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Petroleum Extraction in Santa Barbara County, California: An Industrial History

Final Report

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3. INDUSTRY STRUCTURE

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BACKGROUND: MMS requested an historic analysis of the petroleum extraction industry in San Luis Obispo, Santa Barbara and Ventura Counties from 1950 to 2015. Separate, stand-alone reports on each of the three counties include an analysis of the oil industry's evolution and projected future, its relationships with the surrounding communities, and its role in a complex economy. We also attend to the regulatory context in which oil does business, and to the kinds of innovations developed to operate in the Santa Barbara Channel's natural and social environment. In addition to these reports, we have produced an inventory of all firms operating in the tri-counties during these years, and which oil fields they operated (MMS98-0061).

OBJECTIVES: Our goal is to provide an historical analysis of the evolution of the petroleum extraction industry in Santa Barbara County, including its changing business structure, economic impacts, technological advances, local social contexts, and governmental effects. We attempt to depict a comprehensive view of what an industry means as it operates in a given locale, documenting a wide variety of both direct and indirect consequences and relationships.

DESCRIPTION: Our methods are diverse, tailored to the specific research issue and available data. We interviewed or consulted approximately 100 persons with relevant views or information, drawn from a wide variety of business, government, and civic groups. We scrutinized government statistics from state, federal, and local agencies. We used multivariate regression analysis to determine economic effects; we examined tax documents to specify industry dollars contributed to the county tax base. Through interviews, phone inquiries, and document searches, we derived estimates of the industry's local philanthropic contributions. We reconstruct, using state of California archives, a record of company activities in terms of which firms operated in which fields at which time points. We also provide information regarding oil firm adaptation and the special role of environmental consulting companies as part of the industry.

We provide information regarding local support and opposition to the industry and how political campaigns affecting the industry were conducted and funded. We indicate the nature of the industry's labor supply, including the wage levels of personnel. We analyze the kind of regulations and local oversight faced by the industry and the way controversies, regulations, and permitting activities impacted local government operations. We also discuss technological advances stimulated by local drilling and production. Finally, we offer scenarios of potential future local operations.

SIGNIFICANT CONCLUSIONS: The petroleum industry's long presence in Santa Barbara County has had important impacts both on the industry and the region, but not always of the expected kind. In economic terms, the effects have primarily been significant in terms of contributions to the county tax base (especially in certain earlier periods), as opposed to significantly stimulating growth in the private economy. In terms of business structure, the Santa Barbara County oil industry has consistently allowed room for small operators and independent producers, despite dominance by major companies. In terms of social context, the industry has been highly controversial, reflected in an on-going split between north and south county communities on the benefits and liabilities of the industry.

In part due to the county's internal controversies over the industry, it has been highly regulated compared to its operations elsewhere, having consequences both for the industry's ability to time its projects and the county's administrative capacities. Among the innovations have been changes in regulatory rules as well as technological advances (stimulated as well by specific geologic conditions). Given current local and national attitudes toward the industry and offshore drilling in particular, any new initiatives will be carefully scrutinized by local government units.

STUDY RESULTS: The decline in volume of oil produced in Santa Barbara County onshore was compensated by offshore development, at least through the early 1980s. Based on our econometric analysis, it appears that although oil activity has been a steady part of the local economies over the period of our study, the region would have been equally as well off economically had there been no such activity. We could not find, using our regression analyses, any statistical pattern of positive impacts of the industry's presence on the overall scale of economic activity. In terms of property tax payments, the industry generated $12.6 million in county revenues at its 1985 high point, a level it has recently approached again in 1996 after a decade of declining tax payments (falling as much as 33 percent in 1991).

The industry structure was remarkable in the degree that opportunities for new entrants continued over time, rather than the tendency toward monopolization often characteristic of industrial maturation. While major oil companies predominated until very recently, large independents and smaller operators have constantly been a significant part of the industry, keeping over 100 different producers in the fields of Santa Barbara County across the years. Turnover among producers (except, until recently, the major companies) has been a regular feature of the county's industry, with successive waves of operators finding opportunity in the declining fields that no longer seemed as promising to previous producers. That is true of Outer Continental Shelf (OCS) activity, where a significant shift continues of major operators leaving the area, turning their investments over to smaller independents. Some oil-related firms diversified beyond petroleum operations, including a significant sector of environmental consulting which is particularly strong in the Santa Barbara South Coast region.

Santa Barbara County's relatively stringent regulatory regime on all development issues has affected oil with particular force. Costly political campaigns have been waged, including elections at the local supervisorial level and county-wide initiatives affecting the industry. The North County region tends to support the industry's expansion, both through the kinds of candidates it elects to office and voters' positions on oil-related initiatives. Past pollution events, especially the 1969 oil spill and—to a lesser degree—the long-term and high-volume diluent spill at the county's northern border, are significant to local discourse. In terms of innovations over the years, the most important local technological advances have come in the form of enhanced capacity to drill at great water depths. Regulatory innovations have also been strong, such as the SEMP program through which the industry pays offsets as its impacts are detected and measured rather than through fees set in advance of development.

Current proposals for additional oil activities (and likely scenarios for the near-term) involve one or two slant-drilling initiatives. Given the modest impacts of the industry's current production regime, it is doubtful that such operations will have important aggregates impacts on the county's economy, social make-up, or governmental structure (although site-specific impacts are potential).

STUDY PRODUCTS:

Adamson, Michael R. "Oil Exploration and Production in California's Santa Barbara and Ventura Basins: The Structure of Industry, 1950-1995."

Adamson, Michael R. "Oil Exploration and Production in California's Santa Barbara and Ventura Basins: The Persistence of Small Entrepreneurs in the Regional Oil Industry, 1950-1995."

Adamson, Michael and Randolph Bergstrom. *Exploration and Production in Ventura, Santa Barbara, and San Luis Obispo Counties, California: Oil Well Operators, 1950-1997.* OCS Study MMS 98-0061.

Beamish, Thomas D. *Silent Spill.* Ph.D. Dissertation. Department of Sociology. University of California-Santa Barbara.

Beamish, Thomas D. "Silent Spill: Responsible Party, Remedial Agency, and Community Responses to a Creeping Case of Contamination." A paper presented at the annual meeting of the American Sociological Association, San Francisco, August 1998.

Beamish, Thomas D, Harvey Molotch, Perry Shapiro and Randolph Bergstrom. *Petroleum Extraction in San Luis Obispo County, California: An Industrial History.* OCS Study MMS 98-0049

Beamish, Thomas D. and Krista Paulsen. "The Santa Barbara Channel Post-Petroleum Economy: Environmental Consulting Proliferates."

Nevarez, Leonard, Harvey Molotch, Perry Shapiro and Randolph Bergstrom. *Petroleum Extraction in Santa Barbara County, California: An Industrial History.* OCS Study MMS 98-0048.

Paulsen, Krista, Harvey Molotch, Perry Shapiro and Randolph Bergstrom. *Petroleum Extraction in Ventura County, California: An Industrial History.* OCS Study MMS 98-0047.

Romo, Jacqueline. *Women on the Rigs: A Gender Accomplishment.* Masters thesis. Department of Sociology. University of California-Santa Barbara.

Section 1
Introduction

In this report we examine the history of the petroleum extraction industry in Santa Barbara County from a variety of angles and using several different methods. We examine the economic impacts of the oil industry in this region, uncover the various elements of the oil production and processing industry, describe the movement of oil activities and companies across the county, trace the industry's local presence and transformation over time, and turn an eye toward the social and regulatory context in which petroleum extraction occurs. In addition, we look at how this region has shaped the oil industry by uncovering the technological innovations developed to extract local oil and tracing the fates of oil-related firms who remain in this area despite the industry's recent decline. The report examines topics not traditionally covered in conventional industrial histories such as labor relations, interactions with local communities, corporate philanthropy, and political campaign contributions, which we include here in order to provide a fuller account of the petroleum extraction industry's impacts in Santa Barbara County.

This report centers on the oil industry as it has developed in the tri-county region. For more information on how the people of these counties have responded to oil development, see "Ventura County: Oil, Fruit, Commune and Commute"; "Santa Barbara County: Two Paths"; and "San Luis Obispo County: A Major Switching" (Minerals Management Service Studies 96-0035, 96-0036, and 96-0037, respectively).

We were charged with dividing the years between 1950 and 2015 into distinct temporal periods. We use four periods in this study, each suggested by trends in the local oil industry. We begin with 1950-1968, a period of "Exploration and Expansion" for the industry. During these years terrestrial oil production was still strong in Santa Barbara and Ventura Counties, and offshore leasing and development were just getting under way. Our next period, 1969-1986, we call "The Environmental Era." National and local environmental regulations introduced in the wake of the 1969 Santa Barbara Channel oil spill changed the way that oil would do business in the tri-counties. The industry would have to conform to new expectations from both local residents and the government agencies that represented them. The third era, lasting from 1987-1996, was one of "Decline and Deindustrialization" in this region. Following a drop in the world price of oil, several companies scaled back or sold off local operations (one exception was new offshore development in the western Santa Barbara Channel). Oil extraction in the region did not cease, but it was increasingly performed by small operators, and new exploration reached an historic low. Finally, our fourth era is "The Future" which, for this study's purposes, stretches between 1996 and 2015. During this era we anticipate that oil activity will increasingly center on clean-up and remedial tasks, and that the move toward smaller operators will continue.

Although these historic periods guided our investigation and gave it a temporal structure, for ease of reading we present our findings in thematic, rather than chronological, order. Where appropriate, we direct the reader to information on a specific topic that is found in more than one thematic section.

Our observations and conclusions are based on the following methods: approximately 100 non-standardized in-depth interviews (that is, not using a survey question format); corporate documents from oil companies; media accounts of oil development; data contained in state documents, including those compiled by the California Division of Oil, Gas and Geothermal Resources; US Census data on employment and socioeconomic indicators; local government reports; environmental impact reports for oil-related projects; telephone and street directories (including electronic databases); local historical society archives; and published accounts of the oil industry and its employees. We explain the particular methods used for each oil-related topic in its corresponding section of the report. Whenever feasible, we checked information against more than one source and tried to assemble reliable indicators, including quantitative ones, on trends and patterns we set forth.

* * *

Consisting of Santa Barbara, Ventura, and San Luis Obispo Counties, the tri-county region has a long history of oil industry activity. First onshore and later in adjacent state and federal waters, tri-county oil and gas extraction has been substantial throughout the century, as shown by Figures 1.1 and 1.2 (at the end of this section). This history of oil production corresponds to an industrial and local context which we examine in this report (at the end of this section, see Map 1.1 for the location of the county and major communities).

Economically, the industry's significance varies, depending on the particular dimension being examined. We find that oil production's benefit to local incomes is real yet statistically insignificant (Section 2.1: Econometric Analysis). Comparing oil employment with other local sectors helps explain this effect: Santa Barbara County has consistently depended more on jobs from tourism and white collar industries than on jobs from the oil industry (Section 2.2: Oil and Other Sectors). However, oil activities have generated large tax payments that have provided Santa Barbara County with a stable source of revenue since the 1980s (Section 2.3: Tax Payments). The county's nonprofit organizations have especially benefited from philanthropy by oil companies and workers (Section 2.4: Philanthropy).

Oil activities involve a set of processes, infrastructure, and firms that have changed considerably over time. We describe the sequence of activities that have occurred in the region, from local exploration to transporting product outside the county (Section 3.1: Basic Processes and Linkages). As Map 1.2 (at the end of this section) shows, oil and gas extraction is concentrated in several fields within and off the shore of Santa Barbara County. These fields correspond to a history of exploration and development by a changing group of entrepreneurs and corporations (Section 3.2: Producers, Fields, and Corporate Forms). Declining oil prices in the last decade have induced local changes to the industry that affect more firms than those strictly involved in production. In ancillary sectors, many oil supply and service firms have transformed themselves to adapt to declining local production (Section 3.3: Adaptation and Diversification). Currently, the strongest growth sector of Santa Barbara County's oil industry may be environmental consultants working on environmental remediation and project abandonment (abandonment is also referred to as "decommissioning" in technical and policy circles) (Section 3.4: Environmental Consultants).

Oil activities occur in a community context; in Santa Barbara County, this context has dramatically changed the way the industry usually works. Community sentiments for and against the industry have long been polarized between the northern and southern halves of the county, respectively (Section 4.1: Local Support and Opposition). Particularly in the city of Santa Barbara and neighboring communities on the "South Coast," outrage after the 1969 Santa Barbara Channel oil spill and environmental concerns have produced an unusually frustrating setting for oil companies. This is exemplified by several political referenda on county policy regarding the industry's onshore infrastructure; through donations to referenda and other electoral campaigns, the oil industry has sought to protect their local financial stakes that opponents of oil threaten (Section 4.2: Campaign Contributions).

The oil industry's local workforce also illustrates the unique context presented by Santa Barbara County and the tri-county region in general. Local oil workers have long been known in the industry for their historical expertise in technical matters, from geologically-informed exploration efforts when onshore development began to deep water expertise in the era of offshore platforms. These and other attributes of local oil workers frame recent labor adaptations to workplace regulation and declining oil production (Section 5: Labor).

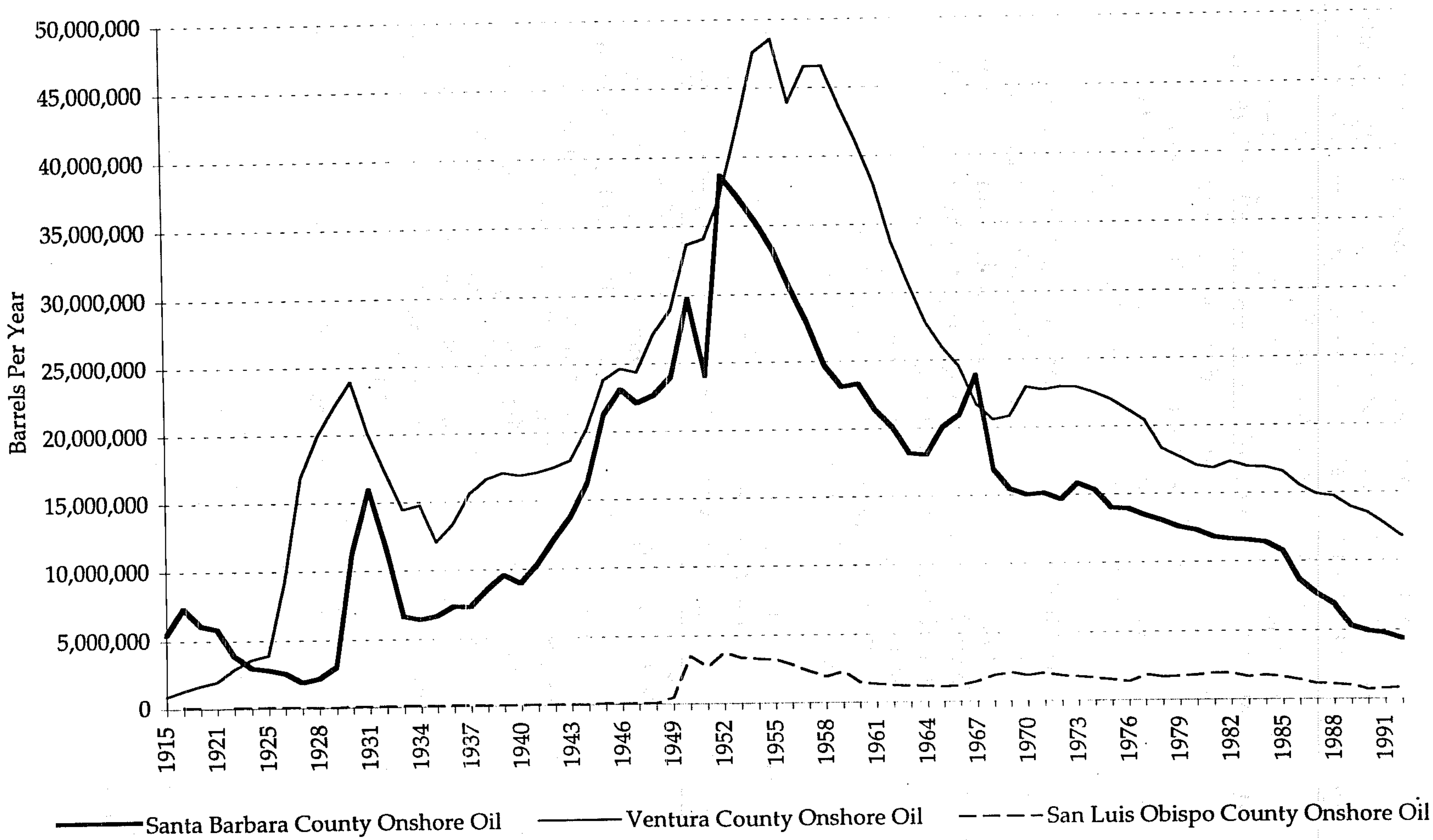
Oil faces a political environment in Santa Barbara County that, again, is perhaps unique among the many places where the industry operates. Combined with state and federal regulations, county laws heavily regulate the way the oil industry does business locally (Section 6.1: Regulations). Additionally, the industry faces a county bureaucracy whose intervention into oil activities has grown steadily since the 1969 oil spill (Section 6.2: Local Oversight). However, the oil industry does not only react to local government; it also shapes local government's capacity to oversee industry activities, as the pressure that oil activity places on county decision-makers' time and resources illustrates (Section 6.3: Agenda Impacts).

Oil and gas activities in and off the coast of Santa Barbara County assume a particular technological form. Since offshore development began, the industry has had to innovate new technologies and procedures in order to surmount the Santa Barbara Channel's geological obstacles. Subsequent environmental regulations and market cycles have also motivated imported technological changes. As local innovations are imported to other regions of oil activity, Santa Barbara County in effect transforms the oil industry far beyond its local presence (Section 7: Technological Innovations).

With these factors in mind, we project the local impacts of future oil development scenarios (Section 8: Future Scenarios). No new development almost certainly means the eventual end of local oil activity, since current development is at a "mature" stage, and most projects are slated for abandonment in the next few decades. One new slant-drilling project (which we anticipate will occur on the South Coast) will forestall the decline of oil activity, as well as the community institutions which regulate and oppose it; however, its fiscal benefit to the county will likely be modest, while local costs to the producer will remain high. These outcomes are not radically modified by the prospect of a second new slant-drilling project (which we anticipate will occur on the northern county coast). Such a project will require extensive new industrialization that will boost local business for ancillary oil sectors; however, the decline of local support and service firms means non-local contractors will generate very modest fiscal benefit to the county economy. Meanwhile, the second project will entail more permitting activity than usual, which in turn increases the likelihood that opponents raise the project's costs to almost prohibitive levels.

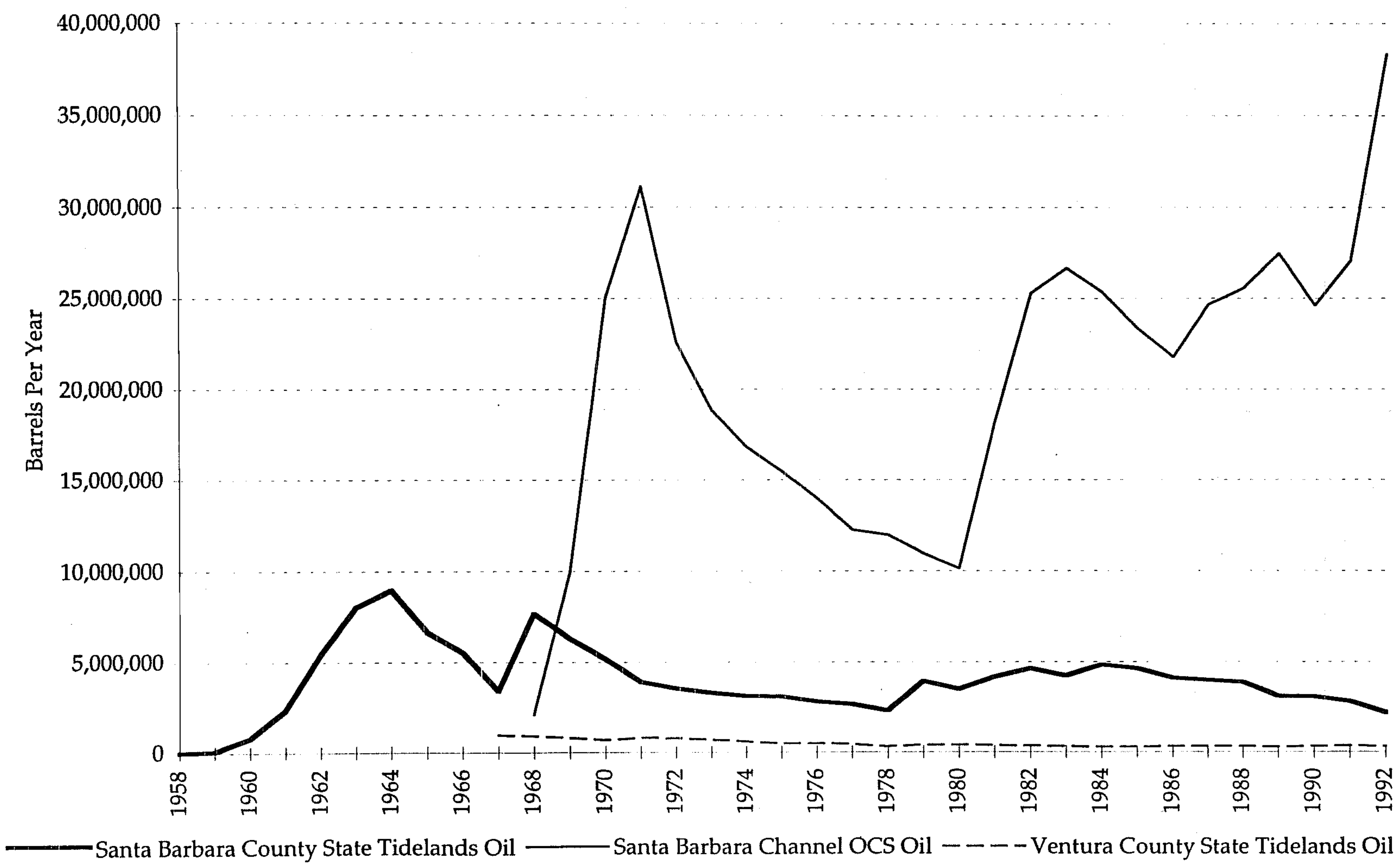
Finally, we include a chronology of oil industry event in Santa Barbara County (Section 9). This list includes details on well development, corporate mergers, and offshore platform installations. In addition, an appendix is available (as a separate volume) that details all the oil companies operating in the county since 1950 and the fields in which they operated.

Figure 1.1: Tri-county onshore oil production, 1915-1992



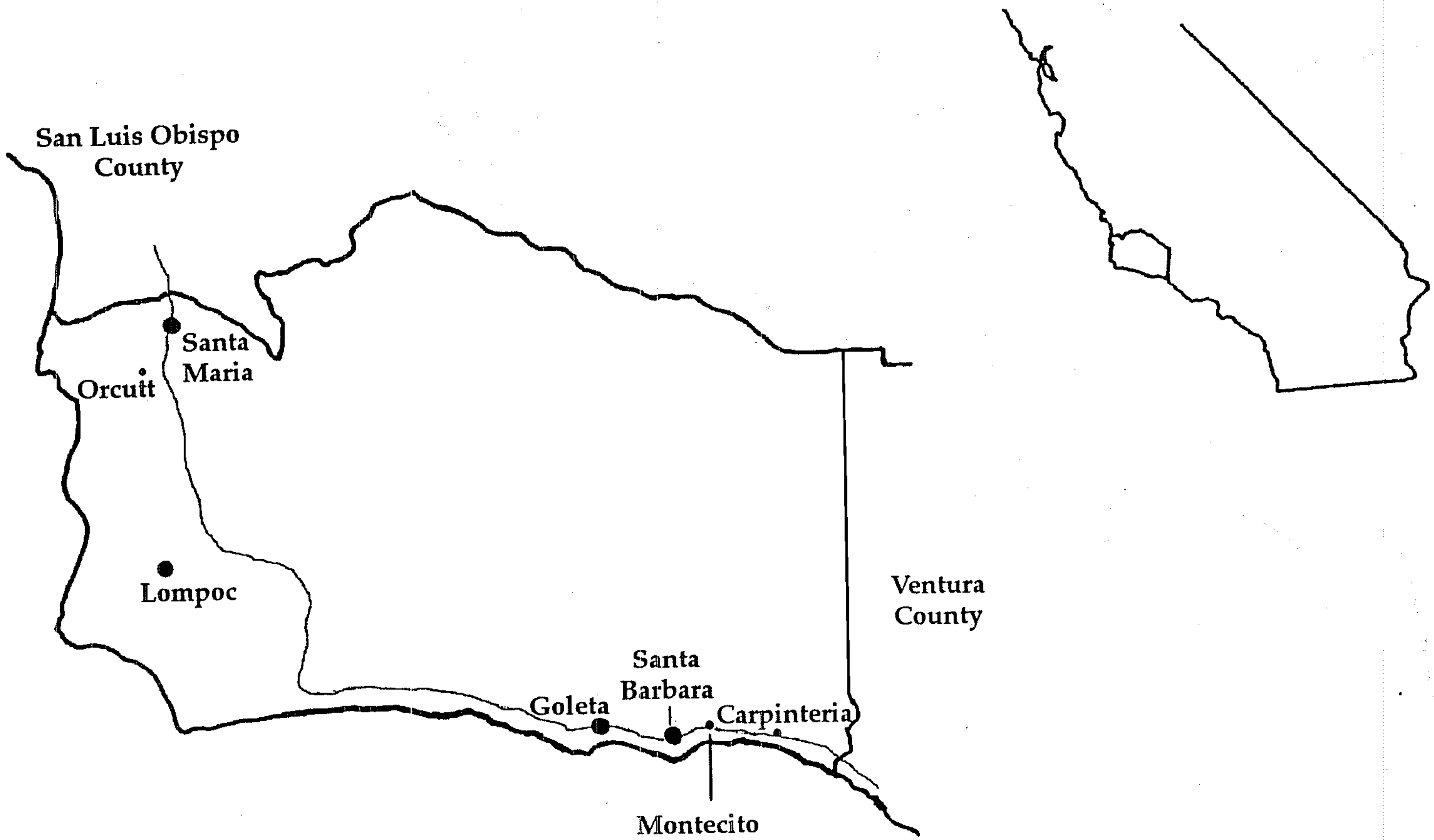
Source: Annual Reports of the Oil and Gas Supervisor, California Division of Oil, Gas, and Geothermal Resources.

Figure 1.2: Offshore production in Santa Barbara and Ventura Counties

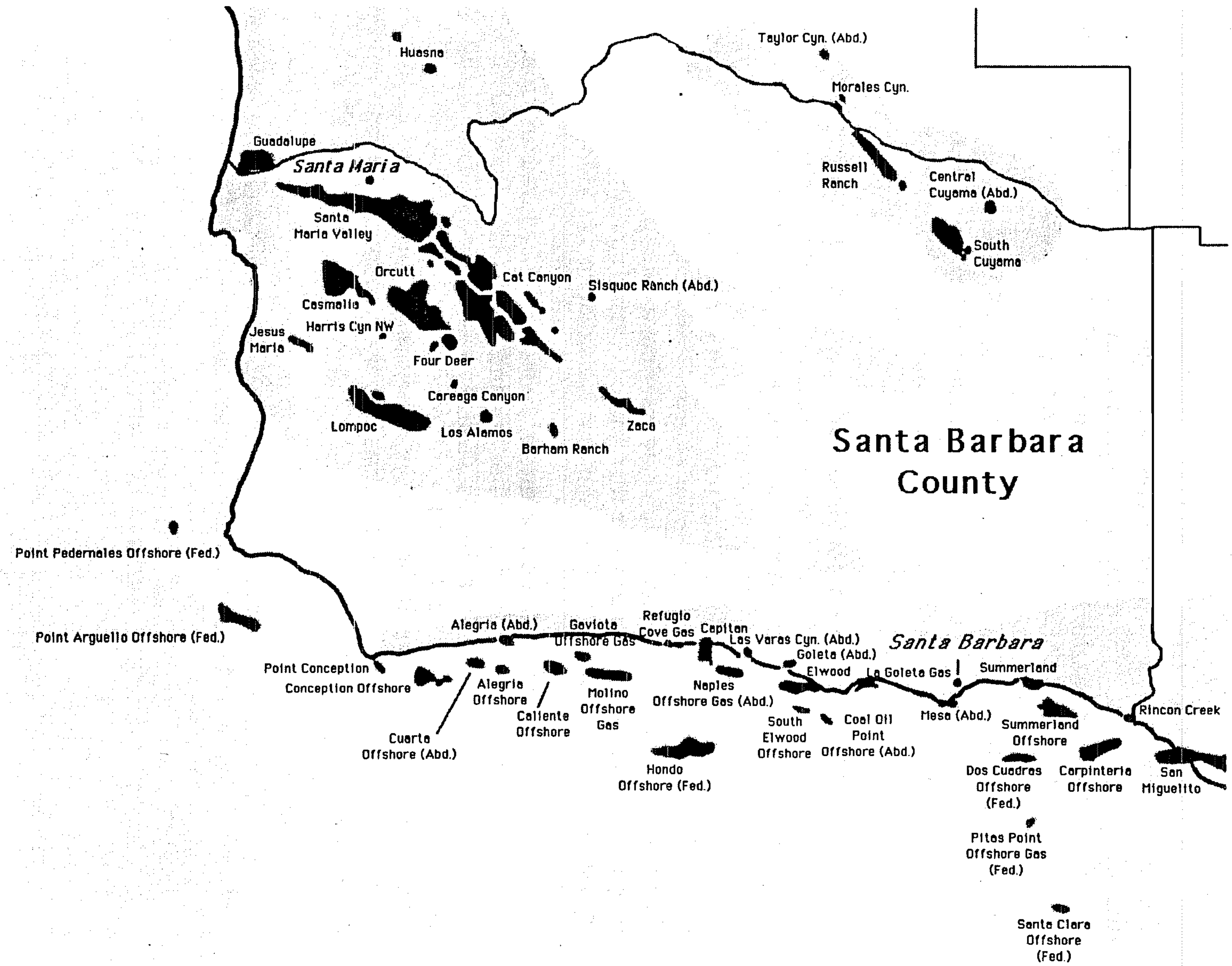


Sources: Annual Reports of the Oil and Gas Supervisor, California Division of Oil, Gas and Geothermal Resources; Estimated Oil and Gas Reserves, Pacific OCS (MMS 94-0008), Minerals Management Service.

Map 1.1: Santa Barbara County



Map 1.2: Oil fields of Santa Barbara County and vicinity



Section 2.1
Econometeric Analysis

A 1997 study carried out by the UCSB Economic Forecast Project with the sponsorship of the Western States Petroleum Association[1] (referenced in the following as the WSPA report), reports an income contribution of the petroleum industry to the tri-counties (San Luis Obispo, Santa Barbara and Ventura) of $727.4 million. With some shortage of explanation the study allocates the income to the three counties in the following way: Ventura: $564 million, Santa Barbara: $333 million and San Luis Obispo: $94 million. It appears that the study offers a choice of income contribution of petroleum-related activity, either $727.4 million or $991 million. Either alternative represents a substantial positive impact on the local economies.

The WSPA report is a one time study, based on an input-output analysis. A complementary analysis to assess the social and economic impact Tri-County Socioeconomic Monitoring and Mitigation Program[2] (SEMP) of oil and gas production on the three counties uses an economic base approach. Both approaches are similar in that they rely, in somewhat different ways, on the theoretical construct of multiplier effects. With both approaches, the theory suggests that a change in the external demand for a home-produced product has repercussions broader than merely the primarily affected sector. In the case of oil production the argument is similar to the following one.

In order to exploit the oil resource, people must be hired and materials must be purchased. Much of the labor bill and some of the material expenditures will stay in local hands. The increased income of the lucky direct recipients will be spent locally. All of this adds to local income. First the initial expenditures and then the expenditures induced by them. The total will be some multiple of the initial, and the fraction by which the initial is increased is called the multiplier.

This analysis misses the possibility that final demand uses studied may "crowd-out" other activities, activities that could have, themselves, produced community income. In order to explain this, let's consider the case of oil exploration and production.

The first thing to consider is the value of permission to exploit the resource. There is no doubt that it exists in commercial quantities off the shores of Santa Barbara and Ventura counties. The resource is owned by the government (State or Federal) and the exploitation rights are auctioned-off to energy corporations. The economic rents associated with the oil resource are divided between the government and the oil companies. The proceeds from the auction of the exploitation rights benefit state and federal taxpayers in that they find there way into reduced taxes or increase government projects. The profits that the oil corporations derive benefit their own stockholders. While some of the rents find there way to the local citizens, the local benefits must be quite small — those residents of the three counties owning shares of the energy companies will enjoy direct benefits in dividends and capital gains — it is unlikely that these benefits represent a significant part of local economic well-being.

Little county income is produced by the rents (royalties) generated by oil production. Changes in county income result from the exploration and production activity. For the exploitation of offshore federal leases there are the offshore facilities themselves to be constructed and maintained. Labor, materials and services are engaged for this. In addition on-shore installations (processing and storage facilities, pipelines and administrative offices) will require expenditures on labor, material and services as well. Some of the necessary expenditures will be made in the counties, however, a larger fraction of the total will be made outside, since none of the three counties have a sufficiently large manufacturing base to provide all of the required specialized equipment and services. It is the local expenditures that give rise to the multiplier theory, which motivates both the WSPA and SEMP studies.

The economic base-multiplier approach is founded on the reasoning of Keynesian economics. A theory formulated to explain the economic crises of the 1920's and 30's; it is based on the prevailing condition of widespread unemployment. Local expenditures, such as the one by the oil companies (in the case of Keynesian economics, these would be government expenditures) will lead initially to an increase in income of the direct recipients. The increased income of this fortunate group will be used to finance their own better life style, and their local expenditures will yield higher income for the recipient of the expenditures. The repetition of this process yields an increase in local income much in excess of the initial externally generated expenditures. The multiple resulting income is the multiplier of the existing studies. The crucial aspect to this theory is that the new expenditures do not crowd-out any alternative. In the Keynesian world of the Great Depression, this was a realistic assumption. In the economies of San Luis Obispo, Santa Barbara and Ventura Counties, the assumption must be use with considerable caution.

As an example, consider an unrealistically extreme case:[3] suppose that natural resource exploitation began in an area with a fixed housing stock.[4] Every new family induced into the area by increased employment in energy production necessarily replaces another. The new one occupies an existing dwelling unit and, by the nature of the housing scarcity, one family moves away. What is the measured effect of this change?

The WSPA report estimates the average annual income of an oil worker in Santa Barbara as approximately $50,000: a salary higher than the Santa Barbara average. If the replaced family has a lower income than this, the exchange would result in a measured increase in Santa Barbara County income. This is a plausible scenario. However, there is an equally plausible one. Suppose the oil family occupies an existing vacant unit for which there was a competing user—perhaps a retiree with a pension income of $100,000 annually. Without detailed knowledge of the alternatives it appears that County income had increased, while it is actually lower than had there been no oil production.

Even though the effects on income are ambiguous there are unambiguous market effects. Whether or not county income increases the oil family would out-bid the alternative users, and while there is some ambiguity as to effect on measured County income, there is no ambiguity about the effect on housing prices—they increase.

While this story is contrived, particularly the assumption of a fully fixed housing stock, it illustrates an important truth. Namely, the exploitation of the federal oil leases will have an ambiguous effect on the Gross Domestic Product of the counties, however it will unambiguously increase housing costs. Unfortunately, we are unable to acquire the data necessary to sort-out the housing value effects. However, we are able to carry out a statistical study of the relationship between oil exploitation and county income, employment and retail sales.[5]

The effects of oil production on the economies of the three counties will be estimated statistically using regression analysis. The regression equations represent the total effects energy exploration and production in that it accounts for the negative (crowding out) effects as well as the positive ones.[6] The basic equations estimated in this study have the form

$$Y_{it} = f(O_{it}, X_{it}, \varepsilon_{it})$$

where Y_{it} is the economic measure to be explained (income, retail sale, and employment). The subscript i refers to the county (i = Ventura, Santa Barbara, or San Luis Obispo) and t to the time period (t = 1950 - 1993). The variables are modeled as a function f( ) of oil and gas related variables (O_{it}) and others (X_{it}) to be specified. The variable ε_{it} represents a normally distributed random error.

Income, oil and population data for the three counties are given in the following Tables, 2.1.1, 2.1.2 and 2.1.3.

The most important economic variable to explain is county income. The study ranges over the period from 1950 through 1993. Unfortunately there is no consistent series that measures county income over the entire period. The income series we wish to explain is county gross domestic product, and the only such measure starts in 1969, after the beginning of the major activity on the federal oil leases. As we are interested in measuring the effects of this activity on income, it is necessary to compare the time path of income before and after the advent of the offshore activity. The only time series of income long enough for the before and after comparison is the series on adjusted gross income produced by the California State Franchise Tax Board. This series is derived from that reported for taxation, and, unfortunately, it is not a true measure of county income. It is a consistent underestimate of the desired quantity as it contains deductions allowed for computing individual tax liabilities. Fortunately, even though the "Adjusted Gross Income" series underestimates the desired " County Income" as long as the longer series is a simple linear function of the county income, deviating only by an independently distributed random variable, the longer series can be substituted.

In order to test the constancy of the relationship between Adjusted Gross Income and County Income we proposed the following model of the correspondence between the two quantities

$$Y_{it} = Y_{i69} + \beta(I_{it} - I_{i69}) + \varepsilon_{it}.$$

This equation is a shorthand statement of the hypothesis, it means that the income of county i in year t, Y_{it}, (i = SLO, SB, or V) is equal to its 1969 value plus a constant proportion, β, of the difference between its current Adjusted Gross Income (I) and the 1969 value. The important part of the hypothesis is that the constant β is the same for each of the counties. The hypothesis is tested with the regression, run over the period in which both adjusted gross income and county income are available (1969-1993).[7]

$$Y_{it} - Y_{i69} = c + \beta(I_{it} - I_{i69}) + \varepsilon_{it}.$$

first allowing different constants, c and β, for each county and then restricting them to be the same. The procedure produces an F statistic with numerator degrees of freedom of 4 and denominator degrees of freedom of 69. On the basis of the F statistic value of 1.53 we do not reject the hypothesis that the coefficients are the same for each county. We further test the hypothesis that the constant c is equal to zero, and that hypothesis is not rejected as well. On the basis of this test we conclude that the best estimate of the relationship between county income, Y, and adjusted gross income I is

$$Y_{it} = Y_{i69} + 1.60(I_{it} - I_{i69}).$$

We will use this formula to evaluate further results.

A simple approach to establishing the link between oil production and county economic activity is a regression of income on oil production. It would be suspected that such a regression would uncover the "multiplier" as the estimated coefficient of oil production would be the amount local income is changed by a change of one barrel of oil per year. The advantage of the regression approach is that it yields a statistical test for the accuracy of the estimated effects. This is in contrast to the approach used in both the SEMP and WSPA analyses. While single number estimates are reported, there is no indication of the "degree of uncertainty"[8] of that number.

