditures generated by the offshore oil operations are minimal. Legal counsel costs during the oil spill require county expenditures of $3,900 per year ($300 per platform per year). Interrelationships with other segments of the Santa Barbara County economy were found to add $1,500 per year to the County's revenue. With the future addition of fishing losses, we assume that the total impact of the offshore oil industry on other Santa Barbara economic sectors are of an insignificant magnitude. County revenues and expenditures attributable to offshore oil's influence on the environment are limited to a one period county revenue of $255 (approximately

---

*Black Tide author, Robert Easton entitled one chapter "The Stinking Mess."

$13 annually for 20 years) during the oil spill cleaning activities. The net impact of the offshore oil production on the Santa Barbara County budget is calculated to provide $1,679,795 annually in County revenues ($1,683,682 + 13 - 3,900).

FOOTNOTES

1. State of California, Resources Agency. The Offshore Petroleum Resource, p. 89. 1971.

2. Anon. "Shell Makes Subsea Completion in 375-ft Water Off Louisiana." Ocean Industry, Vol. 7, No. 8, p. 58. Aug., 1972.

3. State of California, Resources Agency. The Offshore Petroleum Resource, p. 89. 1971.

4. Security Pacific National Bank, Economic Research Development. The Southern California Report, p. 115, Table 47, and p. 105, Table 33. March, 1970.

5. Assessor's Office, telephone communication.

6. State of California, Resources Agency. The Offshore Petroleum Resource, p. 161, Table III-6. 1971.

7. Assessor's Office, telephone communication.

8. Ventura County Tomorrow Plan - 1999, p. 7. May 1, 1972.

9. This and other budget information from: State of California, Controller's Office. Annual Report of Financial Transactions Concerning Counties of California Fiscal Year 1970-71.

10. Santa Barbara Police Department, telephone communication.

11. Santa Barbara Fire Department, telephone communication.

12. Santa Barbara Sanitation Department, telephone communication.

13. Mead, Walter J., Phillip E. Sorensen and Kenneth J. Saulter. The Santa Barbara Oil Spill: An Economic Appraisal. Unpublished manuscript, p. 46. July, 1972.

14. Keisker, Albert D. and Associates. Economic Base Analysis Santa Barbara, California, Table 2. 1970.

15. 18% of SBC oil-gas is offshore - Assessor's Office, telephone communication. 78% of SBC mineral production is oil and gas - Oil Well Inspection Department. Effects of Federal Leasing Outer Continental Shelf. Preliminary Report, p. 5-11. November 15, 1967.

16. Mead, Walter J., Phillip E. Sorensen and Kenneth J. Saulter. The Santa Barbara Oil Spill: An Economic Appraisal. Unpublished manuscript, p. 75. July, 1972.

17. 1/31/73 telephone communication with Mr. John Harnock, member of a Santa Barbara attorney firm.

18. State of California, Resources Agency. The Offshore Petroleum Resource, p. 32. 1971.

19. Mead, Walter J., Phillip E. Sorensen and Kenneth J. Saulter. The Santa Barbara Oil Spill: An Economic Appraisal. Unpublished manuscript, p. 97. July, 1972.

20. Clean Seas Inc., telephone communication.

21. State of California, Resources Agency. The Offshore Petroleum Resource, p. 70. 1971.

22. State of California, Resources Agency. The Offshore Petroleum Resource, p. 25. 1971.

23. 1/31/73 telephone communication with Mr. John Harnoch, member of a Santa Barbara attorney firm.

24. State of California, Resources Agency. The Offshore Petroleum Resource, p. 147. 1971.

25. Easton, Robert Olney. Black Tide. Delacorte Press, New York, p. 147. 1972.

26. Easton, Robert Olney. Black Tide. Delacorte Press, New York, p. 261. 1972.

27. Everitts, Donald J. and John F. Matthews. "Report of a Study on California State Regulations and Inspection Practices of Oil and Gas Operations and Oil Pollution," in 1970 Offshore Technology Conference Preprint, vol. I, p. 677. 1970.

28. Mead, Walter J., Phillip E. Sorensen and Kenneth J. Saulter. The Santa Barbara Oil Spill: An Economic Appraisal. Unpublished manuscript, p. 88. July, 1972.

29. Mead, Walter J., Phillip E. Sorensen and Kenneth J. Saulter. The Santa Barbara Oil Spill: An Economic Appriasal. Unpublished manuscript, p. 100. July, 1972.

30. Oil Well Inspection Department. Effects of Federal Leasing Outer Continental Shelf. Preliminary Report, p. 6-15. November 15, 1967.