The single equation regression analysis to follow starts with the specification of the relationship between oil production and the local economy. It can be criticized because it does not account for the interrelationship between the endogenous variables.[9] A statistical technique that models the interdependencies is Vector Auto Regression (VAR). The results of this modern econometric technique applied to the Tri-Counties are presented in the Appendix C. The regional economies are complex, and, while petroleum exploration may be significant and important, its effects are likely to be masked by all other impacts. In order to separate the oil effects from others, we postulate that were it not for oil, the economies of the three counties would have had the same experience as other similar California counties.

The simplest beginning is a univariate regression of income on oil production. This is an unrealistic model in that it implies that income depends only on oil production, or that all other effects are independent.[10] The regression model is

$$I_{it} = \alpha + \beta \mathrm{Oil}_{t} + \varepsilon_{it}$$

where the β coefficient is the monetary income effect of a small change in oil production. The regression results for the three counties are represented in Table 2.1.4, at the end of this section.

Each of the reported values is an estimate of the monetary effect of increasing local oil production. All estimates appear unrealistically large, in that they suggest that every barrel of oil produced in Ventura County increases the local income by \$35.75[11] and a barrel of Santa Barbara County oil yields an amazing \$61.39 while San Luis Obispo is in the Ventura range of benefits. It should be noted in interpreting these results that the t-statistic of each estimate is reported, and that number indicates the statistical significance of the estimated values. A t-statistic larger than 2 indicates that the coefficient is significantly different than zero while one small indicates that it is not. In order to interpret this table and ones to follow it should be understood that statistically significantly different from zero means that there is only a small probability of getting an estimate the size of the one reported or larger were the true value of the coefficient actually equal to zero. By this standard the estimated value for Ventura, as large as it is, is still not significantly different from zero. However, the ones for Santa Barbara and San Luis Obispo are.

The Table 2.1.4 regression results are flawed in that they attribute all of county growth to oil production. All three counties, indeed the entire state experienced considerable growth over the studied period. Simple population growth alone, in most reasonable cases, leads to increase income. Recognizing this a simply expanded model

$$\dot{I}_{it} = \alpha + \beta_1 \text{Oil}_t + \beta_2 \text{Population}_{it} + \varepsilon_{it}$$

in which county income is regressed against both its oil production and its population. The results of these regressions are presented in Table 2.1.5.

The inclusion of the population induced economic growth considerably changes the results. First, the magnitudes of the estimated oil coefficients are much smaller than they are in Table 2.1.4. Furthermore, only the Ventura estimate is positive while the ones for Santa Barbara and San Luis Obispo are both negative. The uncritical interpretation of these numbers is that oil production has had a depressing effect on the economies of Santa Barbara and San Luis Obispo Counties. Such an interpretation is not warranted, however. Based on the t-statistics none of the coefficients, including the one for Ventura County, are significantly different from zero. What this shows is that simply allowing for the unquestionable relationship between income and population growth, raises important doubts about the positive local economic impact of petroleum activity in the three counties.

Perhaps the Table 2.1.5 results are due to an incompletely specified relationship. The local economies are, of course tied to the economy of the rest of the state and, as such, are expected to grow along with the state. This possibility should be built into the regression model as well. A full model of the local and state economies is far beyond the scope of this study. Nonetheless we have approximated the extent to which the local economies simply reflect the economic experience of the state as a whole with the addition of the variable CALIF. The California variable is constructed as the average income of three counties, chosen because they closely resemble our area of study. They are all coastal and not part of major metropolitan area. In the three reference counties oil production plays a very small part of their economic activity. These reference counties are Sonoma, Santa Cruz, and Monterey. The alternative to the three county (Sonoma, Santa Cruz, and Moneterey) reference would be the experience of the entire state. We chose the three county alternative, even though the chosen counties are not contiguous, as are San Luis Obispo, Santa Barbara and Ventura, and each have different growth experiences. Our judgment is that these three chosen reference counties were similar enough to the study area, but, unlike the study area oil production was non-existent or insignificant. This choice gave us the best chance of sorting out the oil effects from the general growth effects. We propose that differences in the average economic growth of these counties and the three counties of this study can be explained, in part, by the oil activity. We certainly do not propose that all of these differences are explained by oil, but those that are unexplained are independent of oil related activity.[12] The regression results are presented in Table 2.1.6.

Inclusion of the CALIF variable alters the results. As in the previous table the oil coefficients are negative for both Santa Barbara and San Luis Obispo counties and positive for Ventura County. There is an important difference between the two tables however. Whereas, the Santa Barbara oil coefficient is not significantly different from zero with the previous regression, it is negative and significantly different from zero with the fuller specification. An uncritical acceptance of this result implies that oil production has had a significantly negative impact on the Santa Barbara County economy. An examination of the oil production data suggests that an uncritical acceptance is not a sound idea.

Total oil production rises quickly at the beginning of the successful exploitation of a field and then declines rather sharply until a new field is brought into production. The local economic consequences of oil production do not stem from the sale of oil; those rewards accrue to the oil company stockholders. The county specific expenditures of the production companies produce the local economic effects. A substantial proportion of these expenditures take place prior to production and, while they likely have some relationship to total production, for some period of time, expenditures are surely not proportional to production totals. Noting this we explored an alternative procedure for assessing the economic impact of oil production.

The major change in Santa Barbara county oil production occurred in 1969 when oil production rose from 26.6 million barrels in 1968 to 31.7 million barrels, and then to 45.2 million barrels in 1970. As an approximation we guess that the real change in economic activity, that which would be reflected in increases in the local expenditures of the oil companies, began two or three years prior to the significant increase in production. We chose to estimate the effects of this activity by examining the time path of county income before and after 1966 (the presumed beginning of major oil related expenditures).

The first regression we ran related county income, I_{it}, to the comparison counties average, $CALIF_t$. We approximate the economic effects of oil by determining how this relationship was affected by the oil production era. Oil production (barrels of oil) is an imperfect proxy for the economically important impact of the petroleum industry. The expenditures made on exploration, production and public regulatory activity affect the local economy. A perfect study would use the local expenditures of energy companies as an explanatory variable. Unfortunately, the appropriate monetary data are not available. However, the activity preceding and subsequent to production from offshore leases can be used as an approximation of actual expenditures. For this we include a variable, D, which takes on the value of zero before 1966 and one thereafter. It is assumed that the size of the coefficient on this variable indicates the economic affect of the oil activity. The coefficient is interpreted as the average effect of the oil era on the economic activity of the county beyond that which can be explained by the general change in the economy of the State of California. In order to allow for some feedback from oil profitability to the local economy the average level of oil prices, P_t, is include in the regression as well. The estimation model in this case is

$$I_{it} = \beta_1 + \beta_2 D_t + \beta_3 P_t + \beta_4 CALIF_t + \varepsilon_{it}.$$

The economic effect of the oil era is measured by the estimated value of β_2. The results from estimating this model on data from 1950 through 1993 are presented in tables 2.1.7, 2.1.8 and 2.1.9. In each of these tables the coefficient of the variable D_t represents the estimated contribution of the federal offshore oil production on the three counties, the coefficient of P_t is the estimate of the effect of a change in oil prices and the $CALIF_t$ coefficient indicates how county income corresponds to the average income of the comparison counties. The numbers in parentheses below the coefficients are the t-statistics

For Santa Barbara County, the estimate of the contribution of offshore oil exploration and production to the county's adjusted gross income is $192 million. The t-statistic of 1.38 suggest that there is a 17% chance of getting a value as large or larger than $192 million if there were no oil related contribution to the County's economy. The 95% confidence interval for the true oil contribution ranges from -$87 million (namely, offshore oil activity has cost the county $87 million) to +$471 million. The estimate of $192 million in adjusted gross income, translates into $307 million in gross county product, or county income.[13] It is interesting that this estimate corresponds closely to that of the WSPA estimate of $230 million.[14] Unfortunately, the WSPA study does not provide either levels of significance (t-statistics) or confidence intervals, so it is impossible to judge the accuracy of its estimate.

It appears, from the regressions presented above, that Ventura County benefited from larger increases in income than did Santa Barbara County. The estimated contribution of the offshore oil production to the adjusted gross income of Ventura County is $299 million. The t-statistic indicates that there is a lower probability, namely 8.6% that the estimated coefficient would be that value or higher, were there actually no effect at all. The 95% confidence interval for the contribution ranges from -$122 million to +1.28billion: a considerably larger confidence interval than the one for Santa Barbara. By the conversion estimated above,[15] the estimated value of offshore oil production to the gross county product, or income, of Ventura County is $500 million. Again this estimate corresponds closely to the reported WSPA estimate of $390 million.[16]

While our estimates of the impact of offshore exploration and production corresponds quite closely to the WSPA values for Ventura and Santa Barbara Counties, the estimated San Luis Obispo impact is very different. WSPA estimates that the impact of all oil and gas activity in San Luis Obispo County as $65 million,[17] while, based on the regression results presented above, offshore activity has reduced the county's adjusted gross income by about $116 million. Based on the t-statistic, this estimate has a higher level of significance than the ones for the other two counties. There is only about 0.5% chance of an estimate of -$116 million or less if there were no effect. The 95% confidence interval for the impact ranges from -$156 million to -$76 million. By the estimated conversion, the impact on San Luis Obispo income is a loss of $187 million.

The estimates so far, indicate that the advent of offshore oil and gas development in Santa Barbara and Ventura Counties accounted for approximately 8.8% of the income of each of the two counties and a loss of 13.7% of San Luis Obispo County's income. While our estimates are in line with those of produced by the Western States Petroleum Association, the San Luis Obispo estimated loss seems much too high, so high, in fact, as to be unbelievable. A number of explanations for the anomalous results are possible. One may be that the model explaining San Luis Obispo's experience is different than the one for the other two counties. First, oil has historically been a smaller part of its economy than it has for the other two. Its few producing fields (Arroyo Grande in Price Canyon, Morales and Russel Ranch) and its Estero Marine Terminal are significant, but small. Second, the advent of the offshore activity transferred a large part of SLO county's oil activity to the other two counties. However, even if there is some truth in the second explanation, it could hardly explain the large apparent reduction in income. It seems most likely, that we must search for a different regression model to explain the relationship between oil and gas production and the economy of San Luis Obispo.

What we suggest is that, while the relationship between income and oil and gas production are interesting, it is not a true measure of county well being. While it is undoubtedly true some faction of each county have benefited from the offshore activity, others may well have suffered. Here, the potential loss in welfare does not include the loss to those that oppose oil activity for aesthetic or environmental reasons.[18]

As discussed above, offshore production has economic consequences, there was undoubtedly additional spending in the counties involved. The spending of the oil companies enhanced existing local businesses, and there was an increase in the demand for labor, both directly by the oil companies themselves and all the others that serve them directly or indirectly.[19] The extent of these benefits is captured in the estimates given above, as they are in the WSPA report. However, there is another analysis which conforms to a different measure of economic benefits, namely, the one that examines the contribution of oil and gas activity as in contrast to what the county economies would have been had there been no such activity.

Some of this is captured with the inclusion of the income of the reference counties. However, the analysis does not allow for the potential of "crowding-out" mentioned above.

While the t-statistics of the Santa Barbara and Ventura County models suggest that there is considerable uncertainty about the "true" economic effects of offshore oil, the predicted values are consistent with the other estimate (which was not given with its standard error) produced by WSPA. Even if we suspend our doubt, because of the inherent uncertainty, it is, nonetheless, questionable that the income repercussions reflect an increase in county well being. In particular, Santa Barbara County, at least the southern section of the county where there is offshore oil activity, has had a severe restriction on its housing supply. The attraction of oil related workers and businesses to the county might have precluded other activities that would have located in the county instead. While the "true" welfare consequences of offshore oil are difficult to measure,[20] it seems reasonable to attempt an answer by examining income per person. Total income can rise, just by the force of population. Were the population of a county to double, and the new entrants have the same average income as the old, total income would double. However, no single resident is any better off than before the in-migration.

The results of the per capita income regressions are presented in Tables 2.1.10, 2.1.11 and 2.1.12. These regressions suggest a much different interpretation of the effects of offshore development on the economies of the three counties. The San Luis Obispo result (Table 2.1.12) is much more realistic than the one suggested by the straight income regression. While it is conceivable that the county might have been negatively affected, the magnitude of the suggested economic dislocation seems unrealistically large. From the regression in Table 2.1.12, there is an estimated positive effect of $30.25 per person in adjusted gross income, or $48.40 in income. However, the estimated t-statistic forces us to conclude that the effect is statistically insignificant. On that basis, we reach the conclusion that the oil development off the shores of Santa Barbara and Ventura Counties has had no appreciable effect on the welfare of the citizens of San Luis Obispo County.

Tables 2.1.10 and 2.1.11 reveal an interesting possibility. The coefficient on the D variable (the one on which the estimated effects of offshore activity are based) is negative for Santa Barbara County and positive for Ventura County. At their estimated values, we would conclude that the per person adjusted gross income for Santa Barbara County would have been $976.82 higher had there been no offshore activity. This implies that there was a negative effect on per capita income of $1563. However, the t-statistic of 1.27 implies that the effect is insignificantly different from zero. On statistical grounds we conclude that, while it is apparent that oil related activities have played an important role in the economy of the county, the economic welfare of the average citizen of the county was unaffected by it. Similarly, the small t-statistic of the D variable, indicates that the economic effects for Ventura County are insignificantly different from zero. However, in the case of Ventura, the coefficient itself is positive. Taken at the value reported oil has contributed approximately $348.29 to the per capita adjusted gross, or $557.26 in per capita income.

It is not the conclusion that the oil exploration and production activities have had no effect on the county economies, rather, the oil related activities have not had a significant effect on citizen welfare, as measured by their per capita income. Certainly, as the WSPA study documents, energy production is a significant part of the present economic activity of both Ventura and Santa Barbara Counties (less significant in San Luis Obispo). There are many businesses, and consequently, much employment that is traceable to oil and gas production. What these statistical results seem to imply is that oil and gas production and its related derivative activities, appear to do little to raise the economic well being of the average county citizen.

There are a number of potential indicators of the interrelationship between the offshore oil production and the economy. Following the income effect is the effect on the employment composition of the economy. As it is not possible to obtain a long enough time series of employment is San Luis Obispo County, regression analysis of employment is confined to Santa Barbara and Ventura Counties. Even for these a consistent series is available only for the period from 1957, rather than 1950.

The first set of regression was run using the total employment as a fraction of the population (the employment rate; EMPRATE) as the dependent variable. The results for both counties, presented in the following tables, indicate that there was an increase in the employment rate coincident with the offshore oil activity for Santa Barbara County and a decrease in the employment rate for Ventura County.

The coefficients on the D variable is only statistically significant for Ventura County and it indicate that the average employment rate was 2.5% lower in Ventura County and 0.9% higher in Santa Barbara County after 1966 than before. This gives indication of a powerfully significant effect. But one must ask if this can be attributed entirely to the offshore oil activity. One would expect that if the large change in employment rate were do to a substantial degree to oil activity, that there should be disproportionate changes, increases or decreases, in the employment sectors most related to oil, in particular to employment in the mineral sectors.

The regressions of mineral employment as a fraction of total population (mineral employment rate, MEMPRATE) are indicative that oil related activity had little to do with the overall employment rate. For Ventura County the indication that the advent of offshore oil activity coincided with a decrease in the average mineral employment rate of about 0.65 percent and a decrease of 0.12 percent for Santa Barbara County.

Conclusion

While oil exploration and production is undoubtedly and integral part of the local economies, it appears that its importance has been much overstated. Our statistical study is somewhat inconclusive. While there is some indication that offshore oil activity has added some to the incomes of Santa Barbara and Ventura Counties, with mean estimate of the same order of magnitude as the WSPA study, the estimates a sufficiently imprecise that the confidence interval are very large.[21]

The regressions of per capita income add further confusion to the possible effects. From those we might conclude that oil related activity has had a negative effect on the economic welfare of Santa Barbara County rather than the positive one suggested by previous works. Again the standard errors of the estimates are quite large, and, for that reason, we are unwilling to place much confidence in the conclusions.

When we look at the employment effects the overall results are much the same. While it might appear, from the regression of the total employment rate, that oil activity has contributed in a positive way to employment, a more careful examination leads us to question whether the observations are really due to oil.

Our conclusion, based on an admittedly imperfect study (but the best that could be done with available statistics) is that oil activity is an integral part of the local economies. The empirical evidence does not allow a precise estimate of the local economic benefit of oil related activity. Indeed, the evidence supports the conclusion neither of a positive or negative impact.

Notes

1. *The Economic Contribution of the Oil & Gas Industry in the Tri-Counties,* by The UCSB Economic Forecast Project prepared for The Western States Petroleum Association in 1997.

2. *Tri-County Socioeconomic Monitoring Program Impact Estimates and Forecasts,* by Santa Barbara County Association of Governments for various years.

3. We emphasize that this is purely an illustration example and not a factual description of the local economies.

4. While this is not the case for any of the three counties, during much of the federal lease activity, there were strict growth controls in much of Santa Barbara County.

5. In the appendix we present a statistical analysis of assessed property values. The results, while weak, appear to support this conjectural property value effect.

6. Technically we use reduced form equations.

7. Included as Appendix B.

8. The technical terms used for degree of uncertainty are standard error of the estimate and confidence interval.

9. For instance, it is well know that retail sales are a function of income and, less directly, income is a function of retail sales.

10. Orthogonal is the technical term.

11. From this point forward all results are presented in 1983 dollars.

12. Technically, we assume that the unexplained part is distributed independently of the include variables--the left out variable are orthogonal to the included ones.

13. The translation is derived from the formula given, namely $G_{it} = G_{i69} + 1.61(I_{it} - I_{i69})$.

14. WSPA reported $333million. This figure has been converted to 1983 dollars for comparison with the regression results.

15. County Income = 1.60 * Adjusted Gross Income

16. WSPA reported $564million. This figure has been converted to 1983 dollars for comparison.

17. WSPA reported $94million. This figure has been converted to 1983 dollars for comparison.

18. While these are true losses and should be included in a benefit cost study, they are beyond the scope of this work.

19. The interrelationships are spelled-out in the WSPA report.

20. Indeed, it is even difficult to operationally define.

21. The WSPA study does not include similar confidence intervals.

Table 2.1.1: Santa Barbara County income, oil and population data

Year	Adj. Gross Income	Income	Local Oil	Federal Oil	Population
1950	3.60E+08	NA	29683931	0	97741
1951	4.12E+08	NA	24055230	0	98500
1952	4.57E+08	NA	38627994	0	99500
1953	4.86E+08	NA	37048015	0	102000
1954	4.43E+08	NA	35259329	0	103000
1955	5.44E+08	NA	33220500	0	105000
1956	7.16E+08	NA	30464208	0	106000
1957	8.43E+08	NA	27894540	0	105000
1958	8.47E+08	NA	24760113	0	123500
1959	1.08E+09	NA	23189028	0	143100
1960	1.21E+09	NA	24091683	0	167883
1961	1.35E+09	NA	23720144	0	187000
1962	1.49E+09	NA	25487729	0	213300
1963	1.75E+09	NA	26149184	0	226700
1964	1.58E+09	NA	26971894	0	231000
1965	1.79E+09	NA	26682111	0	243100
1966	1.96E+09	NA	26443506	0	247400
1967	1.86E+09	NA	27221830	0	249800
1968	1.97E+09	NA	24565312	2076160	254900
1969	1.95E+09	3.18E+09	21712190	9942733	260900
1970	1.81E+09	3.21E+09	20178967	25035171	261200
1971	2.13E+09	3.28E+09	19025069	31103681	269700
1972	2.23E+09	3.47E+09	18198411	22562566	269700
1973	2.33E+09	3.64E+09	19133622	18818026	269700
1974	2.29E+09	3.61E+09	18454687	16784100	275600
1975	2.33E+09	3.63E+09	17057772	15434507	283600
1976	2.45E+09	3.86E+09	16686767	13977436	283600
1977	2.58E+09	4.00E+09	16064000	12258013	285800
1978	2.70E+09	4.29E+09	15275276	11979674	288131
1979	2.76E+09	4.38E+09	16479434	10971013	293700
1980	2.85E+09	4.41E+09	15750101	10009473	295100
1981	2.90E+09	4.52E+09	15913543	17062314	299484
1982	2.93E+09	4.59E+09	16240263	23058434	304795
1983	3.10E+09	4.85E+09	15771239	22019479	313497
1984	3.31E+09	5.20E+09	16183924	20849654	320362
1985	3.48E+09	5.47E+09	15443190	19708368	327159
1986	4.39E+09	5.73E+09	12772894	18173061	337835
1987	3.73E+09	5.84E+09	11634331	21044118	341754
1988	3.82E+09	6.07E+09	10747061	22350725	345003
1989	3.97E+09	6.21E+09	8372347	22176517	348443
1990	4.12E+09	6.30E+09	7974758	18908300	354072
1991	3.87E+09	6.33E+09	7562208	22529135	376559
1992	3.75E+09	6.41E+09	6507689	34326771	379913
1993	3.15E+09	6.36E+09	5828585	42261634	379913

Table 2.1.2: Ventura County income, oil and population data

Year	Adj. Gross Income	Income	Local Oil	Federal Oil	Population
1950	3.03E+08	NA	33647787	0	113415
1951	3.64E+08	NA	34046481	0	117000
1952	4.39E+08	NA	37159509	0	114647
1953	4.96E+08	NA	42188593	0	114647
1954	4.58E+08	NA	47583526	0	140000
1955	5.39E+08	NA	48536918	0	150000
1956	7.39E+08	NA	43905759	0	156300
1957	8.34E+08	NA	46529745	0	159300
1958	8.96E+08	NA	46569697	0	175300
1959	9.45E+08	NA	43613041	0	184800
1960	1.19E+09	NA	40983131	0	197591
1961	1.21E+09	NA	37946309	0	215000
1962	1.44E+09	NA	33705091	0	235800
1963	1.66E+09	NA	30646643	0	252600
1964	1.76E+09	NA	27785564	0	283300
1965	2.09E+09	NA	25968923	0	302900
1966	2.29E+09	NA	24538817	0	318000
1967	2.29E+09	NA	22721049	0	330800
1968	2.64E+09	NA	21491997	0	350100
1969	2.84E+09	4.10E+09	21625543	0	369100
1970	2.60E+09	4.12E+09	23624898	0	377400
1971	3.02E+09	4.33E+09	23578943	0	376430
1972	3.30E+09	4.72E+09	23722082	0	413000
1973	3.54E+09	5.07E+09	23593327	0	413000
1974	3.59E+09	5.22E+09	23120908	0	421200
1975	3.68E+09	5.41E+09	22481885	0	432407
1976	3.98E+09	5.77E+09	21719182	0	442100
1977	4.31E+09	6.26E+09	20860000	0	457800
1978	4.63E+09	6.92E+09	18644173	0	474688
1979	4.82E+09	7.09E+09	18126124	0	488900
1980	4.79E+09	7.28E+09	17458241	108161	510300
1981	4.84E+09	7.48E+09	17208348	561972	541166
1982	5.06E+09	7.63E+09	17657378	2195262	544703
1983	5.37E+09	8.02E+09	17225380	4615283	565607
1984	5.79E+09	8.57E+09	17198726	4467442	579946
1985	6.10E+09	9.04E+09	16862181	3541604	589499
1986	6.57E+09	9.70E+09	15897492	3559260	606084
1987	7.02E+09	1.02E+10	15170793	3396953	619328
1988	7.40E+09	1.08E+10	14998087	3160749	637407
1989	6.78E+09	1.11E+10	14200568	5276791	653609
1990	6.74E+09	1.12E+10	13794524	5669759	668553
1991	6.46E+09	1.10E+10	12998332	4512364	677859
1992	6.29E+09	1.10E+10	12063477	4002866	686868
1993	7.32E+09	1.11E+10	11394398	4599315	686868

Table 2.1.3: San Luis Obispo County income, oil and population data

Year	Adj. Gross Income	Income	Local Oil	Federal Oil	Population
1950	1.07E+08	NA	3510316	0	51115
1951	1.46E+08	NA	2723491	0	52000
1952	1.81E+08	NA	3739226	0	54000
1953	1.85E+08	NA	3367287	0	63260
1954	1.47E+08	NA	3252870	0	62320
1955	1.95E+08	NA	3173455	0	61640
1956	2.30E+08	NA	2809019	0	56130
1957	2.38E+08	NA	2331333	0	60850
1958	3.01E+08	NA	1937386	0	66500
1959	4.03E+08	NA	2285390	0	72400
1960	3.85E+08	NA	1505444	0	80510
1961	4.54E+08	NA	1361773	0	85900
1962	4.20E+08	NA	1259915	0	91300
1963	5.35E+08	NA	1218518	0	93900
1964	4.33E+08	NA	1166640	0	95700
1965	4.93E+08	NA	1123221	0	100600
1966	5.38E+08	NA	1204642	0	103000
1967	5.50E+08	NA	1489901	0	104300
1968	5.61E+08	NA	1927910	0	105400
1969	6.60E+08	9.52E+08	2082603	0	96800
1970	6.26E+08	1.01E+09	1906348	0	105800
1971	4.98E+08	1.07E+09	2050671	0	105690
1972	7.47E+08	1.16E+09	1845406	0	112800
1973	8.08E+08	1.24E+09	1764542	0	112800
1974	8.24E+08	1.30E+09	1658981	0	112800
1975	8.70E+08	1.34E+09	1540409	0	127300
1976	9.51E+08	1.47E+09	1373127	0	127300
1977	1.03E+09	1.55E+09	1840000	0	133500
1978	1.09E+09	1.72E+09	1707646	0	138712
1979	1.14E+09	1.79E+09	1729026	0	142900
1980	1.14E+09	1.79E+09	1833246	0	149600
1981	1.18E+09	1.81E+09	1929290	0	158854
1982	1.19E+09	1.83E+09	1936838	0	158854
1983	1.33E+09	2.14E+09	1654405	0	170190
1984	1.41E+09	2.26E+09	1771007	0	175697
1985	1.45E+09	2.35E+09	1658837	0	183552
1986	1.57E+09	2.51E+09	1409567	0	192938
1987	1.63E+09	2.62E+09	1125709	0	198220
1988	1.76E+09	2.77E+09	1107273	0	204346
1989	1.84E+09	2.92E+09	1012744	0	211941
1990	1.81E+09	2.93E+09	681147	0	221703
1991	1.77E+09	2.87E+09	767226	0	221340
1992	1.70E+09	2.93E+09	811592	0	221902
1993	1.77E+09	2.92E+09	759235	0	228380

Table 2.1.4: Regression of income on oil production only

County	Constant	t-Statistic	Oil Production	t-Statistic
Ventura	2.02E+09	1.03	35.75	0.64
Santa Barbara	1.52E+08	0.21	61.39	2.68
San Luis Obispo	3.23E+08	3.92	36.37	5.47

Table 2.1.5: Regression of income on oil production and population

County	Constant	t-Statistic	Oil	t-Statistic	Population	t-Statistic
Ventura	-1.49E+09	-5.62	5.56	0.88	11,821	26.40
Santa Barbara	-6.98E+08	-2.50	-6.63	-0.76	12,384	13.99
San Luis Obispo	-4.48E+08	-12.58	-1.46	-0.65	10,446	22.57

Table 2.1.6: Regression of income on oil, population and reference counties

County	Constant	t-Stat.	Oil	t-Stat	Pop.	t-Stat.	Calif	t-Stat.
Ventura	-1.01E+09	-3.12	2.04	0.34	6714	2.79	1.03	1.94
Santa Barbara	1.94E+08	1.15	-13.32	-2.62	4385	7.10	0.82	8.82
San Luis Obispo	-3.74E+08	-4.11	-1.84	-0.81	8274	3.74	0.13	1.18

TABLE 2.1.7:
Regression of Santa Barbara County income on federal oil production dummy, California crude oil prices, and reference counties income

$$I_{SBt} = 2.61E8^{*} + (1.92E8^{*})\, D_t + (3.49E6)\, P_t + 1.09\, CALIF_t$$

$$(2.31)^{**} \qquad (1.38) \qquad (0.61) \qquad (11.44)$$

R^2 : 0.963

*The notation E# means $10^{\#}$, for instance 1.92E8 means 192,000,000.

**The number in parenthesis below the coefficients are the estimated t-statistics.

TABLE 2.1.8:
Regression of Ventura County income on federal oil production dummy, California crude oil prices, and reference counties income

$$I_{Vt} = -5.53E8^{*} + (2.99E8)\, D_t + (19.37E6)\, P_t + 2.18\, CALIF_t$$

$$(-7.16)^{**} \qquad (1.76) \qquad (2.58) \qquad (13.77)$$

R^2 : 0.980

*The notation E# means $10^{\#}$, for instance 2.99E8 means 299,000,000.

**The number in parenthesis below the coefficients are the estimated t-statistics

TABLE 2.1.9:
Regression of San Luis Obispo County income on federal oil production dummy, California crude oil prices, and reference counties income

$$I_{SLOt} = -1.04E8^{*} - (1.16E8)\ D_t + (3.98E6)\ P_t + 0.60\ CALIF_t$$

$$(-4.91)^{**} \quad (-2.92) \qquad (2.59) \qquad (33.17)$$

R^2 : 0.983

*The notation E# means $10^{\#}$, for instance 1.16E8 means 116,000,000.

**The number in parenthesis below the coefficients are the estimated t-statistics

TABLE 2.1.10: Regression of Santa Barbara County per capita income on federal oil production dummy, California crude oil prices, and reference counties per capita income

$$IPERCAP_{SBt} = 1467.20 - 976.82\ D_t + 49.01\ P_t + 0.97\ CALIFPERCAP_t$$

$$(2.53)^{**} \quad (-1.58) \qquad (3.41) \quad (7.26)$$

R^2 : 0.879

**The number in parenthesis below the coefficients are the estimated t-statistics.

TABLE 2.1.11: Regression of Ventura County per capita income on federal oil production dummy, California crude oil prices, and reference counties per capita income

$$IPERCAP_{Vt} = 498.16 + 348.29\ D_t + 25.61\ P_t + 0.94\ CALIFPERCAP_t$$

$$(1.26)^{**} \quad (1.27) \qquad (2.24) \quad (10.27)$$

R^2: 0.945

**The number in parenthesis below the coefficients are the estimated t-statistics

TABLE 2.1.12: Regression of San Luis Obispo County per capita income on federal oil production dummy, California crude oil prices, and reference counties per capita income

$$IPERCAP_{SLOt} = 362.86 + 30.25\ D_t + 37.17\ P_t + 0.75\ CALIFPERCAP_t$$

$$(1.38)^{**} \quad (0.09) \qquad (2.91) \quad (11.97)$$

R^2: 0.898

**The number in parenthesis below the coefficients are the estimated t-statistics

TABLE 2.1.13: Regression of Santa Barbara County total employment rate on federal oil production dummy, California crude oil prices, and reference counties income

$$EMPRATE_{SBt} = 0.2198^{*} + 0.0088\ D_t + 0.0032\ P_t + (4.33E\text{-}11)\ CALIF_t$$
$$(22.97)^{**} \quad (0.95) \quad (7.24) \quad (8.57)$$

R^2 : 0.926

*The notation E# means $10^{\#}$, for instance 1.92E8 means192,000,000.

**The number in parenthesis below the coefficients are the estimated t-statistics.

TABLE 2.1.14: Regression of Ventura County total employment rate on federal oil production dummy, California crude oil prices, and reference counties income

$$EMPRATE_{Vt} = 0.1998^{*} - 0.0252\ D_t + 0.0005\ P_t + (4.71E\text{-}11)CALIF_t$$
$$(20.08)^{**} \quad (-2.36) \quad (2.61) \quad (17.49)$$

R^2 : 0.914

*The notation E# means $10^{\#}$, for instance 2.99E8 means 299,000,000.

**The number in parenthesis below the coefficients are the estimated t-statistics

TABLE 2.1.15: Regression of Santa Barbara County total mining employment rate on federal oil production dummy, California crude oil prices, and reference counties income

$$MEMPRATE_{SBt} = 0.0052^{*} - 0.0012\ D_t + 0.0001\ P_t + (-7.42E\text{-}13)\ CALIF_t$$

$$(6.06)^{**} \quad (-1.28) \qquad (5.62) \qquad (2.74)$$

R^2 : 0.555

*The notation E# means 10#, for instance 1.92E8 means 192,000,000.

**The number in parenthesis below the coefficients are the estimated t-statistics.

Table 2.1.16: Regression of Ventura County total mining employment rate on federal oil production dummy, California crude oil prices, and reference counties income

$$MEMPRATE_{Vt} = 0.0131^{*} + -0.0065\ D_t + 0.0001\ P_t + (-1.51E\text{-}12) CALIF_t$$

$$(6.82)^{**} \quad (-2.96) \qquad (2.25) \qquad (-2.99)$$

R^2 : 0.784

*The notation E# means 10#, for instance 2.99E8 means 299,000,000.

**The number in parenthesis below the coefficients are the estimated t-statistics

Section 2.2
Oil and Other Sectors

In this section, we examine another aspect of the oil industry's economic impact in Santa Barbara County. While the previous section sought to isolate and determine the effect of oil production on the local economy, here we reintegrate oil activity into the economic context of the county. Below, we compare changes in local oil employment and income to simultaneous changes in other industries, such as tourism and high-technology. To take advantage of data culled from the US Census and other sources organized by five or ten year periods, this section departs from the prevailing historical periodization of this volume and presents analysis for two different periods: 1950-1970 and 1970-1995.

1950-1970

In this early historical period, oil activity was down from highs in earlier decades and provided work for only a small segment of the Santa Barbara County population. Table 2.2.1: Santa Barbara County jobs in mining, chemical and allied occupations, and petroleum, at the end of this section, depicts Census data from 1950 to 1970 for "mining" employment—which, in Santa Barbara County, means predominantly oil-related jobs, including jobs in chemical manufacturing and the manufacturing of secondary petroleum products (the misleadingly named "Petroleum" category). This data suggests that over two decades, the number of oil-related jobs in Santa Barbara County shows little increase: from over 1500 jobs in 1950 to just over 1700 jobs in 1970. This modest level of oil employment (both absolutely and over time) is even more striking when we consider that county onshore production peaked around 1950, to be eclipsed in the next two decades by offshore production. This suggests that oil employment growth lags far behind increases in oil production—a pattern consistent with the automation of many oil activities (see Section 5: Labor). Furthermore, the *proportion* of oil-related jobs is seen to decline slowly when compared with total county employment. From almost 4 percent of county employment in 1950, oil-related employment decreases to 1.7 percent over the next two decades.

Population growth in Santa Barbara County from 1950 to 1970 was vigorous—from a starting point of almost 100,000 residents, county population increased almost threefold—so the declining proportion of oil-related employment was to be expected. Yet the growing contrast between oil and certain other industries is important in that it suggests the direction in which the county's economy was heading in this historical period. An especially significant contrast is between jobs in mining and those in the sector usually deemed least compatible with mineral extraction: tourism. Tourism represents a traditional specialization of the Santa Barbara economy (see Stanback et al., 1981). Tourism does not easily diffuse to other locations without aesthetic and recreational amenities already in place, and so it constitutes a competitive economic asset for those localities where it is strong. A common local concern is that tourism and offshore energy development are contradictory industries, where the growth of one potentially forecloses growth in the other. Certainly, many oil opponents have made the argument that tourism cannot prosper with offshore platforms in the Santa Barbara Channel.

We have developed an indicator of economic dependence on extraction industries compared to tourism—an industry that depends on an "intact" earth. We call it the "extract/intact ratio." We constructed it as the ratio of county employment in the sectors of mining, petroleum and chemical and allied occupations, on the one hand, compared to county employment in the sectors of eating and drinking establishments and lodging. We have plotted these ratios across time, from 1940 forward (the higher the ratio, the greater the dependence on mining compared to tourism).[1] Figure 2.2.1: The extract/intact ratio, at the end of this section, reveals how Santa Barbara County's economy has consistently remained more dependent on tourism than extraction (although this dependence diminished slightly around the onshore oil production peaks of 1950). The county's ratio of these two sectors largely paralleled that of the state, although slightly leading the state in extraction relative to tourism at the 1950 time point. The data show a clear contrast with Ventura County to the south, which was much more dependent on the oil industry (especially in earlier periods), and a closer resemblance to San Luis Obispo County to the north, which has experienced relatively little oil industry activity.

What is clear from this data is that there is an incongruence between the amount of oil production going on in the county and the significance of oil as an employer. There is relatively little employment even as production levels are high. Furthermore, employment by tourism establishments was just one aspect of this industry's growing importance; hotel bed taxes and visitor purchases of services and goods were other ways in which the economic stake in scenic beauty and recreational amenities were increasing.

1970-1995

What does the capital-intensive industrial profile of oil and gas production look like in the context of Santa Barbara County's contemporary economy? How have local economic transformations in turn altered or reinforced the trajectory of energy development? Paralleling oil and gas production in the Santa Barbara Channel during this period (see Figure 1.2 in Section 1: Introduction), the local oil industry has expanded and contracted to different degrees, depending on the particular indicator being examined (for a discussion of oil and gas tax revenues, see Section 2.3: Tax Payments).

In terms of employment, Figure 2.2.2: Mineral extraction employment, at the end of this section, shows that as the federal government's expanded OCS leasing program began to reach fruition by 1980, oil employment in Santa Barbara County (here measured indirectly as mining employment) had already expanded to levels unprecedented in recent history—about 1500 workers. As oil workers rushed to build the infrastructure needed for expanded OCS development, employment expanded even further in those few years and topped out in 1981-1983—two years before the first offshore energy development peak in 1985.[2] Oil employment recovered fairly quickly from the 1986 price drop, yet it has declined more gradually since then to pre-1980 levels. This pattern coincides with oil development: Employment is typically greatest at the beginning of development, when infrastructure is built to commence extraction. Once extraction begins, fewer workers are needed for the maintenance and modification of existing projects.

Some discussion of context is in order to understand these patterns more fully. Figure 2.2.2 demonstrates the modest scope of oil employment in Santa Barbara County (technically, also the Santa Barbara SMSA) when compared to Ventura County. There are two specific components of its employment profile. First, although Santa Barbara County outpaces its neighbors in the volume and value of oil development, the county's place in the oil industry is generally as an outpost for capital-intensive extraction, not a particularly labor-intensive industry base (for more discussion on oil and gas workers, see Section 5: Labor). Second, what "native" oil industry exists in Santa Barbara County is clustered in the Santa Maria Valley, an oil town forged in bygone days of onshore energy development, and is thus vulnerable to particular industry trends. For one, many local oil service companies (such as pipeline companies or supply firms) geared towards onshore development are likely to see declining fortunes as onshore oil and gas extraction declines (a process further described in Section 3.3: Adaptation and Diversification). Additionally, smaller companies are especially threatened by market tremors, as the 1986 price drop demonstrated. Generally, *consolidation* best describes the local oil industry's internal transformations (described in Section 3.2: Producers, Fields, and Corporate Forms).

Certainly, nothing from the data reviewed so far suggests that the oil industry is in irreversible economic decline. However, broader transformations indicates that while absolute growth of the local industry is not out of the question, its relative importance to the county's economy is declining. Service industries and other "post-industrial" sectors have grown in both relative and absolute size, thus minimizing the relative economic impact that the oil industry has made on county payrolls and labor forces. On the South Coast, education steadily continues to be the largest employer, thanks to the growth of the University of California campus. Prominent new sectors include high-tech industries like software design, telecommunications, specialized manufacturing (for example, medical instruments), and commercial space applications stemming from the recent commercialization of Vandenburg Air Force Base. Many estimates suggest these high-tech sectors are sufficiently growing to offset the declining industrial base of defense-related electronics and maintain the area's economic status as an "innovation center" (Malecki, 1980).

Another revealing contrast is, again, between jobs in mining and those in tourism. The relative importance of tourism to offshore energy development is visible in our extract/intact ratio, which measures economic dependence on extraction industries compared to tourism—an industry that depends on an "intact" earth. Our ratio formula here departs from our earlier 1950-70 ratio. Here, the ratio pits aggregate personal income in the county for oil and gas extraction against aggregate personal income in the county for these tourism sectors: eating and drinking establishments, lodging, and museums, botanical and zoological gardens.[3]

Figure 2.2.3 reveals a significant disparity between the income wealth that tourism generates in comparison to oil and gas production. At its peak in 1980, oil and gas generated income wealth at roughly one-third that generated by tourism. Additionally, the county's ratio of these two sectors has generally paralleled that of the state, lagging slightly behind in 1975. Two brief upsurges in the ratio (1975-80 and 1990-95) are attributable to the larger relative growth in extract income, although this appears to be modest and atypical. While tourism income wealth has consistently grown, extract income wealth actually decreased for the period between 1985 and 1990. These data suggest continuity with the findings from our previous 1940-1970 measure of the extract/intact ratio. There is an incongruence between the high oil production (occurring offshore and in the county) and the relative insignificance of oil as an employer.

Notes

1. In Santa Barbara County, tourism industry occurs chiefly in the South Coast region, while onshore oil development takes place mostly in the northern portion of the county. Therefore, our extract/intact ratio compares two sectors which, for the most part, do not geographically coincide within Santa Barbara County. The ratio offers a measure of *county-wide* economic development that does not necessarily represent an actual *community* experience—as it does, by contrast, in the nearby city of Ventura (described in Section 2.2 of *Petroleum Extraction in Ventura County, California: An Industrial History* [MMS 98-0047]).

2. The oil employment described here does not include general construction workers or other employees whom oil firms contracted to build oil-related infrastructure but did not report on oil firm payrolls.

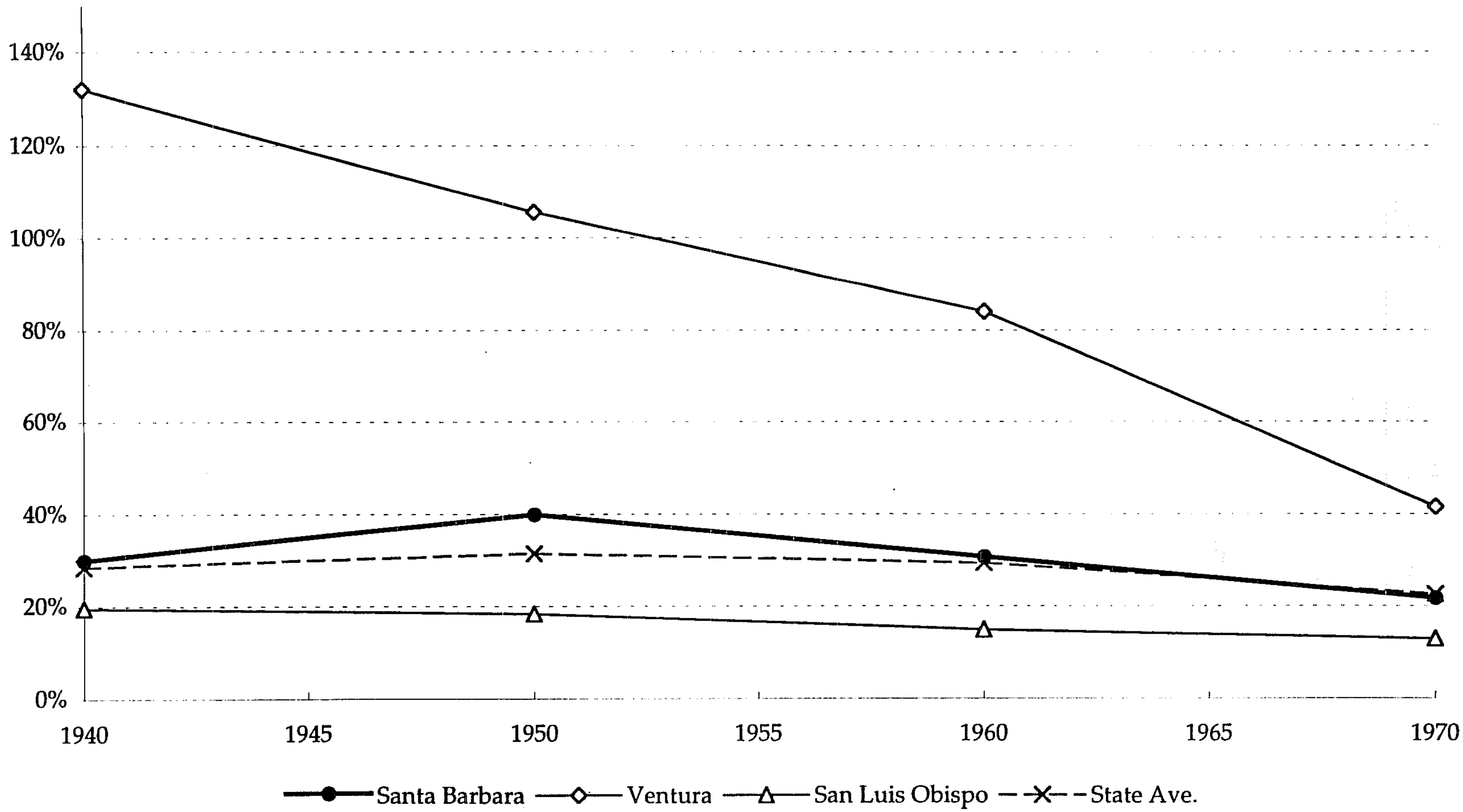
3. In the previous extract/intact ratio for the 1950-1970 period (see also Molotch and Freudenburg, 1996: 39-40), we compared a broader definition of "extract" (oil and gas, plus mining and chemical/allied occupations) with a narrower definition of "intact" (no museums, botanical and zoological gardens). The current ratio therefore reduces error by not overstating extract sectors and not understating intact sectors. Additionally, our previous extract/intact ratio compared numbers of jobs in each sector, for which we were unable to find 1970-1990 data. Since tourism jobs typically pay less than average wages, and oil and gas jobs typically pay more than average wages, the current extract-intact ratio will likely underestimate the comparative number of jobs between extract and intact sectors.

Table 2.2.1: Santa Barbara County jobs in mining, chemical and allied occupations, and petroleum, 1950-1970

	1950	1960	1970
Mining	1187	898	1453
Chem/allied	67	127	181
Petroleum	289	552	89
SUBTOTAL	1543	1577	1723
Percent of total	3.94%	2.35%	1.67%

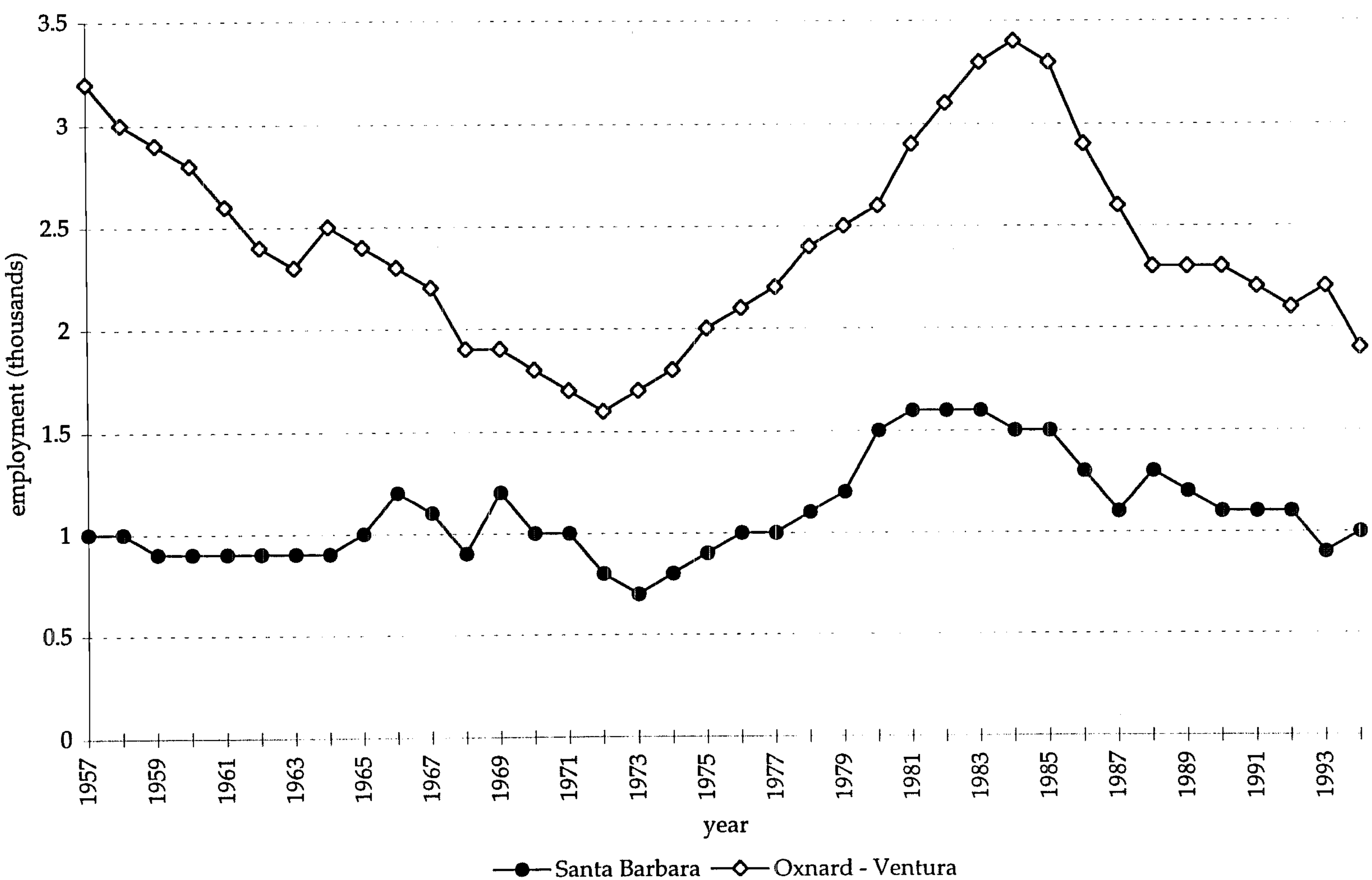
Source: US Census.

Figure 2.2.1: The Extract/Intact Ratio, 1940-1970,
Santa Barbara County compared to state and region



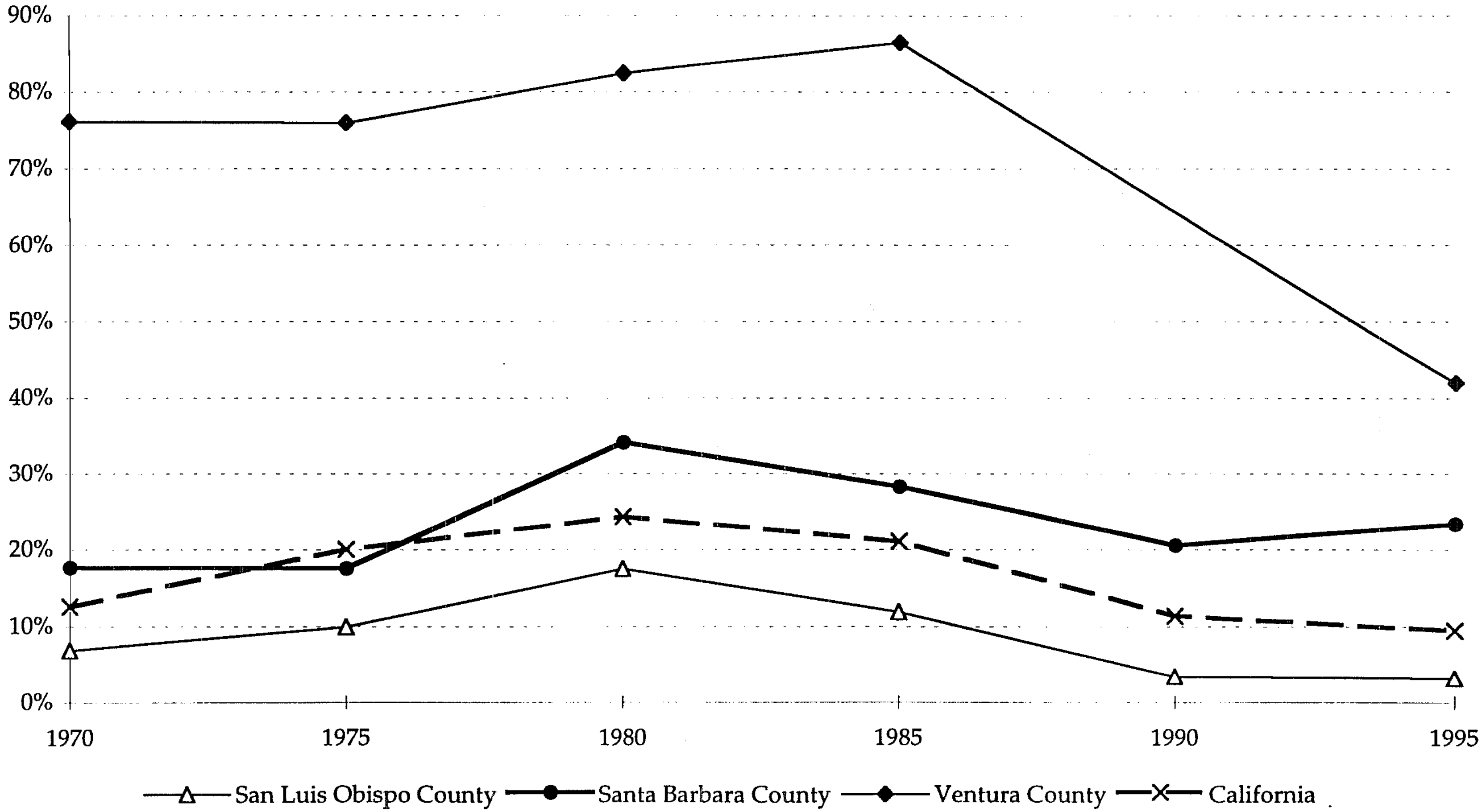
The Extract/Intact Ratio compares numbers of jobs in mining, chemical/allied, and petroleum to jobs generated by eating, drinking, and lodging establishments—a proxy for the tourism industry.
Source: US Census.

Figure 2.2.2: Mineral extraction employment, 1957-1994



Source: California Statistical Abstract.

Figure 2.2.3: The Extract/Intact Ratio, 1970-1995,
Santa Barbara County compared to state and region



The Extract/Intact Ratio compares aggregate income from oil and gas extraction to aggregate income from eating, drinking, lodging, and museum jobs—a proxy for the Tourism Industry.
Source: Regional Economic Information Service.

Section 2.3
Tax Payments

In this section, we examine yet another way in which the oil industry has made an economic impact on Santa Barbara County, through property tax revenues derived from oil and gas related properties. The county assesses tax on a variety of such properties: oil mineral rights, real estate ranging from small offices to giant oil processing facilities, improvements on land that oil companies lease from other landowners, and equipment and technology which may or may not be attached to a particular parcel of land. The county does not collect mineral rights royalties from development in either the tidelands or the outer continental shelf (OCS), which accrue directly to the state and federal governments, respectively. The county does, however, assess property taxes on tidelands development, thereby capturing some revenues from offshore development. County tax revenues also capture an important part of OCS development through the assessment of coastal facilities, land-to-sea pipelines, and other onshore infrastructure related to offshore drilling. Below, we describe the levels of county tax revenues from oil and gas development in the two historical periods for which we have data: 1969-1986 (data beginning in 1978) and 1987-1996.

1969-1986

After 1978, county oil and gas tax revenues rose dramatically through this period, as demonstrated by Figure 2.3.1: Santa Barbara County oil and gas revenues by location, at the end of this section.[1] The top line shows the cumulative tax payments: From 1980, tax revenues surged from $1.5 million to $12.6 million in five years. Hidden by this overall increase, however, is a shift in the geographical locus of oil and gas tax revenues. At least in the beginning, onshore oil and gas development was responsible for much of the increase. Yet particularly by 1983, the construction of OCS-related facilities and infrastructure located onshore (and thus taxed by the county) began to overtake onshore development as a source of oil and gas tax payments.

Figure 2.3.1 illustrates how the bulk of county oil and gas tax revenues shifted from onshore to the OCS through the 1980s. Here, "coastal and offshore oil and gas development" represents the county tax revenues generated by tidelands oil and gas extraction (for example, slant drilling and offshore platforms within three miles of the coast), as well as the coastal infrastructures (like marine terminals, pipelines, and processing facilities) through which tidelands and OCS oil and gas are channeled; "onshore oil and gas development" represents extraction and infrastructure located further inland.[2] In this period, as coastal projects like the expanded Ellwood facility, the Pacific Offshore Pipeline, and particularly Exxon's Las Flores Canyon facility began processing OCS oil and gas, the county assessed the economic value of this activity; as OCS development increased, so has county tax revenues.[3] Importantly, this growing revenue stream more than compensated for falling revenues derived from declining *onshore* development in the county—a relationship which continues to the present.

The 1986 fall of oil and gas prices dramatically slowed the pace of oil and gas development both onshore and offshore. As a result of this declining activity, the county suffered a $2 million drop in oil and gas tax revenues from the year before, as Figure 2.3.1 indicates. However, in subsequent years the rate of revenue decline would be offset somewhat by Chevron's Gaviota processing facility and other future OCS related facilities and infrastructure already in the permitting "pipeline," as the next historical period (1987-1996) demonstrated.

1987-1996

In the wake of the 1986 drop in oil and gas prices, the value of oil and gas production fell from its unprecedented 1985 peak for the next few years—and, with it, the tax revenues which Santa Barbara County derived from this production. As Figures 2.3.1 (from the 1969-1986 period) and 2.3.2: Santa Barbara County Oil and gas tax revenues by location, at the end of this section indicate, total oil and gas tax revenues fell in 1985-1987 and, after a brief 1988 upturn, again in 1988-1991 at a less dramatic rate. Since 1993, production value (and thus county tax revenues) have swung back toward their 1985 peak. These rates do not capture the entire dynamic of oil and gas development on and offshore in Santa Barbara County, since county oil and gas tax revenues do not include OCS oil and gas royalties. However, since the county taxes the production value of coastal and onshore infrastructure like processing facilities and pipelines, its tax revenues *indirectly* reflect the scale and monetary value of OCS development.

These aggregate trends in oil and gas tax revenue hide shifts in the geographic locus (from land to coast and sea) and industrial activity (from extraction to infrastructural investment) that the county taxes. While these shifts began at least in the early 1980s, we are able to document them more explicitly due to the finer details in tax data which Santa Barbara County reports after 1983. First, the qualitative movement of oil and gas production and profit from land to sea is depicted in Figure 2.3.2. Here, "coastal and offshore oil and gas development" represents the county tax revenues generated by tidelands oil and gas extraction (for example, slant drilling and offshore platforms within three miles of the coast), as well as the coastal infrastructures (like marine terminals, pipelines, and processing facilities) through which tidelands and OCS oil and gas are channeled. "Onshore oil and gas development" represents extraction and infrastructure located further inland.[4]

A slightly different way to describe the movement of oil and gas development from land to sea is to follow another shift in the source of tax revenues: from extracted mineral rights to processing facilities, oil transport, and other forms of infrastructural investment. More detailed tax records which Santa Barbara County began keeping in this period allow us to observe this shift, which is illustrated in Figure 2.3.3, below. These data are based on county assessors' distinctions among assessments to mineral rights (that is, tidelands and onshore energy development), improvements (mostly large industrial facilities, but also pumpers, casings, oil well pads, and generators, and some roads), and personal property (offices, some roads, steam generators for secondary recovery, and some extra parts). While total tax revenues from this period fluctuate in the contemporary period around a $10 million average, onshore facilities and other improvements have increasingly picked up the tax revenue slack from declining onshore and tidelands mineral rights. Although onshore and tidelands mineral rights produced eight times more revenue than improvements in 1983, the two kinds of tax revenues became roughly equal in 1987; since then, tax revenues from onshore facilities and other improvements have continued to grow steadily, most recently counting for 20 times the revenue from tidelands and onshore mineral rights.

The growth of infrastructural development and its fiscal importance to Santa Barbara County resulted from activation of several onshore infrastructures: among them, the 1983 activation of Las Flores Canyon, the 1985 opening of the POPCO pipeline, and the 1987 activation of Chevron's Gaviota terminal. Additionally, off-to-onshore pipelines generated a significant fraction of oil and gas tax revenues in the recent period of infrastructural expansion. As captured under the county's unsecured assessment category since 1987, pipeline companies' fiscal importance is demonstrated in Figure 2.3.4: Santa Barbara County secured and unsecured oil and gas tax revenues, at the end of this section. Averaging 12 percent of all oil and gas tax revenues, pipelines and other, substantially less significant unsecured properties have comprised as much as 18 percent of oil and gas tax revenues (in 1991); their revenue share has dropped to 10 percent or less in the last four years.

These tax revenue figures indicate the progression of energy development in Santa Barbara County from onshore to tidelands to OCS. Furthermore, they suggest how the era of expanded OCS leasing is felt locally as an era of infrastructural expansion. While Santa Barbara County has witnessed substantial onshore energy development in previous decades, the county has sustained significant tax revenues from oil and gas even as development has increasingly escaped the county's taxation jurisdiction for the OCS.

Notes

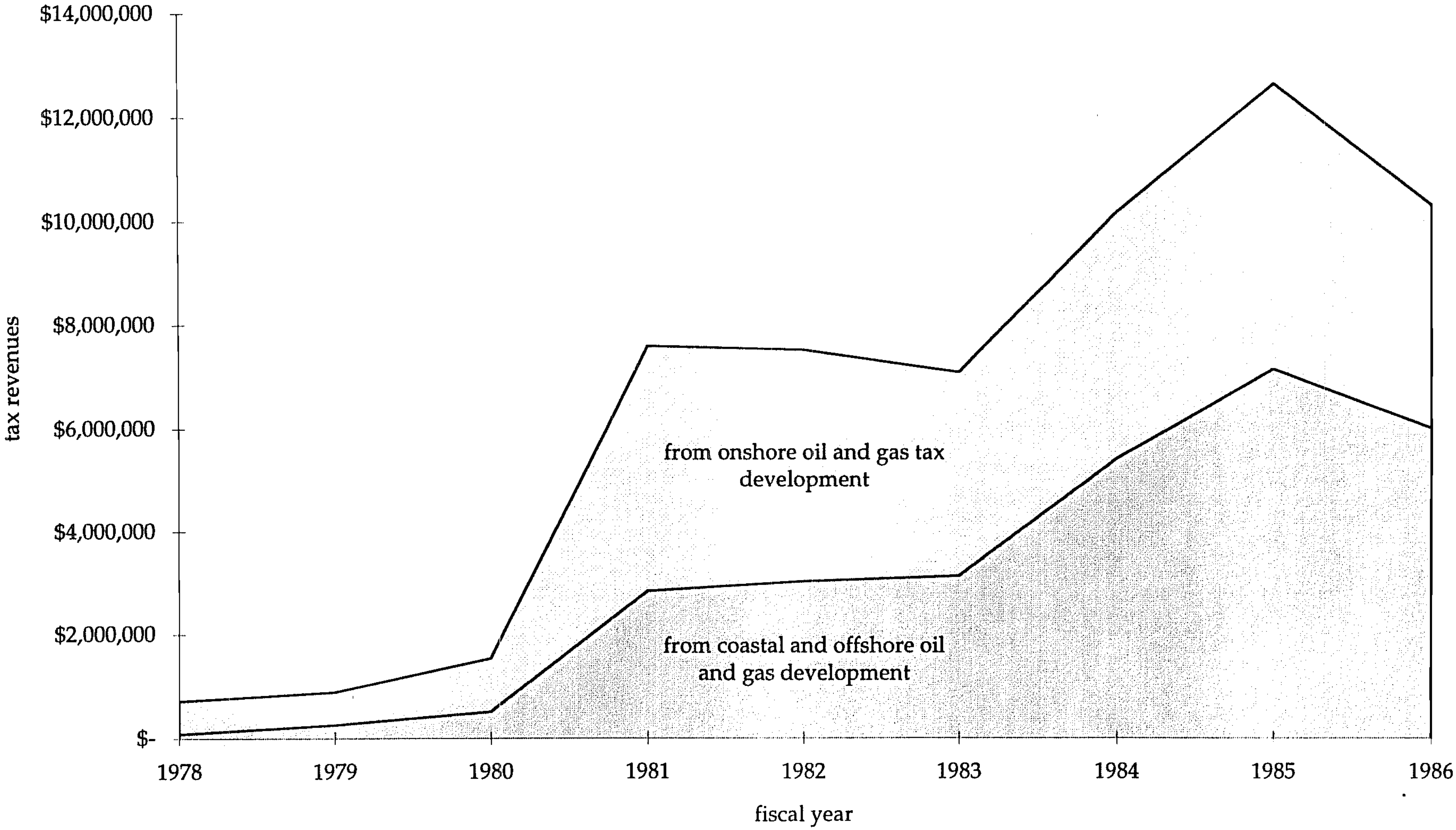
1. The following discussion underestimates the complete tax revenues generated in Santa Barbara County by oil and gas development. By "county tax revenue," here we mean solely the 1 percent tax revenue on assessed property that accrues to county coffers. Not included is a smaller, variable fraction of revenues generated by special district assessments—in other words, bonds levied by local school systems, water districts, and sewage districts.

2. A methodological note: Tax revenues from coastal and offshore oil and gas development are derived from county oil and gas assessment parcels located in known coastal territories (for example, Ellwood, Gaviota, the Carpinteria pipeline corridor), following the methods established by Lima (1994). The specific assessment parcel categories are the 301, 303, 305, 373, 375, 379, 381, and 383 parcel series listed in the "minerals section" of annual Santa Barbara County secured tax rolls. Tax revenues from onshore oil and gas development are calculated by subtracting coastal and offshore oil and gas tax revenues from total county oil and gas revenues.

3. The converse is also true: Partially completed or idle coastal facilities generate much less tax payments than when they are fully operational. For instance, the four-year delay in Chevron's activation of the Gaviota processing facility represented a potentially substantial loss of county tax revenue.

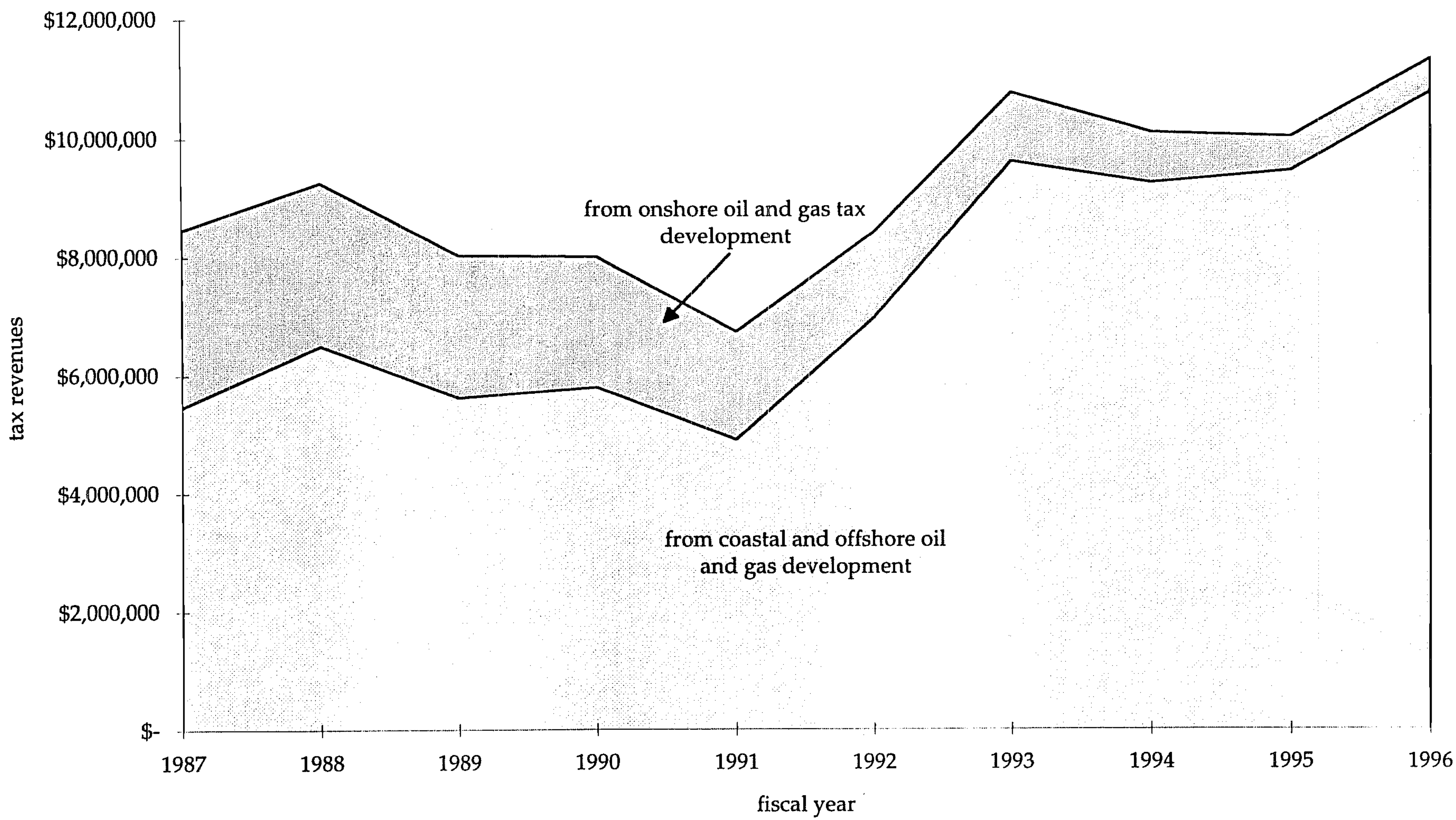
4. See the methodology described in Note 2.

Figure 2.3.1: Santa Barbara County oil and gas tax revenues by location, 1978-1986



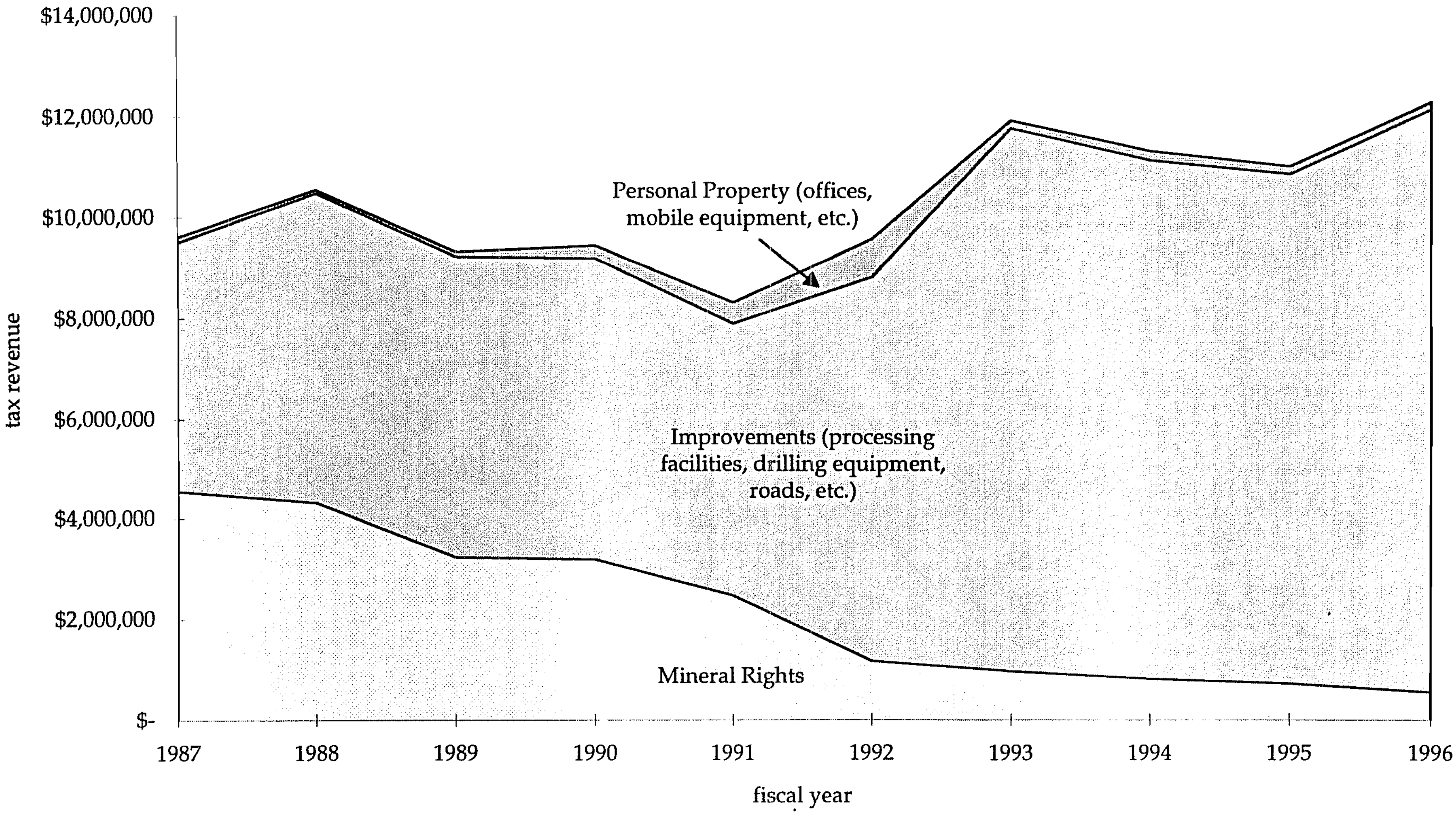
Source: For 1978-1982, annual County tax assessment rolls; for 1983-1986, report from Santa Barbara County Petroleum Assessor.

Figure 2.3.2: Santa Barbara County oil and gas tax revenues by location, 1987-1996



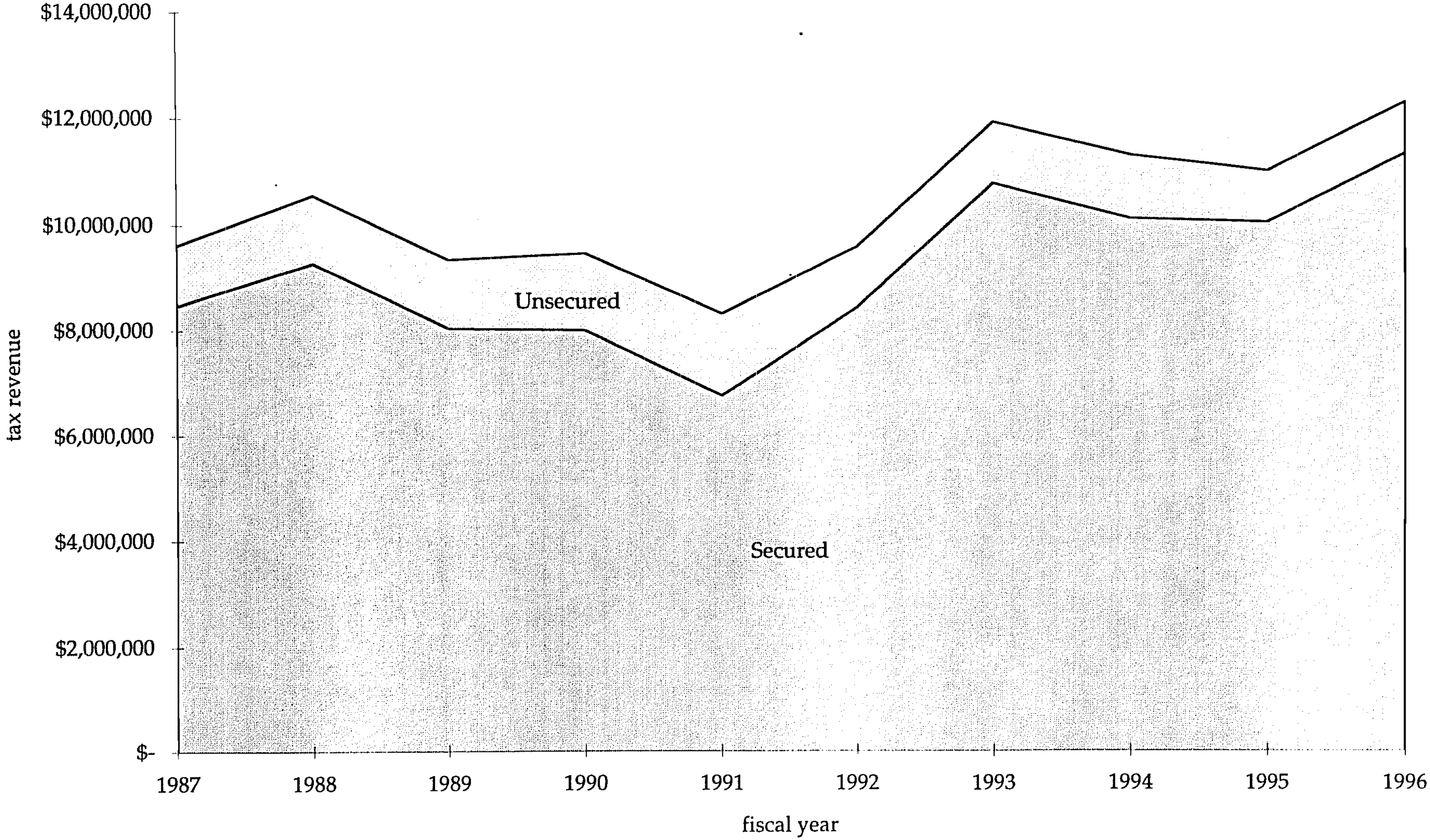
Source: Report from Santa Barbara County petroleum assessor.

Figure 2.3.3: Santa Barbara County oil and gas tax revenues by kind, 1987-1996



Source: Report from Santa Barbara County petroleum assessor.

Figure 2.3.4: Santa Barbara County secured and unsecured oil and gas tax revenues, 1987-1996



Source: Report from Santa Barbara County petroleum assessor.

Section 2.4
Philanthropy

The oil industry impacts local economies in ways other than payrolls and taxes. Oil companies and employees are also a source of philanthropic generosity that benefits local institutions like social services, health care services, schools, and cultural organizations. Here, we describe the extent and modes of local giving by the oil industry, specifically oil producers. We surveyed 23 representatives from 15 oil companies with tri-county operations about their companies' philanthropy in the tri-county region. We supplemented their responses by examining corporate foundation reports and local newspaper clippings for further records of oil philanthropy, and by contacting representatives from local charities and other likely recipients of oil gifts to confirm the amount of oil contributions and explore important targets of philanthropy. Since the respondents generally could not provide philanthropic records earlier than ten years ago, our discussion of oil company philanthropy corresponds to the last historical era studied in this report: 1987-1996. (We discuss a few earlier examples of oil philanthropy in Section 4.1: Local Support and Opposition.) While the data we ultimately gathered are still only partial, they are highly suggestive of the informal ways that the oil industry contributes.[1]

1987-1996

One way to measure the oil industry's philanthropic impacts is to compare industry contributions to local branches of the United Way, whose local chapters distribute money to local social service and health care non-profits. The United Way generally organizes its fund-raising efforts in annual campaigns, soliciting donations from business employees and, separately, corporations or their foundations. Like other industries, oil companies participate in these annual campaigns; by our count, nine of the 15 companies surveyed in the region participated in at least one United Way annual campaign in the tri-counties.[2] At the end of this section, Table 2.4.1 describes the extent of oil contributions to local United Ways in a typical contemporary year.

Overall, our United Way representatives indicate that oil producers gave approximately $280,000 to tri-county United Way branches in a single year (1996).[3] Total oil industry (corporate plus employee) donations to the United Way are greatest in Ventura County, where they almost triple the oil donations in Santa Barbara County (split among the Santa Barbara and Santa Maria branches) and are more than 15 times greater than oil donations in San

Luis Obispo County. Some United Way representatives we spoke with said such differences in magnitude are characteristic of corporate giving in general, in that the size of the employee base most influences the level of United Way donations. Since levels of tri-county oil employment are highest in Ventura County and lowest in San Luis Obispo County (see Section 5: Labor), this pattern suggests that oil contributions to the United Way are greatest where the oil workforce, not oil activity, is greatest. This appears to be a reasonable explanation that is congruent with the ways that individual companies customarily organize their United Way fund-raising efforts. Typically, an individual employee is designated "campaign manager" for the workplace; employees specify a portion of their paycheck to be deducted for charity; and then the company matches employee dollar amounts according to a particular formula (for example, one-for-one).

While these figures describe a single year of donations, United Way representatives claim these donation amounts are characteristic of oil giving since at least the mid-1990s, an era in which many oil companies have reduced or deactivated their tri-county offices in response to declining oil production. Oil industry donations to the United Way were generally larger in the 1980s, especially for branches located in industry centers like Ventura or Santa Maria. A Santa Maria United Way representative gave one indication of just how much the declining oil industry has impacted this charitable agency. From a 1985 Central Coast campaign goal of $1.2 million (an amount devised by the local branch to provide a reasonable target for likely contributors in all local industries), ten years later the branch reduced their gift expectations from oil and other sectors and made their campaign goal only half that amount ($600,000).[4]

The oil industry *proportions* of each United Way branch's campaign totals offer a look at a slightly different aspect of oil philanthropy: its comparative importance relative to other industries. Nationally, the petroleum industry is known to be the first or second largest United Way industrial donor, in terms of proportion of charitable allocation to the United Way and mean gift size (Brilliant, 1990: 216; Platzer, 1986: 18-24). However, the industry's impressive national track record is tempered by its comparatively slight size in Santa Barbara County.

Oil companies give a variety of other gifts to community organizations. Unlike participating in local United Way campaigns, oil philanthropy to these community organizations may require some prior contact, such as grant applications or personal solicitation. Giving by oil companies may reflect and/or forge special connections and bonds to local organizations and the community in general; the number and kind of miscellaneous oil gifts may give a clue as to the "personality" of various oil companies.

At the end of this section, Table 2.4.2: Recent oil company gifts in tri-county region presents our attempt to inventory all these other oil gifts, as reported by oil company representatives, nonprofit reports, and other data like newspaper articles. The data do not represent a complete "census" of oil gifts; additionally, they exclude forms of philanthropy that are not easily measured, such as charitable service by oil workers. For these reasons, we present this inventory of oil gifts as a snapshot of oil industry philanthropy in the last decade. Several aspects of Table 2.4.2 are worth discussion.

We have calculated a total cash value for cumulative oil philanthropy by adding all gift amounts reported in Table 2.4.2 plus the annual United Way contributions (using the 1996 figures as a generous annual estimate). We derived a total of *over $8 million* in oil philanthropy in the tri-county region over approximately the last decade. Since a great number of oil gifts were reported without cash values, this $8 million sum underestimates the true value of cumulative oil philanthropy by (we speculate) at least several million dollars.[5] Additionally, we have also sought to calculate which nonprofit areas receive the greatest oil philanthropy by calculating sub-totals for oil gifts where a recipient organization was identified. Although this introduces yet another source of underestimation (because some oil companies did not report the recipients of their philanthropy), we found that oil companies tend to give to the areas of (in descending order): health and human services, education, civic organizations, arts and culture, and conservation and animal advocate groups.

Oil philanthropy is not evenly distributed across the tri-county region. As Table 2.4.2 indicates, oil philanthropy is concentrated in Santa Barbara County, a pattern which contrasts with oil donations to the United Way. In this case, oil giving in the tri-counties appears to be related to a county's level of oil activity, not its oil employment. Generally, every company gave more to local organizations in Santa Barbara County than in any other county. This is true even of companies like Exxon and Chevron, which have long had regional offices in Ventura and San Luis Obispo Counties, respectively. Only CalResources and Oryx Energy gave more elsewhere, in Ventura County.[6]

There are a few likely explanations for the concentration of oil philanthropy in Santa Barbara County. One possible factor is the number of local organizations who might apply through a grant-making process for oil money; since Santa Barbara County has more community organizations than the other two counties (Molotch and Freudenburg, 1996), this might explain why the county receives more oil philanthropy overall.

Related to this, a second factor may be the return benefit which the recipient organizations may create for oil companies. This is quite likely in the case of educational philanthropy, where local research universities receive far more oil donations than the other colleges in the tri-county region. The University of California campus at Santa Barbara is known for its research strengths in fields of relevance to oil development, such as geology, marine biology, and engineering. Not surprisingly, UC Santa Barbara is a major recipient of oil company gifts; of the 15 companies surveyed, ten had made contributions at some level to the campus. The California Polytechnic University at San Luis Obispo (Cal Poly) is also known for its strength in biological sciences and engineering; although its level of oil philanthropy is smaller, these donations are frequently channeled to campus departments where research can produce at least indirect benefits for the oil industry. In this regard, Ventura County is at a disadvantage, since it has no research universities (at least until the California State University's new Channel Islands campus is opened in the near future).

A third factor which may explain the concentration of oil philanthropy in Santa Barbara County is the contesting of local oil development there. In the tri-counties, the scale of oil company investment and the future potential for oil development have been greatest in the Santa Barbara Channel, even as local opposition and government regulation have raised the "costs of doing business" to unprecedented levels. Thus, the predominance of Santa Barbara County organizations in Table 2.4.2 may suggest the use of philanthropy as a form of public relations to legitimate the industry's local presence. In at least some cases, oil philanthropy even appears to correspond to places and years of controversy, which suggests the intent, at least implicitly, to quell local opponents of the oil industry. For instance, Mobil Oil gave more in 1995, a year in which local decision-makers reviewed its proposed "Clearview" slant-drilling project, than in any other year since it opened a Santa Barbara office in 1993. Similarly, Unocal's contributions to Cal Poly spiked upwards in 1997—a year in which the company was in the midst of substantial financial compensation and environmental remediation at two San Luis Obispo County locales (Avila Beach and Guadalupe), even as it otherwise ceased activities in the tri-county region. In regards to this philanthropic incentive, Ventura County may ironically be at a disadvantage. Its general acceptance of oil activity, in comparison to its more combative neighbors, may give oil companies less need to demonstrate their local good will.

Notes

1. The task of reconstructing the amounts and recipients of the industry's generosity is difficult. Eleanor Brilliant (1990: 210), a former executive and current researcher of nonprofit organizations, describes the fundamental obstacle in research on corporate philanthropy following her efforts to inventory corporate donations to the United Way: "Complete, comprehensive, and specific figures for charitable giving by individual companies are difficult to obtain, since they are not widely disseminated and are usually subject to ambiguities of interpretation." Additionally, a number of oil companies have come and gone from the tri-counties, and it was difficult to make contact with all the oil companies that have operated locally in recent years. While foundation annual reports from multinational corporations provide some data, regional offices of oil companies do not regularly record the often small and frequent gifts they make to community groups, or have a stable staff to provide the "institutional memory" of their local giving.

2. This figure may underestimate the number of companies participating in local United Way campaigns, since some local branches could not confirm the names of participating local oil companies.

3. By contrast, a UCSB Economic Forecast report estimates that tri-county United Way branches received $847,000 from oil-related firms in 1996 (UCSB Economic Forecast Project, 1997: 13). This value exceeds our estimate for the same year by an order of three. There are two likely sources for the disparity between these estimates. First, the UCSB Economic Forecast report calculated United Way gifts through sampling procedures using survey data from oil firms, while we calculate the same figure simply by adding the amounts of oil philanthropy reported by representatives from local United Way branches. Second, the UCSB Economic Forecast report surveyed philanthropy from a broader range of oil companies, including 30 oil supply and service firms, while we asked our United Way informants to report solely on exploration and production firms.

4. The Santa Maria branch's reduced campaign goal also factored in the shrinking military sector (following the reduction of military employees at nearby Vandenburg Air Force Base). This suggests that oil's decline most impacts local economies where other primary sectors are declining. For social service programs dependent on philanthropic support, the result is (according to one United Way representative) that "as the employer base shrinks, the needs increase. As people are being laid off or phased out, they have a greater need so they're drawing on services."

5. For a sense of the relative financial impact of oil philanthropy, it is useful to compare our estimated value of cumulative oil philanthropy to two mitigation funds which oil producers have paid into, starting in the mid-1980s, in order to mitigate their environmental impacts from OCS development projects. Santa Barbara County nonprofits, schools, and public agencies have received over $10 million in oil company money from the county's Coastal Resource Enhancement Fund and over $7 million from its SocioEconomic Monitoring and Mitigation Program payments over roughly the same ten-year period as the philanthropy described here. While the $8 million philanthropic total probably underestimates the true amount of oil philanthropy in the tri-counties, Santa Barbara County almost certainly receives more oil

generosity from its compulsory mitigation funds (which are further described in Section 6.2: Local Oversight) than from its share of voluntary philanthropy.

6. After we obtained philanthropic data from CalResources for this research, the company reorganized as Aera Energy.

Table 2.4.1: 1996 oil industry contributions to annual United Way campaigns in the tri-county region

United Way branch (location)	corporate donations	employee donations	**total oil donations**	percent of total campaign
Ventura County (Camarillo)	$84,333	$116,233	**$200,567**	4%
Santa Barbara County (Santa Barbara)	$11,973	$26,698	**$38,671**	2%
Central Coast (Santa Maria)	$18,032	$13,164	**$31,196**	5%
San Luis Obispo County (San Luis Obispo)	$6,374	$6,870	**$13,244**	2%
TOTAL	$120,712	$162,956	**$283,678**	

Source: Interviews with local United Way branch spokespeople.
Note: The figures correspond to the sole year for which comparative data were available from all the major United Way branches in Santa Barbara, Ventura, and San Luis Obispo Counties. The Lompoc branch (in Santa Barbara County) was not contacted for this study.

Table 2.4.2: Recent oil company gifts
in tri-county region

Amoco

Santa Barbara County

- **UC Santa Barbara**: $184,500 (estimated) from 1989-1994

Arco

Santa Barbara County

- Makes **Arco Conference Center** (in Montecito) available for free use to charities
- **County of Santa Barbara Arts Fund**: $5,000 in 1993 for rural arts program
- **Girls, Inc.** (Santa Barbara): $15,000 in 1993 for expansion of Operation SMART program to girls in Koreatown, East LA and South Central LA areas
- **Jesuit seminary** (Santa Barbara): purchased and restored "Breakers" facility for conference use
- **Kids' Passport to the Arts** (Santa Barbara): $2,000 in 1993 for free admission to arts events
- **League of California Cities** (Santa Barbara County chapter): recent donation
- **Lobero Theatre Foundation** (Santa Barbara): recent donation
- Built **rainbow sculpture** and landscaping on Santa Barbara waterfront
- **Rehabilitation Institute** (Santa Barbara): recent donation
- **Santa Barbara Arts Commission**: recent donation
- **Santa Barbara Museum of Art**: $2,000 in 1993 for Ridley-Tree Education Center
- **Santa Barbara Botanic Garden**: $5,000 in 1993 for volunteer training program
- Corporate donor to the **Santa Barbara Zoo**
- **UC Santa Barbara**: $4,500 (estimated) in 1992

Ventura County

- **Future Leaders of America** (Oxnard): $1,500 in 1993 for "New Citizens" program
- **Ojai Festival**: $1,000 in 1993 for music festival
- **Cabrillo Economic Development Corporation** (Saticoy): $2,500 in 1995 for development of low-income housing in Camarillo, Santa Paula and Oxnard

San Luis Obispo County

- **Cal Poly San Luis Obispo**: $20,000 in 1993 and 1994 for minority student retention program in engineering

Benton Oil and Gas

Santa Barbara County

- **Boys & Girls Club of Santa Barbara County**: $1,000 in 1997
- **Carpinteria Avocado Festival**: $500 in 1997
- **Carpinteria Boys & Girls Club**: $300 in 1997
- **Carpinteria dentists**: $1,150 for youth dental program in 1997
- **Carpinteria Educational Foundation**: $25,000 in 1997
- **Carpinteria Unified School District**: $250 in 1997
- **Cold Springs School Foundation**: $3,500 in 1997
- **Direct Relief International**: $100,000 to sponsor dental clinic for Carpinteria children in 1997
- **Foothill Little League** (Carpinteria): $250 in 1997
- **Girls Inc.** (Carpinteria): $14,400 annually in 1997-98
- **Junior Carpinterians Scholarship Fund**: $1,000 in 1997

- **National Tuberous Sclerosis Association:** $10,000 in 1997
- **Volunteers of America:** $5,000 in 1997
- $135,000 allotted in 1998 for **health programs** (such as immunization clinics, eye surgical program, Benton Health Fair)

Ventura County
- **Boys & Girls Club of Ventura:** $1,800 in 1997

British Petroleum
- Santa Barbara County
  - **UC Santa Barbara:** $570,000 (estimated) between 1989-1994

CalResources
- Most contributions given to K-12 education and health & human services; local United Way branches traditionally receive 10 percent of annual amounts listed below

Santa Barbara County
- from both operator and foundation, approximately **$10,000-20,000 a year** before 1991-92 (not operating in Santa Barbara County in last five years)
- **UC Santa Barbara:** $480,000 (estimated) plus matching gifts from 1989-1994; $75,000 (estimated) plus matching gifts in 1996-97

Ventura County
- from both operator and foundation, approximately **$35,000-50,000 a year**—"ballpark figures"

San Luis Obispo County
- from both operator and foundation, approximately **$7,000-10,000 a year** in the last five years; higher in the late 80s

Chevron
Santa Barbara County
- **Estimated annual charitable contributions** (including United Way donations):
  $45,850 in 1998 (anticipated)
  $58,410 in 1997
  $48,050 in 1996
  $59,400 in 1995
  $71,825 in 1994
- Corporate donor to the **Santa Barbara Zoo**
- **Sea Center** at Santa Barbara Stearn's Wharf: $60,000 for construction
- **UC Santa Barbara:** $234,000 (estimated) plus matching gifts from 1989-1994; $37,500 (estimated) plus matching gifts in 1996-97

Ventura County
- **Estimated annual charitable contributions** (including United Way donations):
  $17,200 in 1998 (anticipated)
  $19,250 in 1997
  $19,600 in 1996
  $18,250 in 1995
  $21,500 in 1994

San Luis Obispo County
- **Estimated annual charitable contributions** (including United Way donations):
  $41,850 in 1998 (anticipated)
  $44,750 in 1997
  $32,850 in 1996

$30,250 in 1995
$27,750 in 1994

- **Cal Poly**:
  $2,930 in 1998-99
  $80,735 in 1997-98
  $58,931 in 1996-97
  $45,690 in 1995-96
  $38,290 in 1994-95
  $65,420 in 1993-94
  $274,105 in 1992-93
  $90,190 in 1991-92

Exxon

- **Average annual tri- county charitable contributions** (including gifts to recipients listed below and United Way donations):
  $120,000 from 1992-96
  $100,000 from 1980-91 (estimated)
  $50,000 from 1970-79 (estimated)

Santa Barbara County

- **Allan Hancock College**: donation(s) in past five years
- **American Cetacean Society**: donation(s) in past five years for Marine Mammal Center
- **Cabrillo High School** (Lompoc): donation(s) in past five years for aquarium
- **Community Action Commission** (Santa Barbara): over $1,000 in 1995
- **Goleta Lemon Festival**: donation(s) in past five years
- **Las Positas Park Foundation**: $10,000 in 1983, plus donation(s) in past five years
- **Lompoc Valley Family YMCA**: donation(s) in past five years
- **Orcutt Union School District**: donation(s) in past five years
- **Santa Barbara Botanic Garden**: $5,000 in 1996
- **Santa Barbara City College**: donation(s) in past five years
- **Santa Barbara County Arts Fund**: $5,000 annually in 1993-94
- **Santa Barbara County Education Office**: $7,000 in 1994 for Minority Forestry Project and other support; $5,000 in 1994 and $10,000 annually in 1995-96 for Impact II and other support in 1995-96
- **Santa Barbara Museum of Natural History**: $5,000 annually in 1993-96
- **Santa Barbara Scholarship Foundation**: $5,000 annually in 1993-95
- **Santa Barbara Wildlife Care Network**: donation(s) in past five years
- **Santa Barbara Zoological Gardens**: $3,000 (estimated) in 1996
- **Santa Maria Valley Children's Museum**: donation(s) in past five years
- **Santa Maria Valley YMCA**: donation(s) in past five years
- **Santa Ynez Valley Coordinating Council**: donation(s) in past five years
- **Sea Center** at Santa Barbara Stearn's Wharf: $40,000 for construction
- **Solvang Theatrefest**: $5,000 in 1993

Ventura County

- **Boys and Girls Club of Ventura**: donation(s) in past five years
- **Camarillo High School Athletic Booster Club**: donation(s) in past five years
- **City of Thousand Oaks**: donation(s) in past five years
- **Conejo Open Space Trails Committee**: donation(s) in past five years
- **Conejo Recreation & Park district**: donation(s) in past five years
- **Conejo Valley Days Sponsorship**: donation(s) in past five years
- **Conejo Valley Little League**: donation(s) in past five years
- **Conejo Valley Unified School District**: donation(s) in past five years

- **Port Hueneme Maritime Day Celebration**: donation(s) in past five years
- **R.M. Pyles Boys Camp**: donation(s) in past five years
- **Southeast Ventura County YMCA**: donation(s) in past five years
- **Thousand Oaks Library Foundation**: donation(s) in past five years
- **Thousand Oaks Police Department**: donation(s) in past five years
- **Ventura County Industry Education Council**: donation(s) in past five years
- **Ventura County Museum of History and Art**: donation(s) in past five years
- **Ventura County Special Olympics**: donation(s) in past five years
- **Ventura Unified School District**: $8,400 in 1994, $13,000 in 1994, $33,000 in 1995 for K-3 math specialist activities

San Luis Obispo County

- **Cal Poly**: Educational Foundation matched employee gifts annually in 1993-95

Mobil

Santa Barbara County

- **Aggregate charitable contributions** to county recipients (including gifts to recipients listed below and United Way donations):
  $34,969 in 1996
  $40,335 in 1995
  $28,316 in 1994
  $10,100 in 1993
- Corporate donor to the **Santa Barbara Zoo**
- **UC Santa Barbara**: $67,500 (estimated) plus matching gifts from 1989-1994; $37,500 (estimated) in 1996-97

San Luis Obispo County

- **Cal Poly**:
  $400 in 1998-99
  $310 in 1997-98
  $250 in 1996-97
  $250 in 1995-96
  $475 in 1994-95
  $400 in 1993-94
  $400 in 1992-93
  $300 in 1991-92
  $2,000 in 1990-91
  $300 in 1989-90

Nuevo-Torch Operating Co.

Santa Barbara County

- **Aggregate charitable contributions**: approximately $70,000 in 1998. Recipients include:
- **Red Cross**: $50,000 designated for El Niño disaster relief
- **Mission Hills Library** (Lompoc): $10,000 for library construction
- **YMCA of Santa Maria**: $2,500
- **Santa Barbara Wildlife Care Network**: $2,000-5,000 to this oil industry-sponsored organization that helps oiled wildlife

Occidental Petroleum

Santa Barbara County

- **UC Santa Barbara**: matching gifts in 1989 and 1992

- **Westmont College:** $19,125 to student project that builds clean-water systems for rural villages in Honduras

Oryx Energy Company

Santa Barbara County

- **Carpinteria Valley Historical Society:** $100 in 1982 and $150 in 1984

Ventura County

- **Help of Ojai:** $400 in 1985
- **Horizon of Ventura:** $300 in 1990
- **Santa Paula Meals on Wheels:** $675 in 1984, $500 in 1985, and $500 in 1986
- **Oxnard Urban League:** $100 in 1984 and $100 in 1985

Pacific Operators Offshore

Santa Barbara County

- **Santa Barbara Wildlife Care Network:** $250 in 1997 to this oil industry-sponsored organization that helps oiled wildlife

Ventura County

- **Industry Day:** $100 to 1997 Ventura event

Texaco

Santa Barbara County

- **UC Santa Barbara:** $4,500 (estimated) plus matching gifts between 1989-1994; matching gifts in 1996-97

Unocal

Santa Barbara County

- **Allen Hancock Community College:** contributions to build athletic track; $5,000-10,000 a year for its Performing Arts Conservancy Program; two $1,000 scholarships each year
- **El Trodeo** (Santa Maria): 100 acres donated in 1994 to new facility
- **Future Farmers of America:** Purchases animals each year at the Santa Barbara County Fair
- **Golden State Air Fair:** airplane fuel donated each year
- City of **Guadalupe:** $200,000 for a new police car, ambulance, park, etc. since 1995
- Donations to **Lewis' Oasis**, a senior citizens club in Orcutt
- Contributions to **Babe Ruth baseball league** (Lompoc)
- **Cabrillo High School** (Lompoc): funding for school aquarium
- Donations to **Los Carneros**
- Contributions to Santa Barbara's **Old Spanish Fiesta Days**
- **Project 2000:** $50,000 pledged as $17,000 annual installments
- **Santa Barbara City College:** 1980s donations to establish restaurateur program
- **Santa Barbara County Education Office:** Funding for "Impact Two" program
- Donations to **Santa Barbara Museum of Natural History**
- Donations to **Santa Barbara Symphony**
- **Santa Maria Discovery Museum:** $500 given for each of the last four years
- **Santa Maria Elks/Unocal Events Center** for rodeo, etc.
- **Santa Maria Museum of Arts:** $500
- Donations to **Santa Maria Symphony**
- **Santa Maria YMCA:** $50,000 donated over last four or five years for construction of new building
- Donations to **Santa Maria Youth and Family Center**

- **UC Santa Barbara**: $54,000 (estimated) between 1989-1994; $5,000 (estimated) plus matching gifts in 1996-97
- **Vandenburg Quarterly Awards**: $800-1,000 awarded annually for the past three or four years to recognize missile team excellence

Ventura County

- **Channel Islands Marine Sanctuary**: underwater videocameras and diving equipment
- Contributions to the **R.M. Piles Boys Camp**

San Luis Obispo County

- **Cal Poly**:
  $172,389 in 1998-99
  $443,525 in 1997-98
  $4,650 in 1996-97
  $57,712 in 1995-96
  $3,110 in 1994-95
  $15,440 in 1993-94
  $5,750 in 1992-93
  $15,860 in 1991-92
  $3,375 in 1990-91
  $2,490 in 1989-90
- **Nipomo**: Funding for youth basketball and soccer leagues

Venoco

Santa Barbara and Ventura Counties

- **Aggregate charitable contributions**: approximately $200,000 in 1998, Venoco's first year of tri-county philanthropy. Recipients include:
- **Breast Cancer Foundation**: $5,000
- **Child Abuse Listening & Mediation** (Santa Barbara): $10,000
- **Council for Alchol and Drug Abuse**: $2,000
- **Girls, Inc.** (3 Santa Barbara County agencies): $10,000
- **Dalmation Dreams**: $10,000
- **Lobero Theatre** (Santa Barbara): $10,000
- **Santa Barbara Film Festival**: $5,000
- **Santa Barbara Harbor Festival**: $2,000
- **Santa Barbara News-Press Half Marathon**: donations
- **Santa Barbara Public Schools Crystal Apple Award**: $10,000
- **Santa Barbara Youth Sports Association**: $10,000

Section 3.1
Basic Processes and Linkages

Although the tri-counties were a significant oil production area by California standards and in some years had among the most productive fields in the nation, they are not a national center of the oil industry. The self-sufficiency of the oil industry in this area in terms of the area's ability to support exploration, production, refining, transportation, and marketing has varied through the years and across different areas of the region. Of the three counties in our larger study, Ventura and Santa Barbara Counties, and particularly the cities of Ventura and Santa Maria, contained the most service and support companies. The scope of the oil industry in Ventura and Santa Maria thus includes not only the oil companies themselves, but the pipe distributors, vacuum truck operators, answering services, and many other small support firms. These areas were also home to chemical and refining plants that increased oil's local downstream linkages.

This section describes the various phases of oil production, what types of companies performed these operations—local or national firms, vertically integrated companies or contractors—and where these firms and activities were located. Linkages to oil production will be addressed in subsequent sections of the report characterizing the field at different moments in time. For the sake of orientation, however, we offer the following the trends in tri-county support industries. During oil's heyday in the early 1950s, service and supply firms (tool distributors, electrical services) proliferated in Santa Maria and Ventura, and many clustered in specialized industrial districts (for example, Ventura Avenue in the city of Ventura). These firms were both branches of national/regional firms and local start-ups. During the offshore era (discussed in the subsection 1969-86, although offshore drilling actually began much earlier in Santa Barbara County) these firms serviced producers operating in the Santa Barbara Channel. As oil production declined, many firms closed local offices and now service the tri-counties from Bakersfield or Los Angeles. Other support functions were removed from the region early on—especially refining and corporate oversight of the larger companies. Still, Santa Barbara County supports several oil supply and service firms, preliminary processing facilties, pipelines, and regional headquarters.

Following this discussion of oil's processes and the firms that engaged in them, we discuss the oil companies themselves. Readers interested in oil production companies and their histories should see Section 3.2: Producers, Fields, and Corporate Forms.

1950-1968

Land Acquisition and Exploration

The oil production process begins with land acquisition and exploration. Land may be purchased outright by oil interests, as was especially common during the early years of tri-county oil production; Union Oil Company, for instance, purchased large quantities of property in Santa Barbara County during the 1890s and early 20th century to help ensure access to oil reserves. A second, more common means of procuring potential reserves is the acquisition of mineral rights—oil companies do not purchase the land outright but purchase or lease the right to drill for minerals beneath land owned by others. Such agreements include the right to pass through the property or construct roads and support buildings as needed and specified in an agreement between the land owner and the oil company. Through the granting of mineral rights, many families and individuals become tied to oil without actually working for the industry. Instead, a part of their livelihood (in the form of royalties) depends on the successful production of oil from their property and the price of that oil.

One example of this process at work is the Russell Ranch Field in the Cuyama Valley (northeast Santa Barbara County). Richfield Oil had been investigating the geology of the Cuyama Valley since 1944-45, before deciding to explore there in 1947. Richfield geologist Tom Dibblee, a Santa Barbara County local (his family owned land in the Gaviota area), prospected the valley that year. Richfield then obtained a few leases, including a small area of the Russell Ranch (Jones, 1972: 241). Later that year, Norris Oil Company commenced a well around oil seepage at Chalk Mountain, at the head of the Cuyama Valley, which produced a small amount of low-gravity oil on December 31, 1947. As "a matter of routine," Richfield assigned scouts to cover the well, and Richfield's land men, lawyers, and technicians were in the valley three days later conducting a "blitz leasing campaign," filing on selected federal leases, and obtaining rights from private landowners (mostly absentee). By the middle of January, Richfield had acquired over 150,000 acres of land and 87 percent of potential production in the area. Independent operators capable of quick decision-making acquired the other leases and no other major companies acquired any interest in the valley. By 1949, 72 wells had been drilled on Russell's property, making him a millionaire.

Both large and small companies searched for oil through the 1950s. Large, integrated firms had geologists on staff, and independent geologists contracted their services to smaller firms and independent producers. In the 1950s, oil exploration firms included Keystone Exploration Company, Eastman Oil Well Surveying, Independent Exploration Company, Schlumberger Oil Well Surveying (a branch of an international oil service firm), and at least one individual acting as a contractor. Exploration techniques included seismic testing (mapping subterranean structures by measuring echoes from small explosions), aerial surveys, ground exploration, and drilling test wells or core samples. Exploration work requires evaluation of samples by testing laboratories that are housed within large companies (often in regional production centers) or are themselves independent businesses acting as contractors. In some instances, contractors become partners in oil companies. Wildcatter George Hadley teamed up with financial backers in Ventura to form Norris Oil, based on his knowledge of the Cuyama area.

Drilling & well maintenance

Drilling an oil well includes tasks beyond the actual drilling of the hole. After land is acquired and assessed for its oil-bearing potential, a drilling site must be prepared. This often includes constructing roads, hauling construction and drilling equipment, grading a site for derrick construction, and constructing the derrick and support buildings. Drilling operations also require power (steam or diesel generation, or electricity) and pipelines to carry both oil and drilling fluids to and from the well. If oil is produced, tanks must be constructed for storing the oil on-site before it is transferred to off-site bulk storage or refining facilities.

Drilling oil wells requires several types of tools and supplies. These include drill bits, cable rigging to maneuver casing into the well, and large quantities of drill pipe (pipe gives structure to the hole and links the drill bit with surface). Drilling fluids and muds are used to cool the drill bit, lift drill cuttings from the hole, and provide weight behind the drilling mechanism; cement is used to line completed wells. Logging equipment is used to assess the kinds of formations that the drill bit passes through and determine the presence of oil producing strata. If oil is discovered, a variety of valves are required to maintain pressure in the well and prevent blowouts (where gas pressure overwhelms the well structure or the drilling tools, causing oil, gas, and water to "gush" uncontrollably toward the surface).

Some oil companies develop and build tools or supplies in-house. Union Oil, for example, a tri-county pioneer, developed a tool division early in its history; Shell Oil mined clay for drilling muds in the Ventura Avenue area and piped this product to various drilling sites nearby. At least one company active during our study period undertook all of these tasks on its own. Chanslor-Canfield Midway Oil, active in both Santa Barbara and Ventura Counties, was completely integrated and self-sufficient at its site in the Rincon Field. This firm built its own roads, graded drilling pads, constructed derricks and supplemental buildings, and performed the actual drilling and testing of oil wells and their products. Chanslor-Canfield Midway also generated its own electricity at the isolated Rincon site and performed preliminary processing on site through its subsidiary, Coline Gas Company. Chanslor-Canfield Midway was somewhat unique, however, as many firms relied on contractors to provide at least some elements of the production process, like drilling wells or more specific elements of the process such as well cementing, perforating (performed as wells are completed), or de-waxing (a routine part of maintenance once a well is in production).

Oil production equipment requires maintenance and repair. For this reason, service providers and suppliers are an important part of the oil economy. Together these small contractors made up a network of oil support firms that in Santa Maria and Ventura were concentrated in small geographical areas. The stretch of Ventura Avenue leading from downtown Ventura to the oil fields became something of an oil service district, and service and supply firms, as well as oil company offices, dotted the Avenue for miles during the 1950s and 1960s. These businesses served not only Ventura County producers, but also those working in Santa Barbara County. Many technical service and tool supply firms in this area were branches of national companies, including Schlumberger, National Supply Company, and Houston Oil Field Materials. Other companies were local start-ups that met with various degrees of success over our study period. For example, National Supply Company was founded in 1941 by a pair of Ventura County residents and by 1953 employed 30 men in the construction of power lines, rig wiring, and industrial motors. The company continues in business on Ventura Avenue. Ventura Tool Company, founded in 1930, is another example of a small, local equipment supplier that grew with, and eventually beyond, the needs of the local oil industry. After founding a research and development unit in 1968, Ventura Tool (later VETCO) applied its engineering expertise to aerospace applications.

Once oil is flowing from a well, the amount of work required at the site sharply declines but does not cease. Pumps are required on wells where natural gas pressure is insufficient to lift oil to the surface. The pumps are not self-sustaining and require periodic servicing to ensure a quality flow of oil and to maximize production from the well. Production from the well must be recorded, valves and pipes maintained, and the well itself must be periodically cleaned of wax, sand and other impediments. In the event of a spill around the well or adjacent sump areas (especially likely in wet weather), vacuum trucks must be employed to remove oily water from the drill site. Vacuum trucks seem especially likely to have been operated by small independent contractors.

Storage, transport, & processing

As it flows from the well, oil has to go somewhere. Most leases have what are called lease tanks for storing oil prior to transport and processing. Some of these tanks act as separators, using gravity to settle out oil and water. Other lease tanks may hold oil before or after some kind of preliminary processing occurs. Dehydration, the removal of water from oil, is another common form of on-site or near-site processing; water must be removed from oil to make pipeline transportation more efficient and reduce the possibility of corrosion.

The separation of natural gas from oil is another form of preliminary processing that generally occurs near the drilling site and before the hydrocarbons are transported or further processed. Gas, once separated from oil and processed into wet and dry components, is compressed and piped to retail outlets. In northern Santa Barbara County, Union Oil's Battles Gas Plant cleaned and separated natural gas from oil produced in the Santa Maria Valley (Uhl, 1987). In 1946, Shell Oil built a small, completely automatic gasoline plant in the Santa Maria field to process gas from old Shell properties (Beaton, 1957: 647). Shell built its first natural gas pipeline from Ventura Avenue to Wilmington in 1927. A natural gas absorption plant, constructed on Ventura Avenue in 1926, was upgraded in 1949. The plant separated "wet" and "dry" gasses from Ventura Avenue's gas-rich field, producing both "dry" natural gas, supplied to local utility companies, and propane (the demand for propane increased sharply following WW II) (*Ventura Star-Free Press*, Oil Progress Week Special Section, October 19, 1949). Shell's Ventura Avenue anhydrous ammonia plant was constructed in 1953 and immediately became Ventura County's largest industrial plant. The facility transformed hydrogen from the field's natural gas into a synthetic ammonia used in fertilizers (*Ventura Star-Free Press*, Oil Progress Week Special Section, October 13, 1954).

Secondary processing, including the refining of crude oil into gasoline, diesel fuel, or other consumer products, was split between local and non-local operations even during this early era. Union Oil operated three refineries in our study area during the 1950s, all in the Santa Maria region. In 1954, Union bought Sunray's Orcutt refinery and began constructing another refinery at Santa Maria. In 1955, Union built its third local refinery across the San Luis Obispo County line at Nipomo. These refineries specialized in the heavy crude produced locally and produced lighter oils (shipped to Union's Oleum refinery), asphalt (used by the neighboring Santa Maria Asphalt Refinery),[1] and coke (transported via rail to Stockton for overseas use) (Nevarez et al., 1996). In 1951, Texaco closed its Fillmore refinery (formerly the Ventura Refining Company) after 35 years of operation. Oil was then shipped to

Torrance for refining, and most of the 30 refinery employees accepted offers of relocation to that area.

The refining and transportation capabilities of Los Angeles and the San Francisco Bay area handled oil from other firms as well. Shell Oil's Wilmington refinery, built in 1923 to process crude from Signal Hill and Santa Fe Springs, was the destination for much of its Ventura Avenue oil and natural (casinghead) gasoline. Production in the Los Angeles Basin was declining as the Ventura Field came on line, freeing up refining capacity in the Los Angeles area (Beaton, 1957: 106-8). In addition, local ordinances enacted during the 1950s prevented construction of new refining facilities in Santa Barbara County's South Coast (see Lima, 1994). Refining appears to be a phase of the industry where economies of scale matter; operating one (or more) large regional refinery seems preferable to companies that can do this.

Like refining, petrochemical manufacture is also concentrated in the Los Angeles and San Francisco Bay industrial regions, although a small amount of chemical manufacturing occurred in our study area. Union Oil manufactured dry ice from excess carbon dioxide found in its Santa Maria Field (Taylor and Welty, 1950), and, as noted above, Shell Chemical operated an ammonia plant on Ventura Avenue (the plant later became a small refinery but was no longer in operation by the late 1980s).

Oil pipelines move product from wells to separation facilities, from separation facilities to lease tanks, and from tanks to transportation or refining centers. Pipelines vary in size depending on their uses. In the tri-county area, large pipelines move crude oil from collection points near the oil fields to refineries in the Los Angeles and San Francisco Bay areas. Smaller pipelines carry oil from leases to preliminary processing or storage units (tank farms), and submerged pipelines off-load crude into tankers. Pipelines are also the primary mode of transporting natural gas (except in its liquid forms). Gas pipelines move product from wells to separation facilities, from separation facilities to compression stations, and from compression stations to homes and industries.

Tankering is a second form of bulk oil transportation and has been utilized in this region since the late 19th century. During its early years, Union Oil piped oil from its Santa Clara Valley fields to the Ventura harbor where steam powered tankers awaited the cargo. Until very recently, tankers continued to transport oil from Ventura storage facilities, loading via submerged pipelines. Marine terminals for offloading crude oil were also constructed at Carpinteria, Coal Oil Point, and Point Conception in Santa Barbara County. These facilities allow for the transportation of crude oil produced offshore to refining facilities in Northern and Southern California.

In San Luis Obispo County, Avila Beach and Estero Bay are also home to bulk storage and marine transport facilities. Here oil piped from San Joaquin Valley fields is collected for transports to refineries.[2]

1969-1986

During the late 1960s, onshore oil exploration and production declined throughout much of the tri-county area. Development of offshore oil reserves in both state and federal waters buffered this decline (see Molotch and Freudenburg, 1997: 38). Drilling in the Channel's state tidelands actually began during the 1920s and 1930s, with offshore pools being tapped from onshore wells (at Ellwood and the Rincon). Richfield Oil leased a 1,175 acre tract off the Ventura County coast in 1954 and in February 1957 began construction of its Rincon Drilling Island.[3] The island was designed to provide a one acre sand and dirt work area, surrounded by a concrete breakwater that brought the total surface area to three acres (400,000 tons of rock and dirt used in the island's base came from a quarry five miles inland, in Rincon Canyon) (*Ventura Star-Free Press*, February 13, 1965). The island supported 46 well slots and processing equipment (including separators, tanks, heaters, gas processing compressors, and dehydration equipment) and produced water injection systems (Dames and Moore, 1997: 2-34).

Through the late 1950s and 1960s, new facilities were built, and others were adapted to process oil from the state tidelands and outer continental shelf. These include Mobil's Ellwood Oil and Gas Processing Facility, Shell's Molino Gas Plant (now referrer to as the SWEPI Gas Plant site[4]), Texaco's Gaviota Oil and Gas Plant, Philips's Cojo plant, Standard Oil/Chevron's Carpinteria Plant, the State Lease 145/410 Oil and Gas Processing Facility (located onshore in northern Ventura County and including facilities similar to those of Rincon Island), Union Oil's Rincon Oil and Gas Processing Facility, and Philips's La Conchita Oil and Gas Processing Facility. These plants performed preliminary processing and transferred oil to pipelines or storage tanks (tanks held oil awaiting tanker transport) en route to refineries. As platforms in federal waters came on line in the late 1960s, several of these plants accommodated the increased production from the outer continental shelf. At the end of this section, Table 3.1.1: Onshore infrastructure supporting offshore oil, lists the facilities still processing oil from the outer continental shelf.

As the large oil companies moved operations offshore, so did the service and support business who contracted their labor to them. Because offshore production is something of a regional activity and depends on support resources that are not adjacent to the production site, service and supply firms began to service wells in a larger geographical region. Santa

Maria and Ventura (especially Ventura Avenue) persisted as the hubs of oil well services and supplies throughout the offshore era. One local start-up, VETCO Offshore (originally Ventura Tool Company), benefited greatly from the offshore boom; the company reached its peak employment of 1,300 in 1982 and built a new Ventura Avenue facility that year (*Ventura Star-Free Press*, November 18, 1986). However, the number of such firms, even in oil support districts, seems to have declined slightly from its 1950s peak.

A third resource used to support the offshore industry was existing infrastructure not expressly intended for oil development. These include such diverse resources as local airports and ports (as bases for helicopters and boats that ferry personnel and supplies to platforms) and local community colleges that train offshore divers (Santa Barbara City College's program is nationally renowned). Santa Barbara's Stearn's Wharf was used by oil supply vessels until residents demanded it cease this function following the 1969 oil spill. One Ventura County port, Port Hueneme in the southern part of the county, came to be dominated by offshore support vessel traffic. In the early 1980s, Chevron moved its Southern California Production offices to Ventura from Orange County in part because of the $600,000 to $700,000 per day it was spending on drilling vessels based in Port Hueneme (Bates 1983).[5] In the 1980s, offshore oil support vessels comprised almost all of the Port of Hueneme's business; in the 1990s, offshore support would decline to about 10 percent of the port's income.

1987-1996

The most recent era was marked by increased investment in offshore infrastructure, as well as a decline in the level of oil service and support available in the tri-county area. During the early and mid-1980s, major oil companies had invested in offshore operations and constructed the support facilities needed to process oil from platforms in the Santa Barbara Channel. As a result, capital investment in oil processing infrastructure within Santa Barbara County increased tremendously. By 1986, the world oil market forced prices down to new lows, threatening many of the firms who profited from oil's presence in the area.

In the 1980s, a second wave of offshore development extended the life span of existing oil and gas processing plants and motivated the construction of four new onshore facilities (see Table 3.1.1: Onshore infrastructure supporting offshore oil, at the end of this section). Of the eight OCS platforms that began production in the 1980s and 1990s, three relied on existing facilities: When Platform Habitat began production in 1983, its gas was piped to Chevron's Carpinteria facility, as were oil and gas from Platform Grace (production began in 1980) and Platform Gail (production began in 1988).

With the exception of Unocal's Lompoc Heating, Separation and Processing (HS&P) Facility built to serve Platform Irene, most new plants would serve multiple platforms and process large volumes of offshore crude. In Santa Barbara County, Exxon and the Pacific Offshore Pipeline Company (formed by Pacific Lighting Company, a domestic natural gas supplier) built facilities in Las Flores Canyon to service Platforms Hondo, Harmony, and Heritage. Chevron built its Gaviota Processing facility to process oil and gas from platforms Hermosa, Harvest, and Hidalgo.[6] In Ventura County, Unocal's smaller Mandalay Onshore Separation Facility served Platforms Gina and Gilda.

As was the case in the earlier eras, most refining and petrochemical production continues to occur outside the tri-counties. Offshore crude refining still occurs at the Santa Maria Refinery (located in San Luis Obispo County at Nipomo) and the Santa Maria Asphalt Refinery (located in Santa Maria).[7]

Oil service and supply firms also suffered when prices declined. By 1996, 36 firms characterized as oil field equipment rental, oil field contractors, or oil and gas field services were located in Santa Maria/Orcutt, eight such firms were located in the city of Santa Barbara, and 108 were located in Ventura. Our region is surprisingly comparable to the Los Angeles area (including Los Angeles, Carson, Wilmington, Torrance, Brea, Industry, Commerce and Long Beach), where 150 firms provide the same services. In Bakersfield, however, we found 531 such firms, suggesting that oil support firms are increasingly reliant on regional hubs to service Southern California oil producers, and that Bakersfield is now performing this function.[8] (For more on the fates of supply and service firms, see Section 3.3: Adaptation and Diversification).

Service and supply firms were not the only casualties of declining prices and production—administrative personnel from the production firms also faced layoffs and reorganizations. Exxon reduced its Ventura County work force in the early 1990s, from a 1980s peak of 400 employees to 150 by 1993. The company then closed its Thousand Oaks headquarters, built just twelve years earlier. Some employees transferred to Santa Barbara production facilities, and a few support staff remained in the Thousand Oaks area (Simon, 1993: B1). Texaco also pulled its regional headquarters out of the tri-counties in 1990, despite having built one new Ventura office in 1989 and renovating another. The company's production division was instead consolidated in Denver (transferring 145 positions out of Ventura County) (Moraga, 1990: A1, A6). At the same time, Chevron scaled back operations and decided not to occupy a new Oxnard office building. Chevron consolidated in Bakersfield in 1993, leaving a half-built office building in

Ventura and laying off or transferring 200 employees (Simon, 1993: B1-B5). In Santa Barbara, Ogle Petroleum closed its offices in 1995, while Venoco, Pacific Operators Offshore, and Pacific Offshore Pipeline maintained offices in Goleta and the city of Santa Barbara. Union Oil's district office in Orcutt was taken over by Torch when that company bought Union's local operations.

Currently, oil activities in Santa Barbara County consist of extraction and preliminary processing phases of the industry. Some refining is done in the county, but regions outside our study area dominate California refining. Corporate headquarters have similarly moved to Los Angeles or San Francisco, and regional offices are often located in Bakersfield. For the time being, those elements of the production process that are most rooted to the well head—production, preliminary processing, and transportation—are the elements most likely to still be centered in Santa Barbara County.

Notes

1. Asphalt, used for paving and the vinyl in record albums, was also produced in Oxnard.

2. Tankering of locally produced oil through the Santa Barbara Channel is a controversial issue in the region, and some onshore facilities have been approved by Santa Barbara County only with the proviso that oil be transported via pipeline, which is considered to be safer.

3. State law prohibited the construction of steel drilling platforms at this time.

4. SWEPI stands for Shell Western Exploration and Processing Incorporated.

5. Exxon also moved its new western regional headquarters to the tri-counties, locating in Thousand Oaks.

6. These Santa Barbara County sites are two of the voter-approved consolidated processing facility sites where oil production and associated industrial development are allowed. See Section 4.2: Local Oversight.

7. Refineries that had operated on Ventura Avenue were closed in the 1980s. Petrochem U.S.A., which used to refine fuel for ships at the former Shell Ventura Avenue ammonia plant, closed permanently in November, 1984. The plant had been the target of an environmental lawsuit that sought to prevent its expansion. Residents of Ojai, located upwind of the plant, blamed the Petrochem operation for local respiratory troubles and feared that any expansion would deteriorate local air quality. The legal fight lasted approximately three years, during which time Petrochem had delayed borrowing the funds needed to begin its expansion (estimated at $100,000,000). At the same time, the price of oil had fallen from its highs of the 1970s. The combination of market factors, environmentalist opposition, and the imminent end of federal subsidies led parent company U.S.A. Petroleum Corporation to close the Ventura Avenue facility (see Paulsen et al., 1996). The plant closure meant layoffs for eighty workers (Petrochem reported an annual payroll of $2.5 million) and loss of the operation's $350,000 contribution to county tax rolls (*Ventura Star-Free Press*, November 17 and 21, 1984). For more on this case, see *Petroleum Extraction in Ventura County: An Industrial History* (MMS 98-0047).

8. Supply and service firm totals were generated using the SelectPhone 1996 CD Rom database. SIC codes used in search were 7359L, Oil Field Equipment Rental; 1629L, Oil Field Contractors; and 1389, Oil and Gas Field Services. Searches were cleaned for duplicate entries, with each entry representing a different address (some firms are counted twice, especially in the Los Angeles area total, because they listed several different addresses). Firms providing more than one of these services are, similarly, counted only once.

Table 3.1.1: Onshore infrastructure supporting offshore oil — Contemporary tri-counties facilities

Name	Location	Date Constructed	Current Operator	Source of Oil/ Gas [1st year of prod.]	Destination of Oil/Gas
Mandalay Onshore Separation Facility	Ventura County coast near Oxnard	1981 (commissioned)	Torch	Platforms Gina [1982] and Gilda [1981] (OCS)	Oil to Los Angeles area refineries via Ventura Pump Station; Gas to Southern California Edison Plant at Mandalay Bay (Oxnard)
West Montalvo Facility	Ventura County coast near Oxnard	1952 (date of initial lease)	Berry Petroleum	Wells drilled from onshore to state leases	Oil to Los Angeles area refineries via Ventura Pump Station; Gas to Southern California Edison Plant at Mandalay Bay (Oxnard)
State Lease 145/410 Processing Facilities	Northern Ventura County coast	1958	Rincon Island Pertnership	Wells drilled from onshore to state leases	Oil trucked to Texaco Fillmore Pump Station; Gas to Southern California Gas Company via compressor at Rincon Oil and Gas Processing Facility
Rincon Island Oil and Gas Processing Facility	Rincon Island (offshore, northern Ventura County)	1957 (island constructed)	Rincon Island Partnership	Wells on Rincon Island; state lease [1958]	Oil to Los Angeles area refineries via Chevron tank facility; Gas to Southern California Gas Company via compressors at Rincon Oil and Gas Processing Facility
Rincon Oil and Gas Processing Facility	Northern Ventura County Coast	1968	Torch	Platforms Henry, Hillhouse, A, B, and C [1968] (OCS)	Oil to Los Angeles area refineries via Chevron tank facility; Gas to Southern California Gas Company
La Conchita Oil and Gas Processing Facility	Northern Ventura County coast at La Conchita	1967	Pacific Operators Offshore / Phillips	Platforms Hogan [1967]and Houchin [1968] (OCS)	Oil to Los Angeles area refineries via Chevron tank facility; gas to Southern California Gas Company and to platforms for gas lift wells
Carpinteria Oil and Gas Processing Facility	Santa Barbara County coast at Carpinteria	1959-61	Chevron	Platforms Gail [1988] and Grace [1980] (OCS)	Oil to Los Angeles area refineries via Chevron tank facility; Gas to Southern California Gas Company

Table 3.1.1, cont.

Name	Location	Date Constructed	Current Operator	Source of Oil/ Gas [1st year of prod.]	Destination of Oil/Gas
Carpinteria Onshore Gas Terminal	Santa Barbara County coast at Carpinteria	1959-61	Chevron	Platform Habitat [1983] (OCS) (Gas only)	Gas to Southern California Gas Company
Ellwood Oil and Gas Processing Facility	Santa Barbara County coast at Goleta	1966	Venoco	Platform Holly (State Waters) [1966] and seep tents [1980s]	Oil to Los Angeles or San Francisco Bay area refineries via barge at Ellwood Marine Terminal; Gas to Southern California Gas Company
Las Flores Canyon Santa Ynez Unit Oil and Gas Processing Facility	Santa Barbara County, between Goleta and Gaviota	1988-1993	Exxon	Platforms Hondo [1981], Harmony [1993], and Heritage [1993] (OCS)	Oil to Santa Maria Refinery, Los Angeles/San Francisco Bay area refineries, or Texas via All American Pipe Line; Gas to Southern California Gas Company
Las Flores Canyon Gas Processing Facility	Santa Barbara County, between Goleta and Gaviota	1983	POPCO	Platforms Hondo [1981] and Harmony [1993] (OCS) (Gas only)	Gas to Southern California Gas Company
Gaviota Oil and Gas Processing Facility	Santa Barbara County coast at Gaviota	1987	Chevron	Platforms Hermosa, Harvest and Hidalgo [all 1991] (OCS)	Oil to Santa Maria Refinery, Los Angeles/San Francisco Bay area refineries, or Texas via All American Pipeline; Gas to Southern California Gas Company
Lompoc Heating, Separation and Pumping Facility	Northern Santa Barbara County, inland at Lompoc	1986	Torch	Platform Irene [1987] (OCS)	Oil to Avila Marine Terminal or Santa Maria Refinery via Orcutt Pump Station; Gas injected on-site

Sources: Minerals Managment Service Drawing PUBLIC07, 1996; Sollen, 1998; Dames and Moore, 1997.

Section 3.2
Producers, Fields, and Corporate Forms

The production of oil in Santa Barbara County's fields (shown in Map 1.2 in Section 1: Introduction) has had a cast of hundreds across the postwar decades, always with a varied lot of operators involved. The story has not been a simple one of ever greater combination into fewer hands, but a mixed tale of operations, some large, some small, showing considerable change in operators as well as significant continuity. Some of the industry's largest companies—integrated firms engaged in transport, refining, and marketing petroleum products as well as extracting crude from Santa Barbara County's fields—have been the predominant operators in the county from the 1950s to the 1990s. But their presence and decisions did not end the involvement of smaller enterprises, typically focused solely on the exploration for or extraction of oil, nor prevent others from entering production, throughout the period. Operators ranging from individual wildcatters to substantial independent oil companies constantly came, maintained, and reinvigorated production; then, with just as great frequency, they combined, spun off, sold out, or left the fields throughout the decades. The roster of producers was never fixed for long.

The mix was regularly shaken by changes in opportunity or perception of opportunity. Changes in local supply, national price, and industry developments mark reasonably clear chapters in the story of the industry in Santa Barbara County. What makes the story a relatively complex one is that not all operators chose to react to the same developments in the same way. Across the decades, the responses to change varied, and the variation in the strategic decisions of those in the fields added to their institutional diversity to keep the story quite dynamic. That was evident not only in the exploration of new fields, in the opening of tidelands and outer continental shelf development, but even in the story's latter chapters, in the variety of strategies operators took toward producing from declining fields.

An introduction to the structure of industry in the Santa Barbara area

Substantial actual and potential onshore and offshore oil reserves in Santa Barbara, San Luis Obispo, and Ventura Counties in the post-World War II period supported an industry structure of many large, medium, and small corporations and numerous partnerships and proprietorships over the duration of the 1950-1995 period.[1] Indeed, more than 1,050 entities operated in the tri-county area fields from 1950 through 1995.[2] Exploration and production sustained more than 220 operators each year between 1950 and

1959. The number of operators dropped off rapidly thereafter to a new level of operators that ranged between 135 and 150 until the mid-1980s. Despite a decline in the number of firms since 1986, the tri-county area still supported more than 90 operators at the end of 1995 (see Figures 3.2.1: Tri-county oil well operators and 3.2.2: Tri-county oil well operators by type, at the end of this section).[3]

In the early postwar period, the majority of firms of all types were based in the Los Angles Basin. This was particularly the case for small firms (which includes small corporations, partnerships, and proprietorships). Over time, as exploration prospects dwindled and the industry consolidated, the number of small firms fell much more rapidly than did the number of large firms (although there was a significant amount of turnover among large independent firms). This decline was almost wholly accounted for by a fall in the number of Los Angeles-based firms operating in the tri-counties. Indeed, after dropping off from the mid-1960s until the mid-1980s, by 1990 the number of small local firms returned to the high levels registered during the 1950s. Since the mid-1980s local firms have accounted for the majority of small operators in the area. Among large firms—majors and large independents—the number of Los Angeles- and California-based firms declined considerably (through mergers primarily, although a number of firms simply left), even though the number of large firms remained remarkably stable until the mid-1980s. Since the mid-1970s, the majority of big firms and large independents operating in the tri-counties have been based outside of the state, primarily in Texas, Oklahoma, and Denver, Colorado (see Figures 3.2.3 and 3.2.4: Tri-county oil well operators by location, at the end of this section).

Although the tri-county area contained many mature fields as of 1950, the discovery of oil in the Cuyama Valley in the late 1940s, the ongoing development of existing fields in Santa Barbara and Ventura Counties, and the discovery of new fields in Ventura County provided significant onshore opportunities in exploration and production during the 1950s. Further, in the mid- to late-1950s, major oil companies turned their attention to substantial offshore opportunities in state tidelands and federal outer continental shelf (OCS) areas.[4] Offshore activity was facilitated and regulated by the May 1953 federal Submerged Lands Act, which deeded title and ownership of tidelands to the states, the August 1953 federal OCS Lands Act, which designated the area outside state limits as OCS under exclusive federal jurisdiction, and the California's 1955 Shell-Cunningham Tidelands Act.[5] While the local "age of exploration" onshore ended by 1960, continuing development of existing fields through both drilling and secondary recovery methods supported a relatively stable industry structure until oil prices collapsed in 1986.

With no further significant onshore field discoveries to be made locally, the industry structure was not substantially altered with the rise of oil prices in the 1970s, even though major firms and a "second generation" of large independents made significant investments in an effort to increase production. That is, the physical supply characteristics of the onshore area limited its responsiveness to human economic inputs. With the drop in oil prices in 1986, the accelerated decline in production spurred transformation of the industry structure whereby major firms for the most part left the area in search of greater returns. They were replaced by a "third generation" of large independents whose business goals included employing new technologies and methods to sustain the production of declining fields. (This postdated a significant shift in exploration by operators, particularly majors, to the San Joaquin Valley and the natural gas fields of northern California that began in the 1950s).[6] Entrepreneurs with a long-time presence in the area formed new companies to operate still-producing wells in a significant number of onshore fields. Thus, by 1995 the tri-counties (excluding the federal OCS area) had become an extractive region of secondary or tertiary importance to major firms, as those with a California presence operated primarily in the San Joaquin Valley. Although offshore potential remained substantial, for political and environmental reasons major firms limited their investments in this area.

Owing to the actual and potential reserves of the area, exploration and production supported a variety of operators in terms of size and type. The high capital requirements of offshore production effectively excluded participation on the part of non-major firms. Moreover, the requirements of ever deeper well-drilling over time biased exploration toward that of large operators. In terms of wells drilled, a group of major firms that included Richfield (later Atlantic-Richfield), Standard Oil Company of California (later Chevron), General Petroleum (later Mobil), Shell, Union, Tidewater, and Texaco dominated upstream activity during this period.[7] Indeed, these firms established a significant tri-county presence by 1945. With the exception of the accession of J. Paul Getty's Pacific Western Oil Company (later Getty), which acquired Tidewater in 1967 and was subsequently purchased by Texaco in 1984, the local dominance on the part of this group of majors remained stable throughout the period (until their departures from the area).

That dominance by a group of the nation's largest integrated oil companies marks Santa Barbara County's oil extraction industry is consistent with what was going on in fields across the country in this period. The industry had "consolidated" much earlier. In a story familiar for its integral part in the country's economic history, John D. Rockefeller's formation of Standard Oil, by combination of firms and integration of production from exploration and extraction to manufacturing and marketing of oil products, had led to anti-trust antagonism and enforced break-up. By the 1930s an oligopoly of roughly twenty integrated firms, including Standard's previous competitors such as Tidewater, the Texas Company, Gulf, Associated, Union, and Shell Oil, along with some of its successor companies, such as Standard Oil Company (California), came to dominate the industry (Chandler, 1977: 350-353).[8] It is not surprising, then, that Santa Barbara found some of these firms the dominant producers in its oil fields.

Dominant but not exclusive

Throughout the period of the study there remained substantial room for larger independents to operate in exploration and extraction in Santa Barbara. The county saw three "generations" of such firms engage in the exploration and production of its crude oil. (A merger movement from 1954 to 1969 resulted in the disappearance of the "first generation;" the merger movement of the 1980s and the price collapse of 1986 decimated the ranks of the "second generation.") Moreover, medium- and small-sized wildcatters[9] and operators continued to produce oil locally throughout the period. A set of conditions particular to the exploration and extraction parts of the industry made them more conducive (than refining, for instance) to continued opportunity for new entrants. Expected and actual discoveries of onshore fields in the and 1940s and 1950s, decisions of major firms to invest in offshore opportunities locally and onshore opportunities elsewhere, the stable yet relatively high level of production sustained from the 1960s until the mid-1980s, relatively low barriers to entry in exploration and production compared to other oil industry functions such as refining and marketing, the presence of a local oil "elite" that shared information and capital to reduce costs and increase their competitiveness, and the continued presence of independents and small operators from the prewar period combined to offer smaller firms a niche in the industry structure. Small operators were especially prominent in a "secondary market" in oil wells—lease transfers between operators comprised an important part of the evolution of the industry structure. So while substantial amounts of capital plus managerial and technical expertise gave the larger integrated firms some advantage, factors that remained outside the control of any one or more firms such as the relative attractiveness and extent of local reserves substantially influenced the structure of industry over time, allowing continual entry by smaller producers.

Santa Barbara County's oil history suggests that shifting sources of supply in this extractive industry created a set of opportunities that provided cyclical periods of expansion and contraction that alter the industry structure over time. During periods of expansion, grounded in market factors often exogenous even to the most highly-capitalized firm, opportunities attracted a large number of operators. Periodically, unsuccessful firms dropped out while successful firms often sold out to integrated companies. This, over time, tended to make the industry more concentrated. Yet, at the same time, as the production from Santa Barbara County's extant reserves declined, making them less attractive than more abundant reserves elsewhere for firms of global reach and high capital, local opportunities for non-integrated firms persisted and even rose. Thus, in contrast to downstream operations such as refining, oil extraction was a relatively competitive industry that could show a structure not only of a more diverse array of participants, but of more frequently changing participants. All of this suggests that the characteristics of particular functions within an industry may determine varying degrees of competitiveness and very different structures of economic opportunity at different points in the process of production. It may suggest that extractive functions, specifically, show characteristics conducive to maintaining variety and volatility in who engages in production.

Area downstream operations were not extensive relative to upstream operations in the postwar period. To be sure, operators constructed extensive transport, storage, and initial refining infrastructure to support production. Moreover, operators constructed a few refineries. What infrastructure there was generally was the property of major firms or larger independents and thus contributed to those firms' preeminent position in the county's industry. Further, offshore activities prompted the construction of significant support facilities onshore. Yet the area's oil industry remained overwhelmingly engaged in extractive operations throughout the period. Santa Barbara County's oil industry, therefore, was characterized across these years as a relatively competitive one, compared to the more oligopolistic industry nationwide.

The local tax and regulatory environment had some effect, too, on the industry. This was particularly the case for offshore development, where environmental considerations limited state and federal lease sales and development, particularly after the 1969 major oil spill in the Santa Barbara Channel (Bradley, 1996: 299-303).[10] Onshore development was much less affected. One important reason was that California's wellhead conservation regulatory regime was far less severe and restrictive than it was in states such as Texas, Louisiana, Oklahoma, Kansas, and New Mexico. Indeed, until the 1970s (when proration was overwhelmed by supply and demand factors) the state benefited enormously from market-demand proration (MDP) in the latter states, as California maintained its national share of the market despite the rise of major mid-continent producing areas from 1927 on. California, which never practiced MDP, relied more on its 1931 spacing law to regulate onshore production well into the postwar period (Bradley, 1934: 80-217).[11] In the area of trade restrictions, local production may have been supported to some extent in the 1960s by mandatory federal oil import quotas established in March 1959 (Bohi and Russell, 1978).[12] Yet, because the West Coast was an "oil-deficit" region—consumption generally outpaced local production—it was treated leniently under the law (Bradley, 1934: 724-738).[13] In the area of taxation, oil depletion allowances and the federal tax code affected the marginal decisions of proprietors and partners to operate particular oil wells over time without greatly impacting the overall structure of industry.[14] Pipeline and transportation regulation may have lowered barriers to entry for small operators. Thus, some regulations benefited independent operators specifically. To the extent that all taxes and regulation imposed costs on the industry, however, major firms have been in a better position historically to meet them (although the net effect of any cost has been to diminish the resources available for enterprise). Yet, on the whole and for the local industry in particular, issues of supply and demand were more determinative of the structure of industry than the regulatory environment.

Exploration and production prior to 1950

With major oil field discoveries and developments in California from the 1890s, many integrated firms established a significant California and local presence before 1945. Area discoveries most notably included those at Orcutt in 1904, Cat Canyon in 1908, Ventura in 1916, Capitan in 1926, Ellwood in 1927, and Santa Maria Valley in 1934. Indeed, by 1945 all of the majors that dominated production in the postwar era already operated in the area. At the same time, a significant number of larger independents and smaller operators established themselves in California and/or locally.[15]

Prior to 1900, the major sources of state commercial production were in Los Angeles. Output there accounted for roughly half of the state's output of 2.6 million barrels in 1900. Production by 1919 had spread rapidly into the San Joaquin Valley and into the coastal areas north and south of Los Angeles. California's 1918 output of 97.5 million barrels was concentrated in Fresno, Kern, Los Angeles, and Santa Barbara Counties. Expanding field development attracted competition for the three integrated firms that dominated the California industry from 1903 to 1911: Union Oil, incorporated in 1890, Standard Oil Company (California), incorporated in 1906, and Associated Oil, formed in 1901 to handle the various petroleum interests of the Southern Pacific Railway Company. Between 1911 and 1918, new entrants into the expanding coastal market included Shell Company of California, General Petroleum, founded in 1910, Tidewater Oil, Los Nietos, and Chanslor-Canfield Midway Oil Company (CCMO), a subsidiary of the Santa Fe Railroad founded in 1901. At the same time, increasing concentration in downstream activity was evident. By 1919, five firms—Standard, Union, Shell, Associated, and General Petroleum—owned and operated 89 percent of the region's refining capacity (Williamson, 1953; Pederson, 1990; Hast, 1991: 385-386).[16]

Shell and General Petroleum established themselves by 1916 most prominently next door to Santa Barbara County in the Ventura field, which soon developed into one of California's largest (producing more than 67,000 barrels per day by February 1930).[17] By 1917, Shell was producing oil as well at Casmalia and Orcutt fields in Santa Barbara County. By 1918, Tidewater had established itself in Santa Barbara County's Casmalia and Zaca fields, with an exclusive presence in the latter field. Moreover, from 1916, General Petroleum operated in Rincon field. Finally, by 1917, Pacific Western and Rio Grande Oil, a predecessor firm of Richfield Oil, operated in Casmalia field (Hast, 1991: 375).[18] At the same time, California Petroleum Company, acquired by The Texas Company in 1928, was operating in South Mountain and Shiells Canyon fields of neighboring Ventura County (Hast, 1991: 351-352).[19] Thus, by 1918, several major and larger independent firms had established themselves in the area to challenge the dominating presence of Union Oil, whose operations in Santa Barbara County's Orcutt and Lompoc fields and Ventura County's Bardsdale, Sespe, Santa Paula, and Torrey Canyon fields all pre-dated 1915.[20]

The post-World War I period saw further expansion of production and of the industry. Significant discoveries from Newport Beach to Beverly Hills, including those at Signal Hill in 1921, sparked a Los Angeles oil boom that spilled into the Santa Barbara area, for some of the firms that improved their fortunes in the Los Angeles Basin invested capital to discover and develop local reserves.[21] State crude oil development from 1919 to 1929, centered principally in the Los Angeles Basin, enabled state production by 1929 to equal 292.5 million barrels of oil, up from 103.4 million barrels in 1919 (Williamson, 1959).

In the midst of this industry expansion, there was significant merger and acquisition activity that affected the local industry structure. The Associated Oil company, which established itself as a significant presence in the Ventura field in 1920, was brought together with Tidewater Oil to form Tide Water Associated Oil Company in 1926 as a holding company for the two firms (which were then merged in 1936). Including its operations in Rincon field that dated from 1932, the new firm was second only to Shell in Ventura County in the number of producing wells by 1949. In addition, with the purchase of General Petroleum in 1925, Socony (later Mobil) established itself as another integrated firm in California and the area (Hast, 1991: 464-465; Chandler, 1977: 351-353).[22]

Perhaps the most significant acquisition of the pre-1945 period was J. Paul Getty's acquisition of the Pacific Western Oil Company in late 1931. Although the firm was one of California's top ten producing firms, its stock price plummeted during the Depression. A cash-rich Getty, who made his money during the 1920s by buying leases and drilling for oil along the California coast at Signal Hill, Santa Fe Springs, Athens, and Huntington Beach, determined in the 1930s that it was cheaper to buy the shares of firms with proven reserves than to explore for oil directly. In September 1930, he convinced the directors of his father's firm, George F. Getty, Inc. (of which he was president but as of yet only a minority shareholder), to buy Pacific Western stock. By late 1931 Getty obtained control of the firm. Moreover, in March 1932 Getty began to purchase shares in Tide Water Associated Oil, at the time America's ninth largest oil firm with $200 million in assets. Like Pacific Western, Tide Water's stock price was far below its book value. After acquiring in December 1933 the two-thirds of George F. Getty, Inc. that his mother owned, he began in January 1935 to buy the shares of Mission Corporation, a holding company that owned 14 percent of Tide Water Associated. In May 1946 Getty merged George F. Getty, Inc. into Pacific Western. Thus, in Pacific Western, which Getty renamed Getty Oil in April 1956, Getty had a vehicle to build a major firm largely on the basis of his own financial and organizational entrepreneurship. By 1953 Getty assumed effective control of Tidewater through a complex array of stock ownership that involved two holding companies, Mission Corporation and Mission Development Corporation. By 1967 Getty merged Tidewater and Mission Development into Getty Oil, which Texaco acquired in 1984. Thus, in Pacific Western can be observed the only large independent to "graduate" to major firm status over the period of the study; in Tidewater can be seen the only integrated firm to disappear from an established and stable group of half a dozen majors; and in Getty/Tidewater can be seen the only major firm operating in the tri-county area to disappear due to a merger in the time period of the study. Otherwise, the corporate structure at the top remained essentially the same from 1945 to 1995 for Santa Barbara County and for California (Lenzner, 1985: 114-122).[23]

Despite the extension of integrated firms into the extractive portion of the industry, increasing demand and sources of supply attracted the entry of new, mostly California-based exploration and production firms into the California market and the Santa Barbara area after World War I. This trend established the presence of a "first generation" of larger independents to compete with the integrated firms. The discovery of Ellwood, Mesa, and Capitan fields in Santa Barbara County in the late 1920s enabled several larger independents based in Los Angeles and San Francisco to establish significant tri-county presences. Most significant of these finds was the discovery by

Barnsdall Oil (with Rio Grande Oil) of the gigantic Ellwood field in July 1928. This field, which produced 85.6 million barrels of oil by the end of 1949, helped Barnsdall, along with Bankline Oil, Pacific Western, and Honolulu Oil to emerge as significant area producers (Jones, 1972: 40-57).[24]

Significant discoveries in the county's Santa Maria Valley between 1934 and 1941 supported the entry of large independents such as Pacific Western, Fullerton Oil, Sunray Oil Corporation of Tulsa, Oklahoma, Signal Oil & Gas, and Barnsdall Oil and development of local operators such as the Abbott B. Jenks Company of Santa Maria and the Palmer Stendel Oil Corporation of Santa Barbara.[25] In addition, increasing production in California enabled the emergence of other, Los Angeles-based corporations in the 1920s and 1930s that operated in the county primarily after World War II. These firms included Douglas Oil, Oceanic Oil, and Universal Consolidated. Three other Los Angeles Basin firms of note, Hancock Oil, Superior Oil, and Western Gulf, a subsidiary of Gulf Corporation, wildcatted in the area prior to 1945. These firms ranked among the "first" generation of larger independents that played a significant role in local exploration activity from 1947 to 1961 (Tompkins, 1988: 218-219).[26]

Santa Barbara County's development prior to 1945 suggests that crude oil exploration and production remained a relatively competitive function within an integrated industry. The same factors that encouraged early challenges to Standard Oil by integrated firms encouraged the proliferation of non-integrated and smaller firms after World War I in California. To be sure, integrated companies played a growing role in extraction nationally: By 1931, the twenty largest integrated oil companies produced 51.1 percent of the nation's crude oil and held 77.4 percent of its crude oil stocks (Chandler, 1977: 352). Still, their percent of total producing wells remained small, and their portion of total US crude oil production was only 52.5 percent in 1937. Although crude oil production in the years prior to 1950 was concentrated, "entry into crude oil production was not blocked nor were crude prices and petroleum output constrained by integrated firms," historian Harold Williamson concluded. Indeed, there remained several thousand producing companies nationally who "predominated even in the environment of giant majors in the drilling of wells and the wildcat explorations for new reserves (Williamson, 1958: 564-565)."[27]

By the end of World War II, the oil fields of Santa Barbara County supported a corporate mosaic of pre-dominantly California-based firms. This included integrated majors Union, Shell, Tidewater, Texaco, Richfield, and Standard, a "first generation" of larger independents, and a number of smaller, local operators. These constituted the structure of the industry that would prevail until the mid-1980s. However, while the group of majors remained more or less stable (though their relative fortunes shifted), the larger independents and smaller operators changed significantly over the ensuing years.

1950-1968

An Era of Exploration

Onshore development in Santa Barbara County was reaching maturity in the early postwar period. Yet important oil discoveries from the late 1940s to mid-1950s stimulated the last significant period of local onshore exploratory activity. Wildcatting and field development together sustained more than 200 operators in the fields of Santa Barbara County and neighboring San Luis Obispo and Ventura Counties until 1961. Although many of the small operators were unsuccessful wildcatters, a majority of these firms, often partnerships or proprietorships, retained one or more producing wells. During this period both actual and expected returns from upstream investments determined the number of operators. Actual field discoveries attracted operators of all types in search of new reserves. During this "period of exploration," activity in Santa Barbara and San Luis Obispo Counties, which centered on the Cuyama Valley, peaked in the early 1950s and declined quickly thereafter. Ventura County sustained a feverish level of exploration throughout the early 1950s. Thereafter, operators made no significant onshore discoveries in the region. They had largely determined the extent of extractable reserves, and by the mid-1950s the number of operators dropped off rapidly.

Local success in locating and developing substantial crude oil reserves in the immediate postwar period, 1945-1960, was part of a national trend during which crude oil production expanded some 50 percent, from 1.7 billion barrels in 1945 to nearly 2.6 billion in 1959. This trend was supported by a rise in crude oil prices; in California, the price per barrel roughly doubled between the end of the war and 1960 (Williamson, 1958: 810-811).

Production in California remained competitive in the early postwar period. As shown in Table 3.2.2: California crude oil production, at the end of this section, the six major firms that dominated production throughout the period accounted for 41.4 percent of the state's producing wells in December 1950 and 35.6 percent of its production for the year. Tri-county production (Table 3.2.1: Leading tri-county oil producers, at the end of this section) was somewhat more concentrated, with the six majors accounting for 57 percent of the producing or potentially producing wells at the end of 1949. A group of roughly 40 large independent firms and numerous small operators extracted the other 43 percent of the area's crude oil.

As a comparison of Tables 3.2.1 and 3.2.2 shows, 20 of California's leading 25 oil producing firms of 1950 were operating in the tri-county area at the end of 1949. The second column of Table 3.2.1 shows that the tri-county area was more important to some operators than others. Indeed, Standard, by far California's leading producer of oil, had only a minor local presence prior to 1950. On the other hand, in terms of the percentage of producing wells, the area's production constituted at least 25 percent of the operations of six of the state's top ten firms. Among major firms, Santa Barbara and its neighboring counties were especially important to the operations of Union Oil, which remained the leading local onshore producer for much of the period of the study, and to Richfield Oil, whose 1948-1950 discoveries and developments in Santa Barbara County's Cuyama Valley enabled it to emerge as a major national producer.

Oil field activity and the structure of industry

The discovery of oil in the Cuyama Valley of Santa Barbara and San Luis Obispo Counties in 1948 was the most significant supply-side factor that determined the level of upstream activity in both counties until the end of the 1950s. Indeed, operators made no further significant onshore discoveries in either county after they defined the valley's five fields.[28] While a high level of exploratory drilling continued in the county through 1955, much activity was directly tied to attempts to extend the limits of the Cuyama Valley and those of existing fields. Exploratory activity waned quickly as the prospects of finding new sources of reserves withered and as operators completed campaigns to extend fields discovered prior to 1945. After 1957, exploratory drilling onshore in the county collapsed completely as firms switched to offshore exploration or the San Joaquin Valley. On strength of production from South Cuyama, Russell Ranch, Santa Maria Valley, and Cat Canyon fields, the county's onshore output peaked a some 42 million barrels of crude oil in 1951. Thereafter, output declined to less than 20 million barrels by 1964. The number of operators fell in step with the fall in onshore production.[29] From a high of 100 operators in 1950, the number of operators dropped below 60 in 1965. Thereafter the number of operators remained within the 40-60 range, as relatively stable actual production predominantly determined the number of firms operating in the county. As early as 1953, however, the oil industry was becoming less and less significant to the local economy.[30]

For both Santa Barbara and San Luis Obispo Counties, the discovery of oil in the Cuyama Valley in 1948 and 1949 brought more than 100 companies to the area in search of oil. The prospect of finding significant reserves sustained feverish levels of exploration there. As this activity waned, wildcatters disappeared, and the number of operators declined to a level that sustained itself on known reserves. The decline in oil prospects hit smaller operators hardest, as the remaining operators at this time were most often majors or larger independents that developed known areas. A number of factors enabled large firms to dominate exploration and development during this period. One in particular was the geological challenges posed by the Cuyama Valley's fields. Majors such as Richfield and Humble were best positioned to exploit the Cuyama Valley because finding oil there was extremely costly and difficult.[31] Another factor was that, to a greater extent than in Ventura County, reserves were confined to fields dominated by major firms: Union and Richfield in particular. One firm, Richfield, predominated in both Russell Ranch and South Cuyama, the largest fields in the Cuyama Valley. Firms such as Union, Tidewater, Shell, Pacific Western, Signal, Sunray, and General Petroleum dominated development elsewhere. Thus, while industry concentration increased throughout the tri-county region by 1960, this trend was more marked in Santa Barbara County than in Ventura County. The motivated and well-capitalized small firm, partnership, or proprietor could still make a "play" for extractable reserves, yet relative to Ventura County, expectations fell much more rapidly. Onshore exploration beyond the Cuyama Valley yielded far fewer satisfactory results. Hence, while small operators were not prevented from investing in exploration, the motivation to do so evaporated. Moreover, once the period of exploration waned, there were fewer wells that small firms could hope to operate.

On January 1, 1948, the Norris Oil Company, a small Ventura operator incorporated in 1944, discovered oil on the Russell brothers' ranch in the Cuyama Valley in Santa Barbara County. Richfield capitalized on this find by rapidly acquiring more than 150,000 acres of Cuyama Valley real estate. Further, the Los Angeles corporation brought in the first major producing well in Russell Ranch field in June. In addition, in May 1949, Richfield discovered the South Cuyama field some three miles northeast of Russell Ranch. By October 1949, of 145 producing wells in the valley Richfield operated 123—102 in Russell Ranch and 21 in South Cuyama. Of the 30,000 barrels of crude oil flowing from the two fields, Richfield produced 24,000. By the end of 1949, Russell Ranch was the county's largest crude oil producing field at 6.8 million barrels, topping Cat Canyon's 6.7 million and Santa Maria Valley's 5.7 million. Valley production made Richfield a leading county producer by the end of 1949, second only to Union (see Table 3.2.3: Leading Santa Barbara County oil producers, at the end of this section). At the time a number of other firms, including large independents Superior and Hancock and small operators Bell Petroleum Company of Los Angeles and Crawford & Hiles, a Long Beach partnership, had production in the valley. Yet they in no way challenged Richfield's position (Jones, 1972: 239-250).[32]

South Cuyama proved to be a much larger field than Russell Ranch. To exploit it, operators, led by Richfield, engaged in an extensive drilling campaign throughout 1950 that involved the drilling of 111 wells. The field emerged the county's largest for the year. Production reached 8.5 million barrels. Russell Ranch ranked second at 7.9 million barrels. Together output from the two fields boosted daily Cuyama Valley production to 43,700 barrels. Although the drilling pace slackened in South Cuyama field in 1951, production soared to its peak of 14 million barrels as the daily output of the field's 200 producing wells reached nearly 40,000 barrels. Indeed, the Cuyama Valley confirmed Richfield as one of the strongest majors on the West Coast. By 1951, the firm's crude oil reserves had increased 243 percent since 1948. Revenues were up 211 percent over 1947. Net income had increased 261 percent over the same period. By 1953, Richfield was the county's leading employer and taxpayer (Jones, 1972: 265-266, 345-350).[33]

Although Richfield dominated actual field production in Cuyama Valley, the prospects for further finds attracted outfits of all types and sizes to an area stretching across Santa Barbara, San Luis, and Ventura Counties, from the Carrizo plain in San Luis Obispo County to the so-called "condor country" of Ventura. Larger independents were conspicuously represented. Small operators included W.R. Gerard, a Santa Barbara partnership, Trans-Oceanic Oil Corporation of West Los Angeles, Arthur C. Fisher & J.H. Maurer, a Los Angeles partnership, Garten Exploration Company, a Los Angeles partnership, and Rothschild Oil Company, a Santa Fe Springs co-partnership. Of course, majors such as Humble and General Petroleum as well participated with Richfield in exploring the valley.[34]

With discoveries in Taylor and Morales Canyons in mid-1950, operators oriented their activities northward into San Luis Obispo County. Santa Barbara County exploration in 1951 continued in what the Division of Oil and Gas designated the Central Cuyama area in Santa Barbara County. At the same time, Richfield continued as unit operator to develop Russell Ranch and South Cuyama fields. Richfield's development efforts continued to maintain a high level of output in the South Cuyama field through 1961, when the output of its 204 producing wells yielded 11.2 million barrels of oil. The firm was less successful in maintaining output at Russell Ranch. Output there fell to 1.8 million barrels in 1961 from 147 producing wells.[35]

After 1953 both the number of operators and the number of prospect wells drilled fell as expectations in the county's portion Cuyama Valley diminished. Exploratory work scattered elsewhere in the county did not yield substantial finds. Although operators continued to develop existing fields, from the mid-1950s large firms began to invest heavily in tidelands exploration. These activities favored larger operators, in whose hands the industry remained concentrated at the end of the period, as Table 3.2.4: Leading Santa Barbara County oil producers, at the end of this section suggests.

At the same time, the Korean War sparked an increase in the demand for heavy crude oil that encouraged operators to reopen shut-in wells and resume drilling in the fields, such as Cat Canyon, that produced it. The new demand, as a local industry observer put it, "created a field day for drilling contractors" as well. In September 1950 William O. Butler, Coastal Division superintendent of Union Oil, announced that the firm would begin immediately a "reopening" program in Santa Maria Valley, Cat Canyon, and Lompoc fields to increase daily production in the three fields by 11,000 barrels. Union's move and an October increase in the price of heavy crude spurred a Cat Canyon development revival on the part of long-time operators Standard, Sunray, and General Petroleum that continued through 1954. In addition, Tidewater, aided by the injection of distillate into its wells, pushed forward with development of Zaca field. Thus, there was a high degree of development work happening in these fields before exploration in the county waned.[36]

Union Oil continued through much of the decade with a comprehensive program that involved extending the limits of and developing the reserves of existing fields. Union's program was part of a general push on the part of operators such as Shell, Honolulu, Hancock, Sunray, General Petroleum, and Standard to determine the limits of county onshore production. Operators other than Union concentrated their efforts in the north county area.[37]

One such field where Union focused its resources was Guadalupe. Development there resumed in 1951, where Continental had discovered oil in May 1948 (Continental drilled seven wells in all before transferring its lease and equipment to Thornbury Drilling Company of Santa Paula in March 1950). After Thornbury's extensive drilling program of 1951 and 1952 pushed the field's limits into San Luis Obispo County, the firm sold the lease to Union Oil in June 1953. Union assumed all of the field's operations. Between 1953 and 1955 Union completed 22 more wells, most of which were in San Luis Obispo County. In addition, the firm then introduced gas injection as a means of stimulating further production, which peaked during this period at 952,000 barrels in 1956.[38] Union's efforts in the area also discovered the minor Jesus Maria field six miles northwest of Lompoc field in September 1952. Production there peaked at 64,000 barrels in 1956.[39]

Drilling in Santa Maria Valley field in 1952 by Standard and General Petroleum resulted in an extension of the field's southeasterly limits one mile. Union followed up in 1954 by extending the limits of the field two miles to the west with the completion of two small producing wells on its Union Sugar leases. Drilling in Cat Canyon field in 1953 yielded minor extensions of the field in 1953 by Standard and the Slick-Moorman Production Company, a Dallas partnership that remained active in the field through 1956. In 1954, the MJM&M Oil Company, a Burlingame firm reorganized in 1951, made a further extension of the field, as did Getty Oil in two years later. Further, operators such as Getty and Monterey Oil Company of Long Beach continued to exploit the area in 1957 and 1958. These efforts sustained the production of both fields during the mid-1950s. However, production fell off as operators turned their attention to the tidelands areas from 1957 onward. In 1961, Cat Canyon's output of 3.9 million barrels was down 33 percent from its 1954 level. Santa Maria Valley's 1.6 million barrels was down 67 percent from its 1953 level.[40]

The expectation for future oil discoveries could touch off a flurry of leasing activity that benefited landowners even when the resulting actual production failed to meet expectations. For instance, seismic exploration tests conducted by Union and Western Gulf near Orcutt that purportedly made a deep zone pool discovery touched off an oil leasing boom in February 1951 that covered several thousand acres. Landowners reportedly received $15-20 per acre per year in lieu of drilling with "big bonuses" and one-sixth royalties from at least ten operators. By April, Western Gulf was ready to challenge Union Oil, the largest operator in the county, on its "turf" between Orcutt and Cat Canyon fields. Landowners were set to benefit from the effort. However, although Western Gulf did make a minor discovery on the southeast flank of Orcutt field in 1952, the firm failed to discover the next Cuyama Valley.[41]

From 1956 on, supply dealers, drilling contractors, oil operators, and lease men looked to offshore production to make up for poor onshore results.[42] Yet the high cost of capital and the high risk involved in offshore production meant that only well-capitalized businesses could invest in it. With the cost of drilling platforms estimated at $3-5 million, most operators could only get in as part of a joint operation.[43] Firms even conducted preliminary work jointly. For instance, during 1956 Union, Shell, Continental, and Superior employed core drilling exploration vessels in the Santa Barbara Channel to find out as much as possible geologically in preparation for the time when the government leased federal OCS lands.[44] Further, offshore drilling required the development of sophisticated engineering methods that only large firms could afford. Still, with potential returns extremely large, several combinations developed several tidelands fields in Santa Barbara County between 1957 and 1961. In general, however, tidelands exploration during the 1950s was much delayed.

As early as 1952 tidelands development was set to take off south of Santa Barbara. In June 1952, Monterey Oil moved to develop tidelands permits off Seal Beach with a $1 million project that entailed the construction of a circular steel island to accommodate the requisite drilling equipment. Together with Humble, Monterey also drilled the first tidelands well in the state since Congress had passed the Submerged Lands Act in May 1953. The firms completed the well at Newport Beach in December 1953. In May 1954, Texaco and Monterey spudded the first well from the island constructed at Seal Beach. Watching developments to the south, the *Santa Barbara News-Press* declared, "The curtain [has gone] up... on a new era in the California oil business."[45] It was premature: In 1955 the state legislature passed the Shell-Cunningham Tidelands Act, which set up a leasing process that was not to operators' liking. As a result, tidelands leasing remained in "limbo" until 1958 while lawmakers and operators battled over the amendments.[46]

Meanwhile, between 1955 and 1957 tri-county tidelands activity did not cease. Tidewater acquired a lease on 500 acres of tidelands at Summerland for $75,166 in June 1956. Richfield, Signal, and Honolulu maintained their lease at Coal Oil Point. Sunray maintained its lease at Ellwood, where the firm's mineral rights in 1957 were assessed at $3 million. Further, in December 1956 the state approved the $7.5 million plus 12.5 percent royalty bid of Standard and Humble for a 5,500 acre lease at Summerland. Thereafter, the state Assembly subjected the State Lands Commission to severe criticism for the terms of the Summerland lease. The commission agreed to halt further leasing. Despite promising results at Summerland for Standard and Humble from a well drilled from a $2 million permanent platform that the two firms erected, in February 1958 the *News-Press*'s "Oil Field News" reported that "not much has been accomplished the last two years in the way of offshore drilling."[47]

That changed in 1958 when the State Lands Commission awarded leases on five tidelands parcels between Point Conception and Ellwood fields. The total bonus paid by firms equaled $55,555,974. Successful bidders included E.W. Pauley, et al. and Phillips Petroleum Company for Parcels A and E, Humble and Standard for Parcels B and C, and Texaco, Monterey, and Newmont Mining Company for Parcel D. The bid for the latter was the highest: $23.7 million. Conspicuous by its absence was Richfield. The firm had recently invested greatly in the Wheeler Ridge area of Kern County and the Tejon/Grapevine area near Bakersfield and had nearly completed construction of its local earthen Rincon Island, perhaps explaining its decision not to bid.[48]

From 1959 on, operators actively developed their respective tidelands areas: Cuarta offshore (where Texaco-Monterey-Newmont erected Platform

Helen), Gaviota offshore gas (Standard and Humble), Point Conception (Phillips and E.W. Pauley, et al.), and Conception offshore (where Phillips and E.W. Pauley, et al. erected Platform Harry). Moreover, in 1961 Richfield, Honolulu, and Signal made a major discovery on their lease at Coal Oil Point. Also in 1961, the state awarded three additional tidelands leases. Texaco acquired a Point Conception lease for $9.5 million. Richfield, Ohio, Socony Mobil, and Tidewater secured a lease in Cuarta offshore area for $1.4 million. Richfield, Signal, and Socony Mobil secured a lease near Gaviota offshore gas field for $1 million. Although in 1961, of the offshore fields only Summerland—where Standard and Humble erected a second platform for $3 million—produced over one million barrels of crude oil ($1.7 million), these large operators were set to make the 1960s a decade of offshore development in the county.[49]

At the same time that large operators looked to state tidelands, they cut back severely on budgets for onshore exploration and development. This was evident in Santa Barbara County. In February 1956, C.E. Dyer, the county's oil well inspector, reported that activity in the county was at an "extreme low," with only three drilling rigs in operation at the end of January. In addition, as Dyer reported in September, "the number of dry holes drilled during the past few months does not present a very encouraging picture for exploration."[50]

Onshore exploration in the county increased in 1957, as Dyer noted in June. Activity was scattered about the county and included an increase in both exploration and development activity. Indeed, December 1957 was the most active month in four years for the county oil inspector in terms of new permits issued. However, for the year the increase in exploration indicated in Figure 3.2.3 owed more to the offshore core drilling performed by firms interested in gaining geological information prior to bidding on leases offered by the state. Of the 106 notices to drill in the county, 85 were for offshore core holes.[51] Moreover, a series of dry holes and abandoned wells discouraged further onshore exploration. By 1958, onshore exploration was in permanent decline. Correspondingly, the number of operators fell as well to a level that actual production could sustain.[52]

By 1961, the county's 22 active fields (onshore and tidelands) supported a corporate structure of almost 30 large firms, but only some 35 small companies, partnerships, and proprietorships (see Figure 3.2.4: Small tri-county oil well operators by location, at the end of this section). In addition, the Union and Richfield in 1960 had secured a dominant position in terms of producing wells (see Table 3.2.4: Leading Santa Barbara County oil producers, at the end of this section). Onshore reserves were declining and offshore development had yet to replace them. The industry in 1961 was in the process of adjusting to the onshore reality of diminished expectations and the fact that offshore opportunities excluded all but the most highly capitalized firms.[53]

Yet, despite the feverish pace of development in the county's tidelands leases, in January 1965, county oil consultant Robert Williams described the county's oil as a "waning asset." "What we need is another Ellwood or Cuyama field," he argued. "But there is not too much possibility of that." Harry Holmquist, the county assessor, added that the assessed value of the county's onshore fields, production, and equipment was decreasing anywhere from four to 20 percent per year. The $64.8 million assessed for the 1964-1965 tax year represented a 4.5 percent decrease from the prior year. The South Cuyama field in particular was being depleted by Richfield, its operator, at a much more rapid rate than Holmquist had anticipated. Offshore discoveries to date had slowed the overall decline rather than arrested it. Neither Williams nor Holmquist believed that tidelands output would ever replace onshore production at its previous peaks.[54]

With existing fields maturing and expectations for major discoveries in the county non-existent, county onshore production became largely dependent upon advanced techniques for recovery and the costs associated with them.[55] The industry looked to secondary recovery methods to produce much of the county's oil in the future. In 1962 operators still produced most of the county's oil by flowing wells or pumps, since secondary methods, such as waterflooding and gas injection, remained largely experimental. But growth in California ensured that the incentive to develop enhanced recovery methods would grow.

Beginning in 1960s operators employed secondary recovery methods and intensive rework, redrilling, and development efforts to revive production. They focused their resources on established fields in particular. A combination of developmental drilling, waterflooding, steamflooding and steam injection increased production in Cat Canyon from 3.9 million barrels in 1961 to 7.9 million barrels in 1967. Spurred by the mid-decade boost in oil prices, ongoing efforts again increased production from 6.7 million barrels in 1974 to 7.1 million barrels in 1977. Indeed, by 1965 Cat Canyon surpassed the rapidly declining South Cuyama field as the largest field in the county. In addition, increased drilling by the major firms that operated in Casmalia field tripled 1961's output to 1.5 million barrels by 1965. A Union-led revival of production in Orcutt field increased output there from 899,000 barrels in 1961 to 2.5 million barrels in 1967. Waterflooding and increased developmental drilling boosted Santa Maria Valley's output from 1.3 million barrels in 1968 to 3.6 million barrels in 1974. As a result, operators increased onshore production between 1963 and 1967 and were able to maintain it through the mid-1970s despite large declines in output registered by the Cuyama Valley fields. As in Ventura County, Santa Barbara County operators achieved the greatest returns from developmental drilling and secondary recovery methods prior to the oil crises of 1973-1974 and 1979.[56]

To a far greater extent than Ventura County, Santa Barbara County developed its extractable reserves in tidelands areas, although production from the nine fields that operators developed never replaced the declines experienced onshore.[57] Indeed, county tidelands production peaked at 8.9 million barrels in 1964, well before the state imposed a moratorium on drilling following the 1969 oil spill. Developmental drilling resumed only in 1977. Yet output in 1984 was only 4.9 million barrels, well below the 7.7 million barrels produced in 1968, the year before the oil spill from Union's Platform A in Dos Cuadras OCS field.[58]

Between 1962 and 1965, the state completed its leasing of the prime tidelands areas between Rincon and Point Conception. In 1962 the State Lands Commission awarded five parcels: Parcel 6 to Union for $3 million, Parcel 7 to Standard for $1.5 million, Parcel 8A to Shell and Standard for $14 million, Parcel 9A to Phillips and Pauley Petroleum for $6.1 million, and Parcel 10A to Texaco for $107,000. The following year Union acquired Parcel 11 for $267,000, and Union and Humble acquired Parcel 12 for $618,840. In 1964, the state awarded Parcel 19, a 5,553-acre tract between Summerland and Rincon, to Humble for $22 million and Parcel 21, located immediately west of Parcel 19, to Standard and Richfield for $18.67 million. In March 1965 the state awarded Parcel 24, located two miles offshore from Ellwood field, to Richfield and Mobil for $3.67 million. Thereafter, interest in the state's lease offerings abated, as the state had leased all the choice acreage between Rincon and Point Conception (acreage north of Point Conception was "off-limits" for national security reasons that involved Vandenberg Air Force Base). In 1966, five leases awarded by the state—three in Santa Barbara County and two in Ventura County—raised only $2.3 million from operators. Of six large tracts offered around San Miguel Island, only three garnered bids. All were rejected by the state.[59]

Exploratory and developmental drilling yielded four tidelands fields of significant size. Texaco and Phillips completed building their facilities in Conception field in 1962. Production in the field reached 5 million barrels in 1964. At Summerland efforts by Standard and Humble realized 3.8 million barrels of production in 1964. In February 1966 Standard/Richfield discovered Carpinteria offshore field. From Platforms Hope and Heidi, which the operators constructed at a cost of $4.75 million each, Standard and Richfield drilled 120 wells to develop the lease (Parcel 21). The two firms realized a peak output of 3.4 million barrels from the field in 1968. In July 1965 Richfield/Mobil discovered South Ellwood offshore field on its tideland lease

3242 (Parcel 24). The firms constructed the 20-well Platform Holly to develop both Parcels 18A and Parcel 24. Placed into production in January 1967, the operators produce 1.9 million barrels of oil from the field in 1968.[60]

Development activity in Alegria, Point Conception, Coal Oil Point, and Cuarta offshore fields yielded fields of small size that were unable to obtain or sustain annual output greater than 100,000 barrels. Moreover, to a greater extent than onshore, operators were unable to sustain high levels of output even in the most productive tidelands fields. Indeed, by 1974 production in Cuarta and Conception fields had ceased and had all but stopped at Coal Oil Point. After the 1969 oil spill, output increased in only one tidelands field: South Ellwood offshore. Richfield boosted production in the field to 3.5 million barrels in 1984 after the state allowed developmental drilling to resume in 1977. By 1984, only South Ellwood and Carpinteria fields remained sizable fields, although output at Summerland from Platforms Hilda and Hazel still topped 200,000 barrels.[61]

Offshore operators counted on investments in federal OCS leases to compensate for declining onshore and tidelands production before the 1969 oil spill. In December 1966, Phillips, Continental, and Cities Service acquired for $21.2 million the first federal offshore lease awarded in the Santa Barbara Channel. The operators constructed Platform Hogan in 1967 to develop the lease, which adjoined Parcel 21 in Carpinteria offshore field. In February 1968 the US Department of the Interior opened bids on 75 tracts comprising 363,181 acres of the federally-owned portion of the Santa Barbara Channel. The government accepted bids totaling $602.7 million for 71 tracts. Among the successful bidders were Humble, Standard, Gulf, Mobil, Texaco, and Union. Union paid $61 million for Tract OCS-P-2041, which yielded the discovery of Dos Cuadras field in March 1968 and the spill from Platform A in 1969 (Johnson and Nye, 1979: 198).[62]

As in Ventura County, the increase in exploration and production in Santa Barbara County required corresponding infrastructure and technology to realize the return on the large investments involved. During this period major firms remained the leading suppliers of both. For instance, as part of the development of the Cuyama Valley, Richfield constructed numerous tank farms, gas absorption and injection plants, pump stations, storage tanks, and waste water disposal systems. The firm also built a road network, field offices, two airstrips, and the town of New Cuyama. In March 1950, as part of a $10 million statewide pipeline construction program, Richfield completed a 40-mile, 10-inch pipeline that extended from its South Cuyama pipeline station to its main trunkline in Kern County's Wheeler Ridge field. The pipeline, was capable of transporting 51,000 barrels of crude oil daily. In 1958 Richfield completed a 59-mile pipeline from its Cuyama fields to Southern

California Edison's Mandalay generating plant in Ventura to transport natural gas (Jones, 1972: 256-263; Welty and Taylor, 1958: 213).[63]

Other firms made significant contributions to the county's oil infrastructure as well (described further in Section 3.1: Basic Processes and Linkages). Tidewater built a two-way, submerged pipeline off its marine loading station at Gaviota that transported distillate to its Zaca field to inject in its producing wells there. The pipeline transported the heavy crude oil produced from the process to Gaviota. In 1959, Standard constructed a processing facility, marine terminal facilities, and storage tanks in east Carpinteria that supported its operations in Summerland offshore field from April 1960. Texaco constructed simple oil and gas separation facilities at Gaviota in support of its tidelands operations. Both Texaco and Phillips erected storage tanks to support of such operations as well.[64]

Firms constructed more sophisticated manufacturing facilities in the county as well. In 1955, Union Oil built a $12 million, 20,000 barrel refining facility at Santa Maria for the purpose of converting the firm's heavy crude oil into gasoline feedstocks. Until then the firm's county production had been used for asphalt and fuel oils. The refinery was part of a program of the 1950s to upgrade its manufacturing facilities in order to produce high-value gasolines. Union's Santa Maria facility was one of seven refineries whose total throughput in 1955 was 164,000 barrels, up seven percent from 1954 (Penderson, 1990: 109).[65]

By the mid-1950s, large extractors were making secondary recovery processes an integral part of producing the county's crude oil. A.C. Rubel, Vice-President in charge of exploration and production for Union Oil, explained why: "Without any question, there is still a lot more oil to be found in Santa Barbara County. We haven't run out of oil, only out of the tools to find [and produce] it." Rubel argued that for every two barrels produced by contemporary methods, eight barrels were left in the ground. The challenge to oil firms, according to Rubel, was to improve the engineering techniques involved with recovering these reserves. In 1954, the firm started an experimental water drive project in Cat Canyon field to recover oil through secondary recovery methods. By 1957, Union Oil was employing gas injection, water flooding, and underground burning at 35 locations, including Cat Canyon, Guadalupe, and Orcutt fields (Welty and Taylor, 1958: 229-230).[66]

The first merger movement and the local structure of industry

For a number of reasons, the period from 1954 to 1969 saw an unprecedented number of mergers and acquisitions in the oil industry nationwide. Many of these transactions involved California producers with Santa Barbara area interests. While the move to merge was not driven by South Coast events or opportunities, it was related to at least three developments that appeared prominently in Santa Barbara in the 1950s: the declining output of existing fields and advent of secondary recovery methods, a divergence in performance of independents and major firms, and a business calculus that saw acquisition of known fields more attractive than exploration as a means of increasing a firm's oil reserves.[67]

Across California in the 1950s, the oil industry had increased the number of producing wells but experienced a fall in production. As Table 3.2.5: California crude oil production, at the end of this section shows, companies in December 1960 were operating some 9,700 more wells than they had in December 1950, a 37 percent increase. Yet, average production failed to keep pace; new discoveries were not enough to replace decreasing production from mature fields. From a peak of 1,000,013 million barrels per day pumped in 1953, California production declined steadily thereafter, reaching a 19-year low of 809,291 barrels per day in 1962.[68] The decline was not felt equally by all producers; while the major firms achieved a substantial increase in production, the output of the larger independents barely increased over the decade while that of all other companies fell sharply.

Although the number of area operators was fairly stable throughout the 1950s, exploratory drilling steadily declined from 1954 to 1963. The effect of that was most apparent for the independent firms in the area. Comparing leading producers' numbers of wells in 1960 to 1950 (Tables 3.2.1 and 3.2.6) shows that the fortunes of many independents operating in Santa Barbara, Ventura and San Luis Obispo Counties did not improve over the course of the decade in terms of producing wells. The industry remained more concentrated at the local than at the state level, with the group of six major firms accounting for 61 percent of the producing wells in the area against only 43 percent statewide. As striking was the increase that they registered statewide in their portion of the state's crude oil production: from 35.6 percent in 1950 to 53 percent in 1960. As the importance of the major companies increased in local production and in the statewide industry, Santa Barbara County and its neighboring counties remained important to the leading firms' success. All of the leading firms in the tri-county area found their local wells constituting a constant or increasing area's share of their company's resources as they entered the 1960s.

Meanwhile, many of the next tier of local producers, the larger independent firms, faced diminished oil-finding prospects, high costs, or suffered from other business problems. Others reached the point, amid flat or declining production, when management and shareholders wished to realize the capital gain on the sale of their assets, merge with an integrated firm, or simply move on to other interests. Not surprisingly, then, it was this "first generation" of larger independents most affected by the shakeout in the industry, both locally and statewide. Larger independents were targeted by integrated firms seeking to build up crude oil reserves in order to feed downstream operations. Small operators were affected as well, often for similar reasons. And from 1965 to 1969, a few major firms looked to one another for the same reasons, undertaking mergers of the type that would become so prominent in the 1980s.[69]

The sale of producing properties in this particular merger movement was nothing new to the industry. As Gene T. Kinney of the *Oil & Gas Journal* noted, although integrated firms were traditionally active in exploration and production, such firms had often looked to regenerate or increase reserves through acquisition in the past. Acquisitions had also long been employed as a way to adjust quickly to new conditions. From the other perspective, many independent operators considered the cycle of wildcatting, development of reserves, selling out for a capital gain, and starting all over again with new financing to be a "normal" way of conducting business. Especially from 1954 to 1965, independents in the extraction business, locally and across the nation, sought union with firms engaged in refining and distributing in order to guarantee markets at the same time that many of the integrated firms found themselves with a crude oil-deficit and sought to build up reserves. Then, once many of the larger independents had been acquired, major firms made a series of huge acquisitions of other major firms before the merger movement faded in the late 1960s.[70]

As the industry's merger movement touched the structure of the county's oil production, so did the federal regulatory response to that movement. The Justice Department, alarmed at the growing concentration of the industry, played a key role in shaping the outcomes of several significant mergers and acquisitions. While there is no evidence that antitrust action directly decided any particular local acquisition, it did affect firms very active in the county, including Texaco, Getty, Humble, and Tidewater Oil, and cast the shadow in which all merger decisions were made. Antitrust action, while robust, did "more to narrow the field of purchasers than to check the merger trend." The Justice Department did thwart some rather large transactions, including Texaco's proposed $765 million stock exchange deal to acquire Superior Oil in 1959 and Humble's desired $329 million purchase of Tidewater's western refining, marketing, and transport facilities. As we will see, the Justice Department also played a prominent role in shaping the outcome of the Getty-Tidewater deal in 1967.[71]

Buyouts and mergers were, of course, only one way to obtain the further reserves of crude oil that the major companies sought at this time. Until about 1955 most majors believed that they could find reserves through their own exploratory drilling more cheaply than they could buy them. About that time, corporate business strategy shifted as a new method of financing acquisitions became popular, making acquisition even more attractive, tilting the calculus of drill versus buy toward the latter option. Coincidentally, the decline in exploratory drilling befell Santa Barbara County's fields just as this "ABC method" of financing rose. Prominent ABC acquisitions involving area firms included Tidewater's purchase of Honolulu Oil and Humble's purchase of Monterey, both in 1961.[72]

Locally, the merger and acquisition movement decreased the number of operators. This did not result in the disappearance of any type of operator (although the decline in exploratory prospects brought a reduction in small independent wildcatters operating in the tri-counties). At the lower level of activity, entities of all sizes continued to operate in the area. The merger movement strengthened already strong firms and the number of majors remained stable even though firms implemented a sizable number of restructuring plans. Subsequently, the "first generation" of large independents that disappeared was replaced by a "second generation." And, as ever, small operators continued to ply their niche within the industry structure. Even with the first merger movement, the level of local production continued to sustain the mixed industry structure established by the end of the war.

Among the affected "first generation" of large independents that had been formed before World War II, some had fallen on hard times. One such firm was Los Angeles-based Oceanic Oil. It had wildcatted in Santa Barbara County in the 1950s, in addition to operating in Ventura County's Eureka Canyon field between 1951 and 1957, but had ceased operations in the area by the time it was acquired by Petroleum Properties in a 1958 $6.4 million stock deal.[73] Oceanic's example illustrates that acquisition was not restricted to the major oil companies; often, rising independents bought out others. In another example, Producing Properties, Inc. of Dallas joined the Santa Barbara County industry mix in March 1960 by purchasing the extractive business of Southern California Petroleum (Socalpet), a Los Angeles firm incorporated in 1919. Socalpet had operated in Santa Barbara County's Russell Ranch field from 1948 to 1956, and had 11 wells in Ventura County's Ramona field plus 11 wells in San Luis Obispo's County's Morales Canyon field. Acquiring Socalpet, coupled with its establishing of operations in Cat Canyon field, helped Producing Properties to emerge as California's 22nd largest crude oil producer by December 1960 with an average daily production of 6,430 barrels (see Table 3.2.5: California crude oil production, at the end of this section). As a result, the firm itself emerged as a leading buyout candidate and was purchased by Sohio and others in a $52 million deal in 1963.[74]

A sizable independent operating locally, Signal Oil & Gas participated in the acquisition movement from a position of strength, acquiring producing properties as part of a program to establish itself as a viable, integrated competitor to the major operators. In three mergers Signal emerged as the leading independent oil company on the West Coast. In December 1958, Signal acquired Hancock Oil, a Long Beach-based firm, in a $200 million stock deal. Hancock had wildcatted in the Santa Barbara County since 1937, particularly in the Cuyama Valley. Although Hancock was the operator of the discovery well in Taylor Canyon field, the firm did not add significantly to its local assets during the 1950s. These, however, remained substantial. Moreover, the firm owned much refinery and distribution infrastructure in the Los Angeles Basin and Signal and Hancock had a long history of joint exploration efforts. At the time of the merger, Hancock was still one of California's more successful independents.[75]

In a second merger in July 1959 and a third in September, Signal absorbed another area producer, Los Angeles-based Bankline Oil, then purchased Eastern States Petroleum of Houston. While Eastern States was not operating locally, Bankline had wells in Santa Barbara County's Cat Canyon field as well as Ventura County's Ramona and Ojai fields. It had suffered flagging output in its ventures in California and Texas, down to 1,500 barrels per day in 1958 from an average of 3,429 barrels in 1950, not enough to maintain throughput at its 10,000 barrel per day refinery in Bakersfield. Bankline was also attractive to Signal because under the federal mandatory import quota program, it had an allocation of 1,840 barrels a day that Signal could use to market its Middle East and Venezuelan production in the US.

These California acquisitions helped Signal to become the state's sixth largest crude oil producer by December 1960. The firm's assets grew to triple the number of producing wells and more than double the number of barrels of crude oil it had produced in 1950. Now integrated, Signal launched an aggressive campaign to modernize and expand its newly acquired downstream facilities (Tompkins, 1988: 218-231).[76] The Justice Department approved the integrating mergers in the interest of promoting competition but warned Signal that any further mergers inside the industry would attract its scrutiny.

Area independents were not just the object of acquisition for their extractive assets. Douglas Oil Company, operating in Santa Maria Valley and Cat Canyon as well as fourteen other California fields, owned an interest in 173 wells (with a daily crude oil production of just under 2,000 barrels), but its biggest asset was its chain of more than 270 service stations. Douglas also owned three refineries with a combined capacity of 19,300 barrels daily, including a 3,500 barrel installation at Santa Maria. Continental Oil purchased Douglas in an $18 million stock deal in February 1961. With the acquisition, Continental entered the refining and marketing business in California at a time when its California extractive performance was declining (albeit improving locally) but its earnings ($61.2 million in 1960) were the highest in company history.[77]

Integrated firms often sought out successful independent producers for their proven reserves and production stream. Honolulu Oil, with local production in three area fields, was a leading buyout prospect by the end of the decade as the state's thirteenth largest firm (see Table 3.2.5: California crude oil production, at the end of this section). In early 1961, the San Francisco firm announced that it was entertaining offers. In a $362 million deal that entailed months of negotiations, opposition from the Justice Department, and weeks of delay in obtaining a tax ruling from the Internal Revenue Service, Tidewater paid $71.9 million for Honolulu's California assets, and Standard Oil of Indiana paid $289.8 million for the firm's other assets. The Justice Department continued until 1964 its attempt to break up the deal on the speculative grounds that it might reduce competition.[78]

Smaller local operators also made attractive buyout targets, either because proprietors sought to realize capital gains on their assets, or because the business had become too competitive to go it alone. As an example of the former case, in 1965, Reserve Oil & Gas of San Francisco purchased Rice Ranch Oil Company and its 29 wells in Santa Barbara County's Orcutt field for $2.25 million. Rice Ranch had operated these wells since 1924.[79] Gene Reid Drilling Company of Bakersfield illustrates the latter case. Faced with increasingly competitive bidding on drilling jobs by early 1958, a number of contractors were selling out or leaving California. Gene Reid, who had drilled a number of exploratory wells on his own behalf in Santa Barbara County between 1948-1954 as well as in other California fields, sold out to Occidental Petroleum in 1959. Then Reid, a petroleum engineer, and his son Bud, a geologist, went to work for Occidental in exchange for shares (Hast, 1991: 480).[80]

Major firms also reorganized themselves with local effects. As part of a corporate reorganization to improve efficiency and cut costs, Socony Mobil merged its affiliates into one American company, Mobil Oil Company. These affiliates included General Petroleum, which was merged into Mobil as of December 31, 1959. At the time, General Petroleum was a top ten producer both in the Santa Barbara area and the state (see Tables 3.2.5 and 3.2.6). Locally, the firm maintained operations in five tri-county fields.[81] In similar fashion, Gulf Oil, which had wildcatted in many area fields and established ongoing production in Santa Barbara County's Cat Canyon, dissolved its subsidiary, Western Gulf Oil, into the parent company in 1959. The firm, with almost two-thirds of its production coming from Kern County, also made two major purchases to expand its statewide extractive and manufacturing-distribution business in California. In 1960, Gulf acquired the marketing and refining interests of Wilshire Oil Company, a Los Angeles firm incorporated in 1919, and in 1962 Gulf acquired Universal Consolidated, considered one of the state's most successful independents.[82]

Union Oil, too, both consolidated its holdings and expanded its operations during this period. In September 1956, the firm dissolved Los Nietos Company, which it had purchased in 1949, and took over all assets and liabilities. At the time of the 1949 purchase, Los Nietos assets included 48 million barrels of proven reserves in California, Texas, and Canada. At the time of its dissolution, Los Nietos maintained operations in Santa Barbara County's Casmalia field as well as five Ventura County fields.[83] In addition, under new CEO Fred Hartley, Union broke out of its region in 1965 by acquiring Pure Oil Company, whose assets included an extensive distribution network in the Midwest and Southeast.[84]

With the more lucrative California large independents taken by 1965, the majors themselves became subject to acquisition, as Union Oil's purchase of Pure Oil illustrates. Indeed, 1965 was a record year for merger transactions. The other prominent merger involving an area producer was Atlantic Refining Company's buyout of Richfield Oil for $573 million. The new Atlantic Richfield Company, with combined assets exceeding $1.4 billion, ranked thirteenth among American oil companies. Atlantic was drawn by Richfield's management, strong refining and marketing position on the West Coast, rising production, and the possibility for new discoveries offshore from California, in the Gulf Coast, and in Alaska (where it owned 2.5 million acres in leases).[85] For Richfield, one incentive to merge was a still-pending 1962 Justice Department suit against the firm regarding 1936 mergers with Sinclair Oil and Cities Service Company. With its acquisition by eastern-based Atlantic, Richfield solved its antitrust problems with the government.[86]

Antitrust issues loomed even larger in Getty's acquisition of Tidewater Oil, one of the tri-county's and California's largest producers, in 1967. A Phillips Petroleum $385 million bid for Tidewater's western refining and marketing assets in 1965 incurred the close scrutiny of the Justice Department. For their part, J. Paul Getty, head of Getty Oil, and his son George F. Getty II, CEO of Tidewater, threatened to sell off these assets piecemeal to other California firms if the deal was blocked, for these assets actually decreased Tidewater's bottom line in 1965. After a protracted legal struggle during 1966, Phillips finally secured the government's approval for the deal. With the deal completed, J. Paul Getty now moved to fold Tidewater and his Mission Development Company into Getty Oil, which he accomplished without much difficulty on September 30, 1967. The purchase of Tidewater, transformed Getty Oil into a major national producer with daily output of almost 300,000 barrels, two-thirds of which was outside California. The deal enabled Getty Oil to emerge as the state's third largest producer by 1970 (see Table 3.2.7, below).[87]

Finally, the $840 million merger in October 1968 of east coast-based Sun Oil and Sunray DX, the latter a significant Santa Barbara County and California producer, created a top ten firm with more than $2.3 billion in assets and almost $1.4 billion in revenue. Sunray, headquartered in Tulsa, had established itself as a major California and Santa Barbara County producer through its $44 million purchase of Barnsdall Oil in December 1950; subsequently it had made itself an integrated oil firm, America's 14th largest, with assets of $474 million, with its April 1955 merger with Tulsa's Mid-Continent Petroleum Corporation. While Sunray's overall state production was in decline at the time of the merger, it remained a prominent Santa Barbara County producer and had been California's 15th largest in 1960 (Hast, 1991: 549-550).[88]

Santa Barbara County activity was not the decisive factor driving merger and acquisition decisions during this period. Still, several large independents had invested large sums of capital in local exploration without success, and the area reserves of other firms were attractive to potential buyers. The case can be made that developments in Santa Barbara and its neighboring counties were of significant, although not necessarily decisive, importance to corporate decision-making during this merger movement. The mergers created a list of leading state producers in 1970 significantly different from the set of firms leading in 1960, as Table 3.2.7: California crude oil production, at the end of this section suggests. This was the case locally as well, as Table 3.2.8: Leading tri-county oil producers, at the end of this section shows. Interestingly, the mergers did not concentrate production in the hands of the state's leading major firms. Their share of state output in 1970 declined to 43.4 percent from 53 percent ten years earlier.

1969-1986

An Era of Stasis

Despite similarities wrought by the merger movement, Santa Barbara County's oil industry entered the offshore era on a different trajectory than the industry in the rest of the state. The county's production had charted a path parallel to the state in the decade and a half after World War II, when led by exploration and production in the Cuyama Valley, local production accelerated from 1948, as did California's. Output in Santa Barbara County peaked a couple of years earlier than it did in California, where output reached its postwar summit in 1953, but output at both the county and state levels declined thereafter. State output reached a 19-year low in 1962. Then state and county production (excluding federal OCS) diverged. State production revived and reached a new peak in 1968 (373.2 million barrels) on the strength of deep pool discoveries and steam injection projects in the San Joaquin Valley and offshore developments in the Los Angeles area. Offshore output played a significant part of the revival as it increased 128 percent in the decade from 1958 to 1967, from 77,708 barrels per day to 177,554. This represented 18 percent of the state's 1967 total of 984,722 barrels per day. Santa Barbara County and its neighboring counties were part of this; while the L.A. area's East Wilmington and Huntington Beach fields were far and away the largest producers, fields in local tidelands held eight of the next ten spots.[89] In the Santa Barbara area, though, production in Carpenteria and the other offshore fields was not enough to offset the steady drop in onshore output.

After 1969, the continued decline of onshore production and the development of offshore exploration and production, particularly on federal leases, changed the industry significantly in Santa Barbara. The decline of onshore production continued across the years 1969-86, though operators remained very active in developing existing fields and reinvigorating production through secondary recovery methods and well maintenance. In that effort, the roster of local operators shrank and changed. The number of firms declined, with a falling-off of small operators from the Los Angeles Basin in particular. Meanwhile, a "second generation" of large independents rose to play a leading part in county production. And the advent of offshore operations, high cost ventures confined to the largest corporations, increased the dominance of the industry's major companies in local oil extraction.

Santa Barbara County's decades of gradual decline in onshore production did not follow the trends in state production. While California's output did fall after peaking in 1968 (to 306.3 million barrels by 1974), exploration and production then responded to the price increases associated with the oil crises of 1973 and 1978-1979 to surge upward for the rest of this period. The expansion of secondary and tertiary recovery projects, particularly steam injection in Kern County's gigantic fields, and the development of new fields, both onshore and in federal OCS waters, enabled California production to set an all-time high in 1985 of 423.9 million barrels before oil prices collapsed in 1986.[90] Local producers applied the same secondary recovery tactics and were able to maintain or even increase production in a few major fields such as Cat Canyon. But Santa Barbara

County, without the several minor field discoveries and dramatic production increases at old fields (such as Ojai and Sespe) experienced by its southern neighbor Ventura County, was not able to increase county production as that county did from 1969 through 1972. As a result, the number of small firms operating in the area declined over this period, though many remained. Overall, the number of operators in the tri-counties generally ranged between 140 and 160 from 1966 to 1985, after falling from 226 in 1958.

As the price increases of the 1970s and the availability of cost-effective technology made it worthwhile to develop the reserves of maturing fields, not only did major operators continue to invest in Santa Barbara crude oil production, but a "second generation" of large independents did as well. Founded in the 1960s or 1970s, firms such as McFarland Energy[91], Argo Petroleum Corporation[92], McCulloch Oil & Gas Corporation of Los Angeles[93], and Petrominerals Corporation[94] invested substantially in Santa Barbara Couny and its neighboring counties during this period. McFarland and Argo worked Santa Barbara County's Santa Maria Valley field, as did Petrominerals along with Cat Canyon, and McCulloch Oil & Gas discovered the minor Los Alamos field in the county in 1972. They were joined by older California firms that established local operations, such as Pyramid Oil of San Francisco[95] and Occidental Petroleum of Los Angeles[96], and out-of-state producing firms, such as Husky Oil Company of Denver, Coastal Corporation of Houston, and Home-Stake Oil & Gas Company of Tulsa, that considered area's oil economically attractive during a period of rising demand. Pyramid operated in Cat Canyon and Orcutt, while Occidental was in Cat Canyon, Santa Maria Valley, and Zaca fields. The oil and gas subsidiaries of large conglomerates such as Tenneco, Inc. of Houston, Celanese Corporation, and W.R. Grace of New York also invested locally in extraction activities. Celanese, for example, owned (then sold to Union Pacific) the Champlin Petroleum Company which mined Santa Barbara County's Careaga Canyon field.[97]

Compared to the "first generation" of large independents, these firms engaged to a far lesser extent in exploration than in development. They did well; from the 1960s to 1980, large independents increased their share of wells and output of crude oil in California relative to the six traditionally dominant major firms (see table 3.2.14: Leading tri-county oil producers, at the end of this section). During this period low barriers of entry and high demand enabled new entrants to quickly establish themselves as substantial producers of crude oil. At the same time, none of these firms displaced any of the major firms, either at the state level or locally (see Tables 3.2.9: California crude oil production and 3.2.10: Leading tri-county oil producers, at the end of this section).

After 1974, secondary recovery methods and new drilling activity could not maintain the production in the county's long-worked fields. Thus, local production did not surge dramatically in response to the price increase of the 1970s as it did elsewhere in the state. Operators continued to employ the latest technologies in an effort to sustain production. However, even before the price collapse of 1986, the Santa Barbara area was in transition to an extractive region of secondary rank.

Tidelands and federal OCS exploration, development, and production held great promise for the industry until the catastrophic oil spill in Dos Cuadras field in the Santa Barbara Channel in 1969. During the 1960s, output accelerated as the state of California and the federal government offered leases for bid. Major operators capitalized on the preparation and investments that they made in the late 1950s to produce sizable amounts of oil from several fields. Here, capital requirements, technology, and proprietary information developed from extensive exploratory exercises presented all but major producers with formidable barriers to entry. Tidelands output, which peaked at the state and tri-county levels prior to the 1969 spill, gradually decreased thereafter. The region's offshore development after 1969 concentrated in federal OCS leases. Those leases that operators developed went forward only after firms waged protracted political and legal battles and many remain undeveloped. Output from these leases, in the hands of fewer than a dozen operators, eventually offset the decline in output from all other local fields. Offshore development served to increase the dominance of large operators in the industry structure.

The price increases associated with the oil crises of the 1970s did have an effect on the local industry, if not directly on production. The price rise created an oil boom that peaked nationally in 1981, generating windfall profits that made oil companies cash rich. Many were eager to diversify—and did. After 1981, a number of factors combined to create a second merger movement in the industry that combined some of California's leading firms. Statewide and locally, the movement yielded unprecedented concentration in producing assets. The share of state production accounted for by six major firms rose to 66 percent in 1990 from 38.7 percent in 1980. This merger wave achieved what decades of investments and a significant first merger movement failed to achieve: an oligopoly in the extraction portion of the industry (see Table 3.2.12: Leading California crude oil producers, at the end of this section).

Oil Field Activity and the Structure of Industry

Initially, local operators' secondary recovery methods and intensive rework, redrilling, and development efforts paid off. They were able to maintain production levels through the mid-1970s despite large declines in output registered by the Cuyama Valley fields. Interestingly, operators achieved the greatest returns from the developmental drilling and secondary recovery methods prior to the oil crises of 1973-1974 and 1979.[98] From 1974 to 1985 their secondary recovery and drilling efforts yielded diminishing returns and overall barely kept pace with the natural decline of the county's mature fields.[99] By 1984, the annual output at Cat Canyon, Santa Maria Valley, Orcutt, and Casmalia had receded to 5 million, 2.6 million, 1.1 million, and 513,000 barrels, respectively. As a result, although county onshore production slightly increased in 1977 owing to gains in Cat Canyon and Santa Maria Valley fields, it declined over the ten-year period even as state production began its decade-long ascent (which peaked in 1985).[100] From the mid-1970,s tidelands output compensated for the decline onshore so that county production was relatively stable between 1974 and 1985 (federal OCS not included). Both onshore and tidelands production thereafter remain mired in a pattern of gradual decline that persisted through 1995.[101]

The opposite was true further offshore. By 1984, Union, Chevron, Exxon, Phillips, Sun, and Texaco operated twelve platforms in six OCS fields in the Santa Barbara Channel. To a far greater extent than the state leases, production from the federal OCS leases realized substantial returns on the large investments that firms made and compensated for declines onshore. During this period, production soared to 31 million barrels in 1971. Thereafter it declined until 1980, when it was only about 10 million barrels. The development of the Santa Ynez Unit by Exxon, which began production from Platform Hondo in 1981, helped to revive production by 1984. Further, Chevron was set to develop Point Arguello OCS field, discovered in 1981, and Union was set to develop Point Pedernales OCS field; located north of Point Conception, both fields promised large returns.[102]

By the mid-1980s, federal OCS activity was the only potential growth sector for oil exploration and production in the Santa Barbara area. Its introduction promoted the concentration of industry in favor of those major firms with the capital, expertise, and technology to exploit crude oil reserves in the Santa Barbara Channel. Yet in the wake of the 1969 oil spill and the development of the environmental movement, offshore production remained locally contentious and highly regulated (as described in Section 4.1: Local Support and Opposition).

Santa Barbara County's industry structure contrasts with Ventura County's even though both counties registered similar patterns of production from 1962 to 1985. That is, operators in both counties, often the same operators, stabilized production at not dissimilar levels of output (excluding federal OCS) after a period of decline. While both counties essentially supported the same group of majors and large independents, Ventura County supported far more small operators than did Santa Barbara County. Much of this owed to the nature of the extractable resources within each county and the patterns of production within their respective fields. Santa Barbara County production remained confined to eight onshore fields, all of which were dominated by major operators. Only Cat Canyon and Santa Maria Valley sustained a large number of operators annually: about two dozen in Cat Canyon and 15-20 in Santa Maria Valley.[103] The six other fields of significant size were all dominated by one or more major operators. Moreover, the rest of the county's onshore fields were extremely small. Finally, owing to the state leasing program and high capital requirements, one or two major operators dominated the nine tidelands fields in production during this period. Thus, relative to Ventura County, the nature and number of the Santa Barbara County's fields and the history of their exploitation made the county far less hospitable for the smaller firm. For instance, in 1965, when production in Santa Barbara County roughly equaled that of Ventura County, Santa Barbara County supported half the number of operators than did Ventura County (and roughly one-third the number of small firms).[104]

Many of the "second generation" firms, including Husky, Home-Stake, Cabot, Occidental, McFarland, Argo, and Petrominerals, joined large independents Continental, Ohio (Marathon as of August 1962), and Sunray/Sun in operating in Cat Canyon and Santa Maria Valley fields and contributed to maintaining high levels of activity there throughout the 1970s. Several of these firms emerged as leading producers in the county by 1980, as Table 3.2.11: Leading Santa Barbara County oil producers, at the end of this section suggests. Moreover, several of these firms emerged as leading state producers by 1980 (see Table 3.2.9: California crude oil production, at the end of this section).

As Table 3.2.11 also points out, the relative fortunes of firms other than still-dominant Union and Richfield shifted far more in Santa Barbara than in Ventura County between 1960 and 1980. Shell, Conoco, Texaco, and Standard all made significant investments that paid off in the number of producing wells retained by each firm. Further, Getty leveraged its merger with Tidewater by making investments that enabled the firm to substantially increase its county presence in terms of producing wells. Tidelands and federal OCS development enabled Phillips to join the ranks of significant county producers. On the other hand, the presence of Signal and Sunray/Sun declined substantially, as both depended on production from the faltering coastal areas. Thus, relative rates of success in exploiting the county's extractable reserves altered the percentage shares of local production among leading firms. The evidence suggests that the firms that made investments in developmental drilling and secondary recovery methods were able to improve or maintain their share of the Santa Barbara County industry. This was the case in Santa Maria Valley and Cat Canyon fields, even though competition in those fields remained keen among firms of all sizes.[105]

The second merger movement and the tri-county structure of industry

The steady decline in local production after 1974 and the end of the national boom had an important effect on the structure of the area's oil industry. Before the boom ran its course, domestic demand for petroleum products declined. The depressed product prices that followed exposed most severely the profit positions of firms that were dependent on exploration and production for revenues. Indeed, many smaller firms that had taken on heavy debt loads during 1980-1981 were particularly vulnerable to takeover or bankruptcy in the 1980s. At a time when major firms sought to find reserves to replace declining production from maturing fields, the downturn in the industry created attractive opportunities to acquire reserves from firms forced to sell properties to service debts or to acquire the firms themselves. Well before 1986, independent firms became prime takeover candidates.[106]

Owing to the decline of the tri-county industry absolutely and relative to other areas of the state, it is difficult to ascribe the motivations behind any deal of the second merger movement to local activity in particular. To a greater extent, the firms involved conducted much of their business outside the area and the state. This contrasts with the first merger movement, when many independents remained to a greater extent confined to state-based activity. Yet the second merger movement had a greater impact on the ownership of the tri-county area's producing assets.

The merger of greatest significance locally was Texaco's $10.1 billion acquisition of Getty Oil in January 1984. Getty was operating in four onshore fields and four tidelands fields in Santa Barbara, as well as elsewhere in the area and was the sixth largest producer locally at the beginning of the decade although the area accounted for only five percent of the firm's state production (see Table 3.2.10: Leading tri-county oil producers, at the end of this section). At the time of the merger, Getty was the state's second largest producer (behind Shell). Texaco, meanwhile, was America's fourth largest oil firm, with stable state and local operations but a poor record of finding and developing reserves. In purchasing Getty, Texaco acquired for the equivalent of $5 per barrel reserves that otherwise would have cost the company $12. Unfortunately for Texaco, Getty gave the firm quantity rather than quality; Texaco's crude oil production fell by 23 percent in the three years following the deal. In 1986, the firm shut in about 1,500 marginal wells statewide, many acquired from Getty.[107]

Of almost equal significance locally (and a larger deal overall) was Chevron's $13.2 billion acquisition of Gulf Oil Corporation in June 1985. Although by 1984, both Shell and Getty had surpassed Chevron in state production and Gulf had fallen to 18th (from 12th in 1970), both firms remained major state and national producers at the time of the merger. As Kenneth T. Derr, Chevron vice-president and corporate officer in charge of the merger, made clear, "the main incentive in our acquisition was to acquire Gulf's large domestic reserves of oil and gas," including those in California. In terms of assets, Chevron ranked fifth among US firms in 1983 (with $24 billion) and Gulf eighth (with $21 billion). Tri-county operations were not a key factor in the merger. Although both firms as of 1980 remained top 20 operators locally, at the time of the merger, both firms' local operations comprised minor shares of their respective state production (see Table 3.2.10). Chevron sold off some assets then stepped up exploration, development, and production nationally to leverage Gulf's large land holdings.[108]

The Texaco-Getty and Chevron-Gulf "mega-deals" significantly concentrated the local oil industry structure. Several mergers that involved major firms acquiring independent firms with valuable extractive assets had a similar impact, albeit to a lesser degree. As in the Texaco-Getty and Chevron-Gulf deals, the acquisitions of independents were motivated by the belief that it was cheaper to buy reserves than to find them. Obtaining proven reserves was Mobil's intent in May 1984 when it acquired Superior Oil for $5.7 billion. Superior had been prominent in Santa Barbara County exploration in the early postwar period, but by the time of the merger its large North American operations included local one field, in Ventura County. The deal was a substantial part of Mobil's 1983-1992 program to build reserves, and it did, increasing the company's American oil and gas reserves 27 percent and its Canadian reserves more than 75 percent.[109] For the same reasons, major national firm Marathon Oil purchased the extractive enterprises of Husky Oil Company, one of the "second generation" of large independents and the 11th largest producer in the three county area in 1980. Husky was producing oil in the Santa Maria Valley field at the time of the merger and had operated in a number of other area fields during the 1970s and 1980s.[110]

In addition to seeking reserves, oil corporations also believed that mergers were a means by which to raise efficiencies, control overheads, and streamline the management of operations. Other acquisitions were driven by purely financial reasons, making (often large) firms, such as Union and Phillips, (often hostile) takeover targets. Stock prices in the early 1980s were cheap. Inflation during the 1970s eroded the value of earnings, yet stock prices remained depressed even as inflation slowed because real interest rates remained high. Moreover, accelerated depreciation rates under the 1981 tax law boosted cash flows with which firms could purchase distressed assets.

Finally, Wall Street invented new ways for smaller "raiders" to buy shares in a firm in order to create a "run" on the stock and sell out at a profit. In order to defend themselves, the targeted firms often hugely indebted themselves in order to buy back their own shares of stock.[111] Both Union Oil—which reorganized in 1983 to thwart potential takeover threats, creating Unocal as a holding company in the process—and Phillips, each with significant tri-county assets, successfully fended off corporate raider T. Boone Pickens during 1984-1985. Yet the experience of each left the firms greatly burdened with debt, which created severe pressures to restructure operations, all of which affected the corporations' decisions about Santa Barbara County operations (Pederson, 1990: 247-266).[112]

The second merger movement was also shaped by large corporations that sought to diversify their businesses in the 1980s. At the same time that many oil firms were divesting themselves of non-oil related businesses that they had acquired during the 1970s, prominent names in American industry acquired oil companies. For instance, in August 1981 DuPont purchased Conoco—at the time still active in four Santa Barbara County fields others in Ventura—for $7.6 billion. The rationale, according to DuPont's chairman, was "to reduce the exposure of the combined companies to fluctuations in the price of energy and hydrocarbons."[113] Thereafter Conoco continued to emphasize extractive operations, increasing its investments in exploration and succeeding in stabilizing its domestic production.

During the second merger movement, fewer deals affected the tri-county industry structure than had in the first. The firms involved had for the most part diversified their operations beyond California to a greater degree than the "first generation" of firms whose success was a product of exploiting the state's extractable reserves. Yet the size of the biggest deals was unprecedented, and the firms involved included the county's most substantial producers. Many of the mergers of the second movement were simply a waste of money, which became all too evident when the "crash of '86" sent an already depressed industry to the wall, so to speak.

1987-1996

Restructuring and Exit: Local Decline and the Transformation of the Tri-County Oil Industry Structure

After 1981, a number of factors combined to create a period of industry restructuring, locally as well as nationally. Locally, the increasing concentration of production among a few major companies reversed, eroded by the inexorable decline in Santa Barbara County's reserves coupled with major restructuring on the part of major firms. It resulted in a more fragmented and much smaller industry, shorn of its top tier of operators. For the major oil companies that had formed that top tier, Santa Barbara County's declining fields were clearly of secondary status. Simultaneously, the end of the oil boom with the precipitous drop in oil prices created pressure on corporate cash flows and profits.[114] The majors found that diversification was often unprofitable and shed non-core assets. Firms that acquired during the early 1980s now restructured, either at the behest of the Justice Department or because they found themselves overburdened with debt. For independent producers, such as Argo Petroleum, "the crash of '86" often meant bankruptcy or the sale of assets. Indeed, between 1982 and 1985, 25 percent of America's 8,000 independent firms sold their producing assets, went bankrupt, or were acquired.[115] For the diversified firm, such as Tenneco or W.R. Grace, the drop in prices prompted an exit from oil extraction investments.

The restructuring of the industry in Santa Barbara was the product of strategic changes. First, the major oil companies decided to cut unprofitable extraction like Santa Barbara County's and sold off their local operations. At the same time, exploration returned to strategic favor over acquisition of extant operations as the means to replenish reserves. Once the major companies had retrenched, their businesses reinvested heavily once again in exploration (as early as 1988) to replace declining reserves—only now they shunned the tri-county area. The leading firms of the much more concentrated post-1986 oil industry looked worldwide for primary exploration and production areas. At that point, with few exceptions, major firms exited the Santa Barbara County onshore oil industry (for the most part, they remained offshore, though even in this area there were notable exits from the area). The firms that for much of the century dominated tri-county exploration and production left this secondary extraction region to a "third generation" of independent firms that emerged. This group of firms focused on acquiring primarily proven reserves and augmenting them "by application of enhanced oil recovery methods, advanced reservoir management, and development drilling," as one firm put it.[116] Also a set of smaller companies emerged after 1986 as operators of wells that had been operated traditionally by individuals and partnerships. These companies were local, often headed by individuals who had been prominent in the industry for much of the postwar period. Thus, the merger movement, corporate retrenchment and redeployment of resources, and the identification of opportunity in lower production fields by a new group of independent firms and locally experienced small operators transformed the local industry structure.

Using ever-advancing technology, the new proprietors made investments in developmental drilling and enhanced recovery that stabilized or revived the production of several fields, including Santa Barbara County's

Barham Ranch and other fields in Ventura County, much as Argo Petroleum and others revived the production of Ojai and Sespe fields during the 1960s and 1970s. Both onshore production and the size of the local industry continued to contract, but they did so gradually. Therefore, while abandonments outpaced new activity, the productive life of the tri-county's onshore fields and the industry that it has supported may be sustained for several more decades.

The offshore oil industry, as of 1995 confined for the most part to federal OCS fields, took a different course. It registered substantially higher levels of output as major firms brought large fields into production: Point Pedernales in 1987 (Union), Point Arguello in 1991 (Chevron and Texaco), and Pescado in 1993 (Exxon). Further, in December 1993 Exxon began production from Platform Harmony in its Hondo field, which helped to boost production there to 14.9 million barrels in 1995 from 9.1 million barrels in 1994. These major investments boosted production in the Santa Barbara Channel from around 30 million barrels a year in 1982-1991 to 69.4 million barrels in 1995. These firms placed a high priority on developing these fields in the 1980s as a means of boosting profits during a period of declining demand and falling profits. Yet gaining the approval of these projects, including their associated onshore processing facilities, over state and local opposition was a protracted process. Moreover, the failure to secure environmental permits and to overcome other legal obstacles stymied several other proposals.[117] At the same time, as output declined or ceased in several offshore and OCS fields, operators abandoned fields and removed platforms or transferred assets to non-major firms. Although production soared and many OCS leases remained undeveloped[118], no platforms were erected after 1989. Hence, while offshore development remained the one tri-county upstream activity area that remained attractive to major operators, for a variety of economic, legal, political, social, and environmental reasons it remained doubtful that it would constitute a dynamic sector after 1995, at least in the short run.[119]

Restructuring the oil industry

The end of the oil boom prompted many oil firms that had spent much of the 1970s diversifying their businesses to restructure their operations to refocus on their core businesses. The second merger movement, one consequence of the end of the boom, was a cause for further reorganization. Hence, the collapse of oil prices in 1986 served to accelerate a trend already under way. It drove many large independents and oil and gas subsidiaries of non-oil industry conglomerates from Santa Barbara County's fields, as it did from the extractive industry across the state and nation. Locally, liquidation of assets on the part of firms now bankrupt or no longer involved in oil and gas production moved active wells to new firms who emerged as industry leaders in a declining extractive region. For major firms refocusing exploration and production on areas that promised high returns, Santa Barbara no longer a primary source of supply, so they left the tri-county area.

The experience of ARCO was perhaps typical of the process, exceptional perhaps only in its persistence in its Santa Barbara enterprises into the mid-1990s. From 1977 to 1979 the firm decentralized its business into eight wholly-owned subsidiaries, including ARCO Oil & Gas for crude oil operations. In 1984-1985, the firm wrote-off $2 billion worth of assets, reduced capital spending, sold its 1,350 gas stations east of the Mississippi, and laid off several thousand employees. After restructuring, the firm concentrated on extraction, West Coast refining and marketing, chemicals, and its coal mining business. The "crash of '86" prompted further cuts; the firm divested itself of its interests in some 700 oil and gas fields. ARCO maintained its local ventures until it transferred its interests in South Cuyama field in 1990 to Stream Energy of Oklahoma City and sold its interest in South Ellwood offshore field to Mobil in 1993. By the end of 1994 Arco, California's (and the nation's) seventh largest oil producer, no longer extracted oil locally (see Table 3.2.21).[120]

Many firms restructured as a result of mergers and acquisitions. Texaco and Chevron sold unwanted assets of Getty and Gulf, respectively, and reassigned and fired the acquired employees. Chevron maintained most of the two firms' exploration and production offices, including those in Ventura and Bakersfield, as it sold off $4.5 billion of its operations by the end of 1986. Texaco's sell-off amounted to $2.8 billion (nationwide) in former Getty assets as the new firm restructured extraction operations under Texaco Producing, Inc. Even with those steps, its output fell 23 percent from 1984 to 1986 and was struggling financially before the 1986 "crash" hit. The crash made the extraction part of the industry's situation dire. Many firms without downstream operations or non-oil income faced bankruptcy or liquidation if measures to cut costs and reduce debt did not overcome cash flow problems. Some major firms operating in the Santa Barbara area, such as Unocal, Texaco, Phillips, and Occidental, faced a financial squeeze because of heavy borrowing and cut further. Occidental chose to cut 1,500 workers (on top of the 2,000 slashed in 1985) and reduced capital spending by 35 percent. Meanwhile, integrated firms with strong balance sheets and substantial cash flows, such as Shell, Chevron, Exxon, and Mobil, relied on profits from downstream operations to see themselves through the crisis. Yet seven of the largest firms, six of which operated in the tri-counties, cut 25 percent from their capital budgets in 1986. Firms large and small substantially ceased exploring for oil and cut staffs further. As the number of wells drilled in America dropped to its lowest level in 40 years, the thirteen biggest oil companies logged as a group their first loss on domestic extractive business since the 1960s.[121]

In Santa Barbara, 1986 accelerated the decline in production and in the shift in the industry structure itself, as California production fell for the first time in 12 years from the record 424 million barrels in 1985, to 407 million in 1986, and downward to 344 million barrels in 1993. The local restructuring manifested itself in two ways through major operators. First, the fall in prices ensured that production dropped off more rapidly than it had over the previous decade. Second, it meant that once prices stabilized and recovered, that major firms took their investments elsewhere, which ensured the further decline of the industry. The crash eliminated much of the "second generation" of large independents that had operated in the area during the 1961-1985 period. For instance, Argo Petroleum, which was ranked 173rd in assets among the top 400 publicly-owned oil firms in 1986, transferred all of its Santa Barbara extractive business in July 1987 to three firms, two of which were part of a "third generation" of independents to operate in the tri-counties: Seneca Resources Corporation of Houston and Fortune Petroleum of Agoura Hills.[122] A number of Texas-based firms, such as Sage Energy of San Antonio, Triton Energy of Dallas, Coastal Corporation of Houston, and Union Pacific Resources of Fort Worth, exited California as crude oil producers to concentrate their investments elsewhere domestically or internationally.[123]

As early as the third quarter of 1987, somewhat higher oil prices and poor profits from refining and marketing prompted oil firms to focus once again on upstream investments. With the cost of drilling for oil reduced to two-thirds of its 1985 levels, and with major oil firms having found only enough oil to replace 41 percent of what they produced in 1986, exploration returned to 1985 levels nationally in 1987 and rose another 15 percent the next year. Better extraction techniques, computers, and keen competition between oil service firms kept the costs of upstream activities down. Firms now found producing oil using enhanced recovery methods to be cheaper than buying other firms' reserves.[124]

The renewed focus on exploration and production of crude spurred another round of rising extraction costs, retrenchment, and restructuring in the industry at the end of the 1980s, with an impact on the industry's investment and employment in Santa Barbara. As Texaco restructured its management nationally, it cut the number of layers from 11 to five, closed its Ventura district, and consolidated operations in Denver, transferring 145 employees and reorganizing the remaining 170 into a Ventura field office. Other major firms operating in California, such as Shell and Texaco, created separate subsidiaries for their state operations. Shell did so twice, creating

Shell Western Exploration & Production (SWEPI) in 1987 and CalResources LLC in 1995, headquartered in Bakersfield.[125] They intended to promote adaptation to the unique challenges of the state's heavy crude oil and relatively mature fields, focusing on utilizing the best practice and technologies to recover oil from existing reserves. Extractable reserves remained substantial—particularly in light of advancing technologies. As major firms wound up their area onshore operations, they continued to close or relocate offices, often moving to the San Joaquin Valley. Chevron did that in 1993, laying off or transferring some 200 employees from neighboring Ventura County and consolidating its state operations in Bakersfield. At the time, Chevron no longer had onshore production in the county, having transferred its remaining wells—in West Montalvo field—to Bush Oil Company (a division of Berry Petroleum Company) in May 1990.[126]

The net effect of mergers, restructuring, and the end of the oil boom on the structure of industry statewide can be seen by comparing Table 3.2.14: Leading tri-county oil producers and Table 3.2.15: Leading tri-county oil producers, at the end of this section. The industry, now centered in the San Joaquin Valley (and offshore in the Santa Barbara Channel), was more concentrated than ever. Six majors finally established what could be labeled an oligopolistic pattern of state dominance—helped enormously by the 1984 Texaco-Getty deal. In addition, the "second division" of firms was much changed between 1980 and 1990, as firms such as Argo, Husky, Superior, and Grace no longer existed or had exited the oil business. Further, "third generation" independents, such as McFarland, Berry, and Seneca Resources, appeared in the top 25 by 1990 (see Table 3.2.12).

The Transformed Structure of Local Industry

The end of the oil boom changed the local extractive industry structure in a direction quite different than the statewide industry was going: It ended the major oil companies' predominance in the local structure that had been in place since the early 1960s. As major firms came to dominate California production, they left Santa Barbara County, opening it to other firms (with the notable exception of Shell's and Texaco's continued run in the declining, but still substantial, Ventura field). Large independents, often based outside California, for the first time led extraction in most fields of Santa Barbara County and its bordering counties. After area reserves had sustained roughly 150 operators for two decades, the decline in oil prices, coupled with the depletion of the reserves, shrank the number of firms engaged in crude production, as local output dropped toward the 17 million barrel mark by 1995. Table 3.2.13: Leading California crude oil producers, at the end of this section does not fully capture the change in industry structure, for in 1996

Unocal transferred its still substantial Santa Barbara, Ventura, and San Luis Obispo Counties assets to Torch Operating Company and Nuevo Energy Company.

The "third generation" of independent firms that came to dominate local production in the 1990s comprised California-based "second generation" survivors such as McFarland Energy, Berry Petroleum, Petrominerals, and Pyramid Oil, newer California-based firms such as Fortune Petroleum and Saba Petroleum, and, most prominently, out-of state firms Vintage Petroleum, Torch Operating Company, Nuevo Energy Company, and Hallador Petroleum Company. The business goals of these firms fit with the supply conditions of the area. They aimed to acquire existing producing properties and develop them using advanced recovery methods such as horizontal drilling and steam-assisted gravity drainage processes (SAGDs) to pull more crude oil out of the fields in an environment of steady or rising demand. As exploration and production companies neither refining nor distributing their own crude, they were especially subject to fluctuations in prices. While exploratory drilling in the area ceased entirely in 1995 for the first time since World War II, development activity was vigorous. The intensely competitive nature of this side of the business placed a premium on lease acquisition and the capacity to exploit existing reserves. That these independents tended to hold a large share—if not all—of their California assets in local fields (see Table 3.2.14: Leading tri-county oil producers, at the end of this section) suggests a very different relationship between local production and these operators' fortunes than had characterized the area's oil industry in decades previous.

The most prominent "third generation" operators in Santa Barbara County were Vintage Petroleum of Tulsa, Torch/Nuevo of Houston, and Saba Petroleum of Southern California. Incorporated in 1983, by 1996 Vintage owned and operated wells in California, the Gulf Coast, East Texas, and the Mid-Continent. These included 1,171 productive West Coast wells. The firm acquired the Santa Maria Valley and Cat Canyon properties of Shell in June 1992, bought the San Miguelito and Rincon operations of Conoco, Santa Fe Energy, and Mobil in 1993-1994, planned some 90 projects in these fields to sustain production, then obtained Texaco's wells in nine oil and seven gas fields in California, including over 700 wells in four Ventura County fields. These lease transfers fit with the firm's goal of acquiring properties that had the potential for increased value through further exploration and development. Vintage held a 100 percent working interest in the Zaca field, for example, and planned to invest further in the field's production. The acquisitions made Vintage the leading Ventura County and area producer in 1995 as well as 52nd nationally on the *Oil & Gas Journal* 200 with $648 million in assets. [127]

Torch Operating Company and Nuevo Energy Company became leading local operators by acquiring onshore and offshore properties in the tri-counties between 1993 and 1996, including Unocal's interests in Hueneme and Point Pedernales OCS fields, 19 more Unocal sites in Santa Barbara and Ventura Counties, Triton Oil's interests at Santa Barbara County's Barham Ranch (where Triton from 1987 to 1992 increased production to more than 400,000 barrels), and 103 wells in Ventura's Rincon field. Torch, like Vintage, was a relatively new corporation, founded in 1978, and it created Nuevo as a separate public corporation in 1990. Together, Nuevo and Torch emerged second only to Vintage Petroleum in onshore operations in the three county region and third behind Exxon and Chevron offshore. With 2,430 California wells as of December 31, 1996, Nuevo also emerged as a leading state producer, and its $863.8 million in assets made it a leading national oil firm as well.[128]

Saba Petroleum of Irvine emerged as Santa Barbara County's leading operator and the tri-county area's fifth leading producer by the mid-1990s. Acquisitions from Unocal were its source of entry to local fields; between 1992 to 1995, Saba bought Unocal's Cat Canyon, Casmalia and Santa Maria Valley operations in Santa Barbara County as well as sites in Ventura County. Saba had the same strategy as Vintage and Torch: apply new, low-cost secondary recovery methods to get the large reserves of oil in these long producing fields. Saba generated sizable yields from Unocal's former fields and rapidly devised strategies to improve upon these. It drew 209,000 barrels of crude oil from Santa Barbara County's Cat Canyon field in 1995, for example. By 1996 the firm's in-house technical staff identified 184 drilling locations on its California leases; by January 1997, the company had drilled five horizontal wells in the Cat Canyon field and planned 36 more at an average cost of $500,000 each (in a budget of roughly $45 million for exploration and extraction for the year).

For Unocal, on the other hand, the sale of its low return California assets was part of a strategy to increase the firm's investments in international areas that promised gigantic field discoveries and high returns, including the Gulf of Mexico and Southeast Asia. Unocal could not depart entirely from Santa Barbara and San Luis Obispo Counties even after it ended activity as a producer, because the company continued to incur substantial charges for environmental contamination at its sites. Remediation of the diluent-contaminated Guadalupe oil field, the tank farm at Avila Beach, and local properties totaled $230 million in 1996. During 1996 the firm established $77 million in reserves to address these sites. As of December 1996, Unocal had set aside $250 million to fund environmental remediation.[129]

Like Saba, Denver-based Hallador Oil acquired a large holding of declining production, ARCO's former South Cuyama wells, from Stream Energy in October 1991 to enter Santa Barbara County. As the operator of the field's 92 active and 167 inactive wells (as of March 1996), Hallador retained a working interest in 80. Though South Cuyama's March 1996 daily production of 1,130 barrels was just three percent of its peak during the 1950s, and Hallador estimated that the field's remaining recoverable reserves were less than one percent of original levels, the annual output of over 400,000 barrels made Hallador Santa Barbara County's fourth leading producer (federal OCS not included) in 1995 (see Table 3.2.15: Leading Santa Barbara County oil producers, at the end of this section).[130]

Although local industry conditions remained attractive to some independent operators after 1986, declining prospects and the lure of the San Joaquin Valley encouraged other "third generation" firms to diminish their presence in the 1990s. Pyramid Oil of Bakersfield , McFarland Energy, and Berry Petroleum Company of Taft were three such firms. Pyramid was a surviving "second generation" independent that split its California production between Kern County and Santa Barbara, operating 22 leases altogether in 1995. Its three producing local wells were in Cat Canyon, where the firm had operated since 1973. A small firm by 1995, Pyramid retained only $3.4 million in assets: interests in 160 wells on 22,837 proven acres. McFarland and Berry were larger, growing firms—among the top twenty producers in the state in the mid-1990s—that cut holdings in area fields while increasing operations in San Joaquin fields.[131] Still other "third generation" firms quit California altogether, as nearby Ventura County producer Fortune Petroleum did in 1996. Founded in 1987, by the mid-1990s the firm's managers decided that the cost of operating local wells was disproportionately high relative to the revenues that they generated, due the low gravity weight of the oil, the small production from each well, and worker's compensation and environmental costs. The company moved to Houston.[132]

Even without the dominant presence of major firms, the competitive nature of the extraction industry meant that success was not guaranteed. Another "second generation" survivor whose fortunes continued to decline in step with the area's extractable onshore reserves was Petrominerals. The firm had operated in the area since 1966, but in 1995 the now Alhambra-based firm exited from Santa Barbara County, selling its Santa Maria Valley and Cat Canyon interests for $150,000 to B.E. Conway Energy of Orcutt. The firm conceded that "most of the Company's competitors have substantially more technical and financial resources available to them." With the sale, Petrominerals retained interests in a mere 36 wells in Los Angeles; its assets had declined to $3.34 million.[133]

Although major operators Exxon and Chevron retained platforms in the most productive federal OCS fields, independents also made inroads in offshore production during the 1990s. In addition to the nine platforms operated by Torch and Nuevo by 1997, Pacific Offshore Operators of Santa Barbara had operated Platforms Houchin and Hogan in Carpinteria offshore field since 1990, and Venoco, Inc., also of Santa Barbara, operated Platform Holly in South Ellwood offshore field, which it bought from Mobil in 1997.[134]

As the entry of smaller firms into offshore oil production shows, the absence of competition from majors in many fields enabled local entrepreneurs to emerge as the area's leading producers in the 1990s. Many of the small firms were headed by individuals with years of experience in the local industry. For instance, R. Scott Price, president of Mirada Petroleum and South Mountain Resources of Ventura and a partner in Petroleum Engineering of Oxnard, was a second generation local oil producer. His father, C. Ray Price, had been an agent for many years in Ventura County. Moreover, firms that long operated in the shadow of major operators now emerged as leading operators in their respective counties. With only two majors still with a significant presence after the 1996 Union/Torch deal, small extraction-only firms found that local supplies provided them with opportunities to compete successfully.[135]

Conclusion

This study suggests that opportunity has apportioned itself differently in the extraction industry than in other aspects of the oil industry.[136] The exploration and extraction part of oil production has remained a relatively competitive portion of an otherwise oligopolistic industry. To be sure, six major firms comprised a large part of the Santa Barbara industry until 1985. Yet only by the end of the 1980s did their share of production approach oligopolistic levels. Even with the looming presence of the major corporations in local extraction, barriers to entry were consistently low enough that operators of all types could enter into the industry structure. That was true in periods of exploration, development, and declining production. The Santa Barbara fields offered a varying range of opportunities that firms could match with their business goals and resources. Indeed, when falling reserves and slowing rate of production made the fields no longer profitable enough for the major integrated oil companies, these firms abandoned the region to independents and small operators. That was true of offshore production, too. Initially, the offshore industry contrasted with its onshore counterpart by excluding all but the most highly capitalized firms from exploring, building and operating platforms. Yet even here, with platforms extant and production declining, conditions were such that independent firms joined this enterprise, too, in Santa Barbara after 1990.

Variety in the structure of the industry and change over time promise to remain central features of the local oil extraction industry.

Notes

1. The term large corporation in this study refers to integrated major oil firms and large independents. Small corporations, partnerships, and proprietorships refer to entities organized by one of more individuals for purposes of drilling or operating oil wells. Corporations are organized under the laws of the state in which the firm is domesticated. A partnership is an unicorporated entity of more than one individual. A proprietorship is an unincorporated entity of a single individual for operating purposes.

2. State of California, Department of Conservation, Division of Oil and Gas, Index of Well Records, District 2 (Ventura) and District 3 (Orcutt) offices (hereafter referred to as IWR). Each district office maintains well records for the fields in its district. The well records are grouped in a set of three-ringed binders by field by operator in alphabetical order. As of 1998, District 2 covers all of Ventura County, the Summerland and Carpinteria areas of Santa Barbara County, and parts of north Los Angeles County that lie in the Ventura basin. District 3 covers the rest of Santa Barbara County, all of San Luis Obispo County except for parts in the east near the Kern County border, and Monterey, San Benito, Santa Cruz and Santa Clara Counties. Until January 1, 1973, District 2 included Ventura County only. District 3 encompassed all of Santa Barbara County and the areas noted above. By including operators only, this study includes neither firms' interests in onshore production where the company was not the operator nor the royalty interests of other parties.

3. Operators denotes ownership of a well only. It does not infer production. Thus the term includes wildcatters who unsuccessfully drilled so-called "dry holes" and owners of standing, idle, shut-in, or "potentially producing" wells, to use the terms employed by the state of California's Division of Oil and Gas (now Division of Oil, Gas, and Geothermal Resources). For purposes of this study, operation ends with abandonment or transfer. Thus, the number of operators in general exceeds the number of firms with production in the field at any given point in time.

4. The term "state tidelands," while a popular term and therefore employed here, is technically incorrect, since it refers only to those lands covered and uncovered by the tide. In California, "state tidelands" includes submerged lands out to three miles. OCS is the area beyond three miles.

5. For a review of this legislation see Nash (1968: 190-238) and Bradley (1996: 282-289). From the first offshore production in 1899, the state of California claimed ownership and asserted jurisdiction over it. Although the state passed an offshore leasing law in 1921, not until 1937 was states' assumption of jurisdiction challenged when Senator Gerald Nye of North Dakota, at the urging of Interior Secretary Ickes, introduced Senate Bill 2164 to declare offshore waters part of the public domain. The bill failed. However, once World War II ended, the Navy and Interior Department joined the debate, which resumed when President Truman declared federal jurisdiction over all coastal waters in September 1945. 46 states then backed a quitclaim measure renouncing federal ownership of submerged lands three miles seaward from state coastlines. Introduced as House Joint Resolution 225, the Congress passed the bill (which Truman vetoed in August 1946). Nevertheless, states granted leases and collected royalty per existing statutes. The United States sued California in late 1945. In 1947 the Supreme Court ruled for the federal government, which had "paramount rights in [and] full dominion over the

resources," according to Justice Black's majority opinion (quoted on page 283). The states turned to Congress, which passed a compromise Submerged Lands Act in 1953.

6. This shift can be seen by comparing the number of exploratory wells drilled in Kern County and the tri-counties from the late 1950 through the 1970s in California Division of Oil and Gas (1982).

7. Upstream activities include the exploration, development, and production of crude oil. Downstream activities include the refining, marketing, and retailing of crude oil products. The transportation of oil is sometimes referred to as a separate, so-called midstream activity, although it is generally conceived of as a downstream activity.

8. As Chandler argues, "mergers and acquisitions in the 1920s and early 1930s completed the pattern of integration and concentration so firmly established before 1917." For more on the shifts in domestic demand for petroleum products, see Harold F. Williamson, Ralph L. Andreano, Arnold R. Daum, and Gilbert C. Klose, *The American Petroleum Industry: The Age of Energy, 1899-1959* (Evanston, Ill.: 1963), 167-203.

9. Wildcatting refers to drilling in areas of unproven crude oil production.

10. Federal offshore environmental legislation includes the Oil Pollution Act of 1924, Federal Water Pollution Control Act of 1948, Clean Water Restoration Act of 1966, National Environmental Policy Act of 1969, Federal Water Pollution Control Act Amendments of 1972, Coastal Zone Management Act of 1972, Marine Protection, Research, and Sanctuaries Act of 1972, and the Endangered Species Act of 1969 (amended 1973, 1978, 1979). Although the 1969 oil spill in the Santa Barbara channel in many ways spawned the environmental movement and began a period of intense local opposition to offshore development, only from 1976 was offshore leasing heavily litigated.

11. Proration is a legalized regime instituted to limit the production of crude oil reserves on behalf of regulating output over time. Wellhead conservation (to structure production in a manner that maximized the recovery of oil reserves) by means of unitization was not made compulsory in California for primary operations until 1973 (1971 for secondary operations). Voluntary unitization was legalized in 1929 when the state's antitrust law was relaxed. Between 1929 and 1971, more than 100 primary and secondary units were formed to regulate production and entry on behalf of the conservation of resources. As of 1990, California required a one acre minimum spacing requirement for both oil and gas, had a maximum gas to oil ratio statute that dated from 1929 (which proved difficult to enforce), and had a compulsory pooling statute that dated from 1947. Crude oil maximum efficiency rates of production (MERs) have been recommended to the state Division of Oil, Gas, and Geothermal Resources since 1955 by the Conservation Committee of California Oil and Gas Producers, a non-profit organization established in 1929 that administers a voluntary program of production and conservation control. On the topic of conservation, see also Erich Zimmerman, *Conservation in the Production of Petroleum* (New Haven: Yale University Press, 1957); Nash, *United States Oil Policy*; Stephen McDonald, *Petroleum Conservation in the United States* (Baltimore: Johns Hopkins University Press, 1971); Wallace Lovejoy and Paul Homan, *Economic Aspects of Oil Conservation Regulation* (Baltimore: Johns Hopkins University Press, 1967); Norman Nordhauser, "Origins of Federal Oil Regulation in the 1920's," *Business History Review*

(Spring 1973): 53-71; Norman Nordhauser, *The Quest for Stability* (New York: Garland Publishing, 1979).

12. The quota established in 1959 equaled nine percent of estimated domestic demand. Yet under the system, imports gradually increased to 23 percent of actual demand by 1972. In 1973 the government discontinued the increasingly complex and hard-to-manage quota system and substituted a license fee system in its place. The fourfold increase in prices prompted by the oil crises of the 1970s soon rendered this system superfluous.

13. America emerged as a net petroleum importer in 1948. In 1949, the Independent Petroleum Association of America (IPAA) petitioned the Congress to restrict imports using national defense arguments. Yet the Korean War intervened to stave off the independents' protectionist efforts. The IPAA, whose members accounted for 40 percent of domestic production, renewed their arguments in 1954 with the Eisenhower Administration. The president set up a cabinet committee to study the situation. In 1955, it recommended "voluntary" import controls to keep imports at 1954 levels. The voluntary approach was tried for four years but failed to head off imports' share of the domestic market. Under the mandatory import program, the nation was divided into five regulatory districts. District V, of which California was a part, received the most lenient treatment. Crude, unfinished oil, and finished oil could be imported into the district as long as they did not exceed the 1957 import level and unfinished products did not exceed 10 percent of crude and finished products. Finished product quotas were allocated to historic importers in relative amounts, and crude/unfinished quotas were to be allocated according to refinery size and qualifying pipelines. Industry reaction was mixed overall.

14. The oil industry went from being one of the least taxed before World War II to being one of the most taxed major US industries by the mid-1980s. Federal taxation has been intermittent but has had important consequences. In the postwar period, the 1980 Windfall Profits Tax (WPT) was the most important tax. Its impact was lessened by ERTA (Economic Tax Recovery Act) in 1981. WPT affects majors more than independents and thus tends to privilege the latter where marginal operations are concerned. Although the tax aimed at gaining revenue without reducing production incentives, it was very complex and had nonneutral competitive effects. The basic corporate tax in 1944 was 24 percent. The rate from the end of the Korean war to 1976 varied from 48 to 52 percent. Even though the rate had increased by 1984 to 46 percent, owing to incentives such as the Investment Tax Credit (ITC), the estimated effective rate for 1983 was 17 percent. The depletion allowance, which allows deduction of intangible drilling costs, remained 27.5 percent from 1926 until 1969, when it was reduced to 22 percent. The Tax Reduction Act of 1975 eliminated the deduction for all integrated producers, foreign production, and properties transferred after 1974. In 1976, the allowance was reduced for the remaining 15 percent of the industry that still qualified for it to 65 percent of taxable income computed on a cost basis. Until 1976, tangible (mostly fixed costs of materials) and intangible (mostly variable) drilling costs were treated differently and encouraged operators to boost intangibles (which could be expensed in the current year). Intangibles constitute some 70 percent of all well costs in any case. The 1976 tax act reduced intangible deductions for corporations and attempted to eliminate it for proprietors and partnerships. The tax act of 1982 reduced the intangibles deduction for integrated producers while maintaining it for independents. Thus, in this area, taxation has gone up for all producers, but independent firms did best through the mid-1980s. California has taxed production since 1939. As of 1983, current rates equaled 1.4 cents per barrel. Since 1915 the state has levied a conservation tax to finance the regulatory efforts of the

Division of Oil, Gas and Geothermal Resources. California is one of six states that allows local taxation of production.

15. Pre-1945 tri-county oil field activity is surveyed in Wesley G. Johnson and Ronald Nye, eds., *Environmental Hazards and Community Response: The Santa Barbara Experience* (Santa Barbara, Calif.: 1979); Gertrude M. Reith, *Ventura: Life Story of a City*, Ph.D. dissertation, Clark University, 1963; Judith P. Triem, *Ventura County: Land of Good Fortune* (Northridge, Calif: 1985); Walker A. Tompkins and Russell A. Ruiz, *Historical Highlights of Santa Barbara* (Santa Barbara, Calif.: 1989).

16. Union Oil was the result of the merger of three firms: Sespe Oil, Torrey Canyon Oil—both owned by Thomas Bard, a prominent Ventura County landowner — and Hardison & Stewart Oil, a firm founded in 1883 by Lyman Stewart and Wallace Hardison. By 1900, Bard had sold out his interest. Stewart and his son Will moved the firm from Santa Paula to Los Angeles in 1901. A 1906 merger created Standard Oil Company (California). It was the result of the combination of Pacific Coast Oil Company, founded in 1879, and Standard Oil Company (Iowa), a move precipitated by Standard Oil Company of New Jersey. Standard became an independent firm with the 1911 Standard Oil consent decree (and was the only integrated firm of the Standard group). On February 2, 1926, the firm was incorporated in Delaware and reorganized as Standard Oil Company of California ("Still Growing at 75," *Oil & Gas Journal*, September 6, 1954). Shell Company of California was, as of 1915, the renamed American Gasoline Company, a firm founded by Royal Dutch/Shell in 1912. It was integrated with California Oilfields, Ltd., which Royal Dutch/Shell acquired in 1913. The Los Angeles oil boom of the 1920s significantly boosted the fortunes of the firm. In 1922, Shell and Roxana Petroleum, founded by Royal Dutch/Shell in 1912 in Oklahoma, merged with Union Oil Company of Delaware to form Shell Union Oil Company, a holding company of which Royal Dutch/Shell owned 65 percent. In 1939 Shell Company of California and Shell Petroleum Corporation merged to form Shell Oil Company. The firm maintained an office in San Francisco until 1949, when New York became the firm's sole headquarters. For more on the early history of Shell, see *Shell: 75 Years Serving America* (Houston: 1987). Los Nietos was founded by E.L. Doheny in the early 1900s to consolidate his holdings for the benefit for his five grandchildren. It became a wholly-owned subsidiary of Union Oil in October 1949 when Union purchased the firm for $22.4 million in cash and 600,000 shares of Union stock ("Union absorbs Los Nietos," *Oil & Gas Journal* (hereafter referred to as *OGJ*), September 17, 1956.

17. "Tide Water Associated Oil Company Paces Development of Avenue," *Ventura County Star-Free Press* (hereafter referred to as *VCS*), October 19, 1949; "Shell Oil Company Helped Pioneer Ventura Avenue Development," *VCS*, October 19, 1949.

18. Richfield Oil Corporation in its modern form was organized in 1936 through the merger of Rio Grande, whose fortunes flagged during the Depression, and other companies. Richfield's first president, Charles S. Jones, relates the history of the firm in *From the Rio Grande to the Arctic: The Story of the Richfield Oil Corporation* (Norman: 1972).

19. Founded in 1902, The Texas Company (today Texaco, Inc.) reorganized as a Delaware subsidiary of a new Delaware holding company in 1926. The company moved its headquarters from Houston to New York at this time. The holding company, The Texas Corporation, acted as a holding company for The Texas Company of Delaware and The Texas Company of California (the renamed California Petroleum Company) until 1941, when all three firms formed a single

entity, The Texas Company. For more on the early years of Texaco, see James Marquis, *The Texaco Story: The First Fifty Years 1902-1952* (New York: 1953).

20. IWR. Moreover, Union established itself in Cat Canyon and South Mountain fields by 1917.

21. One such firm was Signal Oil and Gas, whose Signal Hill story is told by Walker A. Tompkins in *Little Giant of Signal Hill: An Adventure in American Enterprise* (Englewood Cliffs, N.J.: 1964), 1-38. By 1945, Signal established itself in the tri-county area in Arroyo Grande and Huasna fields of San Luis Obispo Counties and in the Santa Maria valley of Santa Barbara County (IWR).

22. IWR; "Tidewater name may disappear," *OGJ*, June 19,1967. General Petroleum maintained its separate identity as an affiliate of Socony until 1959. For more on the early history of Mobil Corporation, see *A Brief History of Mobil* (New York: 1991); Ralph W. Hidy and Muriel E. Hidy, *Pioneering in Big Business, 1882-1911* (New York: 1955).

23. "Tidewater name may disappear," *OGJ*, June 19, 1967; "Industry braces for new round of major oil firm mergers," *OGJ*, November 12, 1984. This analysis excludes the merger of the Atlantic Refining Company and Richfield Oil in 1965, which did not reduce the number of major firms operating locally.

24. "Officials, Oil Men Speculating on News Barnsdall Oil to Abandon Last Nine Wells in Ellwood Field," *Santa Barbara News-Press* (hereafter referred to as *SBNP*), March 12, 1950; IWR. Barnsdall was incorporated in 1915; Bankline Oil in 1912; Pacific Western in 1928; and Honolulu Oil in 1930. Dates of incorporation for all "first generation" independents herein are taken from the *Twenty-Second Annual Report of the State Oil and Gas Supervisor* (San Francisco: Division of Oil and Gas, 1937). Hereafter all such reports referred to as *ARSOGS*. All reports are published by the Division of Oil and Gas of the Department of Conservation of the State of California (as of 1992 the Division of Oil, Gas, and Geothermal Resources).

25. IWR. Fullerton Oil was a Pasadena firm incorporated in 1899 that had operated in Ventura County's North Tapo field prior to 1915. Sunray was founded in 1920. Signal was incorporated in 1928 after success at Signal Hill established the firm as a leading independent in the state.

26. IWR. Douglas was incorporated in 1935; Oceanic in 1921; Universal Consolidated in 1922; Hancock in 1929; Superior in 1921; and Western Gulf in 1929. Hancock got its start at Signal Hill in 1922 when John W. and L.A. Hancock formed the firm with partners C.H. Windham and W.N. Reagon. Although Hancock specialized in the refining end of the business, Hancock operated in the Huasna area of San Luis Obispo County from 1937. Superior consolidated with Limited Oil Company in 1936 and relisted on the Los Angeles Stock Exchange in 1937. Under William M. Keck, the firm's stock increased from $25 to $1,100 in February 1956. The Keck family owned or controlled 52 percent of the firm, worth $243 million at the time ("Misty Figure in Home Bailiwick," *SBNP*, February 19, 1956).

27. Almost ten times as many wildcat wells were drilled in the mid-1930s by small, non-integrated firms than were drilled by Chandler's twenty major corporations, for example. Indeed, as Atlantic Refining Company president Thornton F. Bradshaw noted in an interview following his firm's merger with Richfield Oil in 1965, although smaller- and medium-sized

companies faced limitations in geography, personnel, and capital, there was still a place in the industry for such enterprises. "Why oil companies merge ...," *OGJ*, 18 April 1966.

28. The other significant onshore field discovery of the postwar period, that of Guadalupe field, was made in 1947.

29. Although tidelands production reached almost 9 million barrels by 1964, this had little effect on the number of operators since this activity was restricted to major firms who for the most part were already active in the county. However, tidelands (and later, OCS) production further entrenched the dominance of large corporations in the industry structure.

30. *Thirty-Seventh ARSOGS* (San Francisco: 1952), 46; *Fiftieth ARSOGS* (Sacramento: 1965), 100-101; Bill Betwright, "'Black Gold' -- Waning Asset," *SBNP*, 15 January 1965.

31. OFN, June 29, 1951.

32. "Cuyama Development Called Most Sensational in California in Years," *VCS*, October 19, 1949; *Thirty-Fifth ARSOGS* (San Francisco: 1950), 54-57. According to Jones, Richfield's organizational structure, which facilitated rapid decision-making on important matters, gave it a competitive advantage in the leasing of of the Cuyama valley. Norris retained a lease of 4,885 acres in Cuyama valley. The firm subleased its 61 producing wells to Richfield, Hancock, and F.C. Griggs Associates, the latter an Exeter, California partnership. The lease had more than 50 producing wells at the end of 1949. Bell Petroleum, originally Alphonzo E. Bell Corporation, was an outgrowth of the money Bell earned on his fee holdings in Los Angeles County's Santa Fe Springs field (OFN, March 31, 1950).

33. *Thirty-Sixth ARSOGS* (San Francisco: 1951), 57-61; *Thirty-Seventh ARSOGS*, 42-46; Hallador Petroleum Company 10-K for fiscal year 1995 (SEC EDGAR database); OFN, July 13, 1950; OFN, March 29, 1953. In September 1950, Russell Ranch field was unitized for control of production from the Dibblee zone. Richfield became the designated unit operator. Effective July 1, 1953 the Dibblee zone of South Cuyama field was unitized, again with Richfield designated the unit operator. The unit included 211 wells and all development wells drilled thereafter. All operators except for Superior (with 17 wells) joined the unit agreement (*Thirty-Ninth ARSOGS*, 73). The federal government benefitted from Cuyama valley development as well. By June 1952 it was receiving some $154,000 per month in royalties (out of a total of $600,000 per month in California from leases in 31 fields) (OFN, June 16, 1952).

34. IWR; OFN, January 23, 1950; OFN, May 24, 1950; OFN, June 5, 1950; OFN, June 10, 1950; OFN, June 29, 1950; OFN, July 7, 1950; OFN, July 14, 1950; OFN, July 16, 1950; OFN, July 28, 1950; OFN, August 6, 1950; OFN, August 9, 1950; August 16, 1950; September 3, 1950.

35. *Thirty-Seventh ARSOGS*, 42-46; *Forty-Seventh ARSOGS* (San Francisco: 1962), 86-87; OFN, March 8, 1953; OFN, March 17, 1954; OFN, March 18, 1954; OFN, August 8, 1954; OFN, September 29, 1954; OFN, October 11, 1954.

36. OFN, August 2, 1950 (quote); OFN, August 5, 1950; "Union to Boost S.M. Oil Output 11,000 Barrels," *SBNP*, September 23, 1950; OFN, October 18, 1950; OFN, October 22, 1950; OFN, November 8, 1950; OFN, November 24, 1950. The demand created an oil well casing shortage as well, which slowed the pace of exploration for some operators through 1952 (OFN, September

18, 1950; OFN, February 14, 1951; OFN, April 22, 1951; OFN, January 1, 1953). Except in Lompoc field, actual returns on this activity were delayed until 1951, when the output at Cat Canyon reached 7.6 million barrels, that at Lompoc reached 2.5 million barrels, and that at Zaca reached 1.6 million barrels. These represented increases of 13, 1,150, and 167 percent, respectively, over 1949 totals (*Thirty-Fifth ARSOGS*, 757; *Thirty-Seventh ARSOGS*, 46).

37. OFN, April 22, 1951; OFN, January 2, 1952; OFN, February 8, 1952; OFN, February 13, 1952; OFN, February 16, 1952; OFN, September 9, 1952; "Union Running Test on Orcutt Field Well," *SBNP*, February 4 , 1953; "2 More Wells Started in County's Newest Oil Development," *SBNP*, April 10, 1953; OFN, June 24, 1954; OFN, September 5, 1954.

38. *Fiftieth ARSOGS*, 71-73; *Forty-Second ARSOGS* (San Francisco: 1957), 95; OFN, March 24, 1953. Thornbury Drilling Company was headed by William M. Thornbury of Los Angeles. The firm had interests in the county's Casmalia, Cat Canyon, and Santa Maria Valley fields, which it sold to Union. Thereafter, Thornbury reconstituted himself as William Thornbury, Inc. and operated in Ventura County (IWR).

39. *Forty-Second ARSOGS*, 95; *Thirty-Eighth ARSOGS* (San Francisco: 1953), 70; OFN, October 4, 1955.

40. OFN, April 2, 1953; "2 More Wells Started in County's Newest Oil Development," *SBNP*, April 10, 1953; OFN, April 24, 1953; OFN, April 6, 1954; OFN, May 6, 1954; OFN, May 13, 1954; "Production Tests Set on Union Oil Betteravia Well," *SBNP*, August 8, 1954; OFN, August 22, 1954; *Thirty-Eighth ARSOGS*, 67; *Thirty-Ninth ARSOGS*, 71-72; *Fortieth ARSOGS* (San Francisco: 1955), 91-93; *Forty-Second ARSOGS*, 93; *Forty-Third ARSOGS* (San Francisco: 1958), 99; *Forty-Fourth ARSOGS* (San Francisco: 1959), 115; *Forty-Seventh ARSOGS*, 86-87; IWR.

41. "Oil Leasing Boom Under Way in the Santa Maria Valley," *SBNP*, February 3, 1951; "North-County Oil Lease Boom Bigger Than at First Reported," *SBNP*, February 4, 1951; "Orcutt Oil Leasing Nearly Complete," *SBNP*, February 27, 1951; OFN, April 4, 1951; OFN, April 16, 1951; *Thirty-Eighth ARSOGS*, 66; IWR.

42. OFN, December 18, 1956.

43. OFN, February 13, 1956.

44. "US Offshore Land Getting Oil Tests," *SBNP*, May 1, 1956. During 1957, the firms set to bid on five state tidelands leases employed nine exploration vessels in the Santa Barbara channel between Naples and Point Conception. As an *SBNP* article noted, this was good for local merchants, electricians, welders, consultants as well as oil workers themselves ("Oil Searchers Busy At Sea," *SBNP*, March 10, 1957).

45. OFN, June 16, 1952; OFN, July 9, 1952; OFN, September 23, 1953; OFN, December 21, 1953; OFN, May 30, 1954 (quote); Monterey Oil was a Long Beach firm founded in 1951 as a successor to the Jergins Oil Company. See section below on the first merger movement for further details on the firm, which Humble purchased in 1961.

46. W.T. Smith, "California Looks to The Sea"; "New Tideland Oil Royalty Plan Nears Final OK," *SBNP*, June 6, 1957; OFN, July 8, 1957. For more on "the politics of oil" see Johnson and

Nye, *Environmental Hazards* and James T. Lima, *The Politics of Offshore Energy Development*, Ph.D. diss., University of California-Santa Barbara, 1994.

47. OFN, July 8, 1956; OFN, August 4, 1956; OFN, October 28, 1956; OFN, December 26, 1956; OFN, January 15, 1957; "County's Oil Potential is Eagerly Eyed," *SBNP*, January 12, 1957; "Assembly Unit Hits Oil Lease," *SBNP*, January 16, 1957; "Tideland Leasing Held Up,: *SBNP*, January 17, 1957; "Tidewater Drills Summerland Hole as a Preliminary," *SBNP*, June 19, 1957; Smith, "California Looks to The Sea"; *Forty-Third ARSOGS*, 116; OFN, February 10, 1958. Tidewater's Summerland lease failed to produce results. Standard and Humble spent between them $25 million to drill the first 10 wells from the platform, according to former Honolulu Oil geologist John F. Curran ("Oil Industry Scope Is Pointed Out," *SBNP*, February 16, 1960). The engineering practices employed in the construction of the platform were "revolutionary," according to David Goodwill, superintendent of the Carpinteria district for Standard. For instance, the effort required a 13,000-foot power cable, the longest ever fabricated in one piece ("Offshore Oil Job Explained To Lions Club," *SBNP*, October 17, 1958).

48. *Forty-Fourth ARSOGS*, 116; "55 Million Tideland Bid Points to Huge Oil Pool," *SBNP*, June 28, 1958; OFN, July 2, 1958.

49. *Forty-Fifth ARSOGS* (San Francisco: 1960), 92-93; *Forty-Seventh ARSOGS*, 87, 125-127; James Schermerhorn, "Picture Cleared On Tideland Oil," *SBNP*, June 19, 1960.

50. OFN, February 13, 1956; "Oil Activity In County at 'Extreme Low'," *SBNP*, February 15, 1956; :Oil Report Shows Many Dry Holes," *SBNP*, September 20, 1956.

51. *Forty-Third ARSOGS*, 100-101.

52. "Oil Drilling in Area Stepped Up," *SBNP*, June 19, 1957; OFN, June 13, 1957; OFN, June 28, 1957; OFN, August 17, 1957; "Oil Drilling Seems To Be Slowing Now," *SBNP*, September 8, 1957; "Oil Industry Problems Told In County Report," *SBNP*, January 5, 1958; "Only 2 County Oil Rigs in Operation," *SBNP*, March 14, 1958; "Drilling Cutbacks Seen 'Leveling Off'," *SBNP*, May 15, 1958. Twenty-three of the twenty-six wells drilled in the county in 1959 were dusters. John F. Curran, independent geologist, estimated the cost of drilling a 5,000 foot well in the county to be about $60,000 in 1960. He estimated the cost of a 15,000 foot well at more than $500,000 ("Oil Industry Scope Is Pointed Out," *SBNP*, February 16, 1960). Further, the assessed valuation of the mineral rights in the county's oil fields for fiscal year 1959 fell 12 percent to $69.79 million, according to County Assessor Harry W. Holmquist ("County Oil Values Drop 12 Per Cent," *SBNP*, June 18, 1959).

53. *Forty-Seventh ARSOGS*, 86-87.

54. Bill Betwright, "'Black Gold'—Waning Asset," *SBNP*, January 15, 1965.

55. Indeed, in the early 1960s operators confined almost all of their exploration activities to offshore areas. For instance, in 1962, 22 of the 26 exploratory wells drilled in the county were located offshore or on lands immediately adjacent to offshore leases. For 1963 and 1964, the numbers were 13 of 14 and 37 of 43, respectively (*Forty-Eighth ARSOGS* (San Francisco: 1963), 150; *Forty-Ninth ARSOGS* (San Francisco: 1964), 116-117; *Fiftieth ARSOGS* (Sacramento: 1965), 152).

56. IWR; *Forty-Seventh ARSOGS* (San Francisco: 1962), 86-87; *Fifty-First ARSOGS* (Sacramento: 1966), 151-152, 95-96; *Fifty-Third ARSOGS* (Sacramento: 1968), 17-18, 48-49; *Fifty-Fourth ARSOGS* (Sacramento: 1969), 15-16, 48-49; *Fifty-Fifth ARSOGS* (Sacramento: 1970), 16-17; *Fifty-Seventh ARSOGS* (Sacramento: 1972), 27-28, 66-67; *Sixtieth ARSOGS* (Sacramento: 1975), 39-40, 85-87.

57. Operators of offshore leases acted on behalf of all parties to the lease, often two or more firms. While many combinations involved the major operators themselves, several well-capitalized independent firms participated as well. Nonetheless, tidelands operations privileged the major operator.

58. *Fiftieth ARSOGS*, 100-101; *Fifty-Fourth ARSOGS*, 48-49; *Sixty-Third ARSOGS* (Sacramento: 1978), 4; *Seventieth ARSOGS*, 52-74.

59. *Forty-Eighth ARSOGS*, 150; *Forty-Ninth ARSOGS*, 116-117; *Fiftieth ARSOGS*, 152-153; *Fifty-First ARSOGS*, 152; "California set for biggest lease sale," *OGJ*, May 16, 1966; "San Miguel Island bids sink over seals, sea lion," *OGJ*, August 15, 1966; "Interest sags in California's offshore sales," *OGJ*, August 22, 1966.

60. *Forty-Eighth ARSOGS*, 149-150; *Fiftieth ARSOGS*, 100-101; *Fifty-Second ARSOGS* (Sacramento: 1967), 87-88; *Fifty-Fourth ARSOGS*, 48-49; "Offshore California slated for drilling," *OGJ*, January 17, 1966; "Heidi goes to work off California," *OGJ*, January 31, 1966.

61. *Forty-Seventh ARSOGS*, 86-87; *Fifty-First ARSOGS*, 95-96; *Fifty-Fourth ARSOGS*, 48-49; *Fifty-Seventh ARSOGS*, 66-67; *Sixtieth ARSOGS*, 81-86; *Seventieth ARSOGS*, 52-74. Operators located several new fields or pools on existing leases between 1982 and 1985 after the state allowed exploration in these areas to resume. As of 1995 all remain undeveloped.

62. "California offshore tract draws huge bid," *OGJ*, December 26, 1966; *Fifty-Second ARSOGS*, 88; *Fifty-Fourth ARSOGS*, 16-17. The federal government allowed operators to resume drilling on OCS leases in December 1970.

63. OFN, March 24, 1950; OFN, April 17, 1950; OFN, April 19, 1950.

64. OFN, September 10, 1950; "Carpinteria Site OKed for Oil Facilities," *SBNP*, April 23, 1959; "Big Tanker Loaded With Offshore Oil," *SBNP*, April 19, 1960; James Schermerhorn, "Picture Cleared On Tideland Oil," *SBNP*, June 19, 1960. Prior to the completion of its pipeline to Gaviota, Tidewater trucked distillate in from Ventura. Infrastructure could be destroyed as well as constructed. Within 12 days in 1950, Sunray's refinery southwest of Santa Maria exploded and caught fire and a $250,000 fire destroyed Union Oil's Orcutt compressor plant (*SBNP*, July 12, 1950).

65. "New Refinery Plant Hinted for Santa Maria," *SBNP*, October 15, 1953; "'Maybe' Is Union Oil Answer to Coke Plant In Nipomo Mesa Area," *SNBP*, October 22, 1953.

66. Rubel quoted in "New Refinery Plant Hinted for Santa Maria," *SBNP*, October 15, 1953; OFN, August 18, 1950.

67. Gene T. Kinney, "What's behind the rash of sellouts by oil producers?" *OGJ*, January 22, 1962. Kinney reported that more than 700 mergers and buyouts occurred between 1954 and 1961 alone.

68. Ted A. Armstrong, "California output hits comeback trail," *OGJ*, February 7, 1966.

69. Kinney, "What's behind?"

70. Kinney, "What's behind?"; Gene T. Kinney, "Merger prospects harder to find," *OGJ*, November 23, 1964; "Oil merger deals hit new high in '65," *OGJ*, March 14, 1966.

71. During this period the Justice Department, the Federal Trade Commission, and the courts returned to the Brandeisian theory held during the late 1930s that keeping companies from growing too large would stimulate competition. Yet big deals and thousands of smaller deals did go through. Only if mergers involved firms in the top twenty nationally or locally in terms of assets, sales, or production were they subjected to scrutiny. Even then, the merger generally was attacked only if the two firms were competitors in any market whose combined market share exceeded 15 percent, if one firm was a customer of the other, or if the Justice Department determined that corporate expansion could have been realized through internal growth. On antitrust policy and the oil industry from the New Deal to the 1960s, see for instance Roy C. Cook, *Control of the Petroleum Industry by Major Oil Companies* (Washington: 1941), Harold L. Ickes, *Fightin' Oil* (New York: 1943), David S. Painter, *Oil and the American Century: The Political Economy of US Foreign Oil Policy, 1941-1954* (Baltimore: 1986), 11-74, and Nash, *United States Oil Policy*, 128-179. On policy in the 1950s-60s, see "What are a merger's chances?".*OGJ*, November 23, 1964; "Market power is merger test," *OGJ*, March 14, 1966.

72. The "ABC method" had been used since the 1940s. Its advantage to buyers was that its tax treatment increased the value of proven oil reserves by approximately 20 percent. Its popularity was affirmed when the IRS favorably resolved in 1962 that oil payments in such deals would be treated as a capital gain to be assessed at 25 percent rather than ordinary income to be taxed at 52 percent, thereby making buyout prices offered to selling firms higher than they otherwise would have been. Kinney, "What's behind?"; Kinney, "Merger prospects."

73. "Selected list of sales and mergers, 1954-1961," *OGJ*, January 22, 1962; IWR.

74. "Selected list of producer sellouts and mergers, 1962-1964," *OGJ*, November 23, 1964; IWR.

75. "Selected list of sales and mergers, 1954-1961," *OGJ*, January 22, 1962; "Signal Oil, Hancock Merger OKed," *SBNP*, December 5, 1958; IWR.

76. OFN, February 2, 1959; "Gas Price Boost Seen by Mosher," *SBNP*, June 7, 1959; "Signal Oil, Gas Co. Sales Rise in '60; Earnings Increase," *SBNP*, February 16, 1961.

77. "Continental-Douglas Merger Approved," *OGJ*, February 20, 1961; IWR.

78. "Honolulu Oil Offers Received," *SBNP*, February 16, 1961; "Honolulu Oil sale finally wrapped up after lengthy delay," *OGJ*, October 23, 1961; Gene T. Kinney, "What's behind?"; Gene T. Kinney, "Merger prospects."

79. "Oil merger deals hit new high"; IWR.

80. "Oil Industry Problems Told In County Report," *SBNP*, January 5, 1958.

81. "Why Socony Mobil Reorganized," *OGJ*, February 1, 1960; IWR.

82. "Gulf to buy West Coast firm," *OGJ*, March 12, 1962.

83. "Union Absorbs Los Nietos," *OGJ*, September 17, 1956; IWR.

84. *International Directory*, 570; "Oil merger deals hit new high."

85. "Oil merger deals hit new high"; "Big year ahead for Atlantic Refining, *OGJ*, January 3, 1966; "Atlantic reorganizes to cover broader base," *OGJ*, January 10, 1966; "Why oil companies merge...," *OGJ*, April 18, 1966.

86. "Arco, Sinclair push hard for proxies," *OGJ*, December 16, 1968, 52-53; "Arco claims lead in Sinclair takeover," *OGJ*, December 30, 1968, 87.

87. "Justice eyes Tidewater-Phillips deal," *OGJ*, April 4, 1966; "Justice raising new barriers to mergers," *OGJ*, July 18, 1966; "Phillips-Tidewater deal clears hurdle," *OGJ*, July 18, 1966; "Let Phillips fight not buy, US urges," *OGJ*, August 15, 1966; "Phillips wins again in Tidewater scrap," *OGJ*, August 29, 1966; "Tidewater name may disappear," *OGJ*, June 19, 1967; "Directors approve Tidewater merger," *OGJ*, July 31, 1967; Lenzner, *The Great Getty*, 143-148. Getty Oil, with interests in the Middle East and large investments in US refineries, was hit hard by the mandatory import program established in 1959. Tidewater, as an integrated firm, lost 17 percent of its retail gasoline market share from 1960 to 1963 owing to fierce price wars on the west coast. By getting rid of the uneconomic bits of the now debt-ridden Tidewater and merging the two firms, Getty created financially stable firm, but one that concentrated on exploration and production.

88. "Sun, Sunray merger finally complete," *OGJ*, November 4, 1968; "Merger of Sunoco, Sunray on target," *OGJ*, June 29, 1970; "Sunray Woos Mid-Continent," *OGJ*, January 24, 1955; "Directors Back Merger," *OGJ*, January 31, 1955; IWR. The average daily output of the new Sun Oil Company continued to decline as well. In 1970 it was 25 percent below Sunray's 1960 total.

89. Ted A. Armstrong, "California output hits comeback trail," *OGJ*, February 7, 1966; "California hits production high," *OGJ*, December 11, 1967; "Californians look past beaches for oil," *OGJ*, November 6, 1967; "California's offshore oil output soars in past decade," *OGJ*, September 23, 1968; *Fifty-Fourth ARSOGS* (Sacramento: 1969).

90. *Sixty-First ARSOGS* (Sacramento: 1976), 1-3; *Sixty-Seventh ARSOGS* (Sacramento: 1982), 36; *Seventy-Second ARSOGS* (Sacramento: 1987), 1-3.

91. McFarland Energy of Santa Fe Springs was incorporated in California as Jade Oil Company in 1972. Jade changed its name to Seaboard Oil & Gas before adopting the current name. McFarland reincorporated in Delaware in July 1987. During the 1960s, 1970s, and 1980s, the firm operated in all three tri-counties, including Barham Ranch (1965-1968) and Santa Maria

Valley (1972-1989) in Santa Barbara County (IWR; McFarland Energy, Inc. 10-K for fiscal year 1995, SEC EDGAR database).

92. Argo was founded as Imperial Oil & Gas, Ltd. in December 1963. Based in Santa Monica, the firm operated in five fields of Ventura County as well as in the Santa Maria Valley field until 1987 (IWR; *Fifty-Eighth ARSOGS* (Sacramento: 1973), 34; "Argo Corp. completes five California wells," *SBNP*, July 11, 1973; "9 new wells in S.M. Valley field put on steady production by Argo," *SBNP*, February 9, 1974; Chet Holcombe, "Dentist finds richer drilling," *SBNP*, July 15, 1974).

93. McCulloch during the 1960s and 1970s operated in Hopper Canyon, Sespe, and Ventura fields of Ventura County, as well as Los Alamos (IWR; *Fifty-Eighth*, 34).

94. Incorporated as California-Time Petroleum Company in 1966, the Beverly Hills firm operated in Cat Canyon and Santa Maria Valley fields of Santa Barbara County and Rincon and South Mountain field of Ventura County during this period (IWR; Petrominerals Corporation 10-K for fiscal year 1996, SEC EDGAR database).

95. Pyramid Oil, founded in 1909, operated in Ojai field from 1942 to 1969, in Cat Canyon field of Santa Barbara County since 1973 and in Orcutt field from 1972 to 1977. The firm, which relocated to Bakersfield in 1987 from Santa Fe Springs (IWR; Pyramid Oil Company 10-K for fiscal year 1995, SEC EDGAR database).

96. Incorporated in May 1920, Occidental made its first tri-county investment at Cat Canyon in 1956, where it remained until 1983. Oxy was also active in Santa Maria Valley and Zaca fields as well as four Ventura County fields during this period (IWR).

97. Celanese's oil and gas subsidiary was Champlin Petroleum Company, which it acquired in 1964 in a $197 million stock deal. Celanese sold the firm, founded in 1916, to Union Pacific Railroad in 1970. Locally, the firm operated in Ventura County's West Montalvo field from 1968 to 1974 and Santa Barbara County's Careaga Canyon field from 1985 to 1988. UP changed the name of the firm to Union Pacific Resources (UPR) in 1986. In 1996, UP spun off UPR as a large independent firm (IWR; "Selected list of producer sellouts and mergers, 1962-1964," *OGJ*, November 23, 1964; "Majors, chemical firms want to buy reserves," *OGJ*, November 23, 1964; *Annual Employees' Report to Shareholders 1996* (Fort Worth: Union Pacific Resources Group, Inc., 1997).

98. IWR; *Fifty-Third ARSOGS* (Sacramento: 1968), 17-18, 48-49; *Fifty-Fourth ARSOGS* (Sacramento: 1969), 15-16, 48-49; *Fifty-Fifth ARSOGS* (Sacramento: 1970), 16-17; *Fifty-Seventh ARSOGS* (Sacramento: 1972), 27-28, 66-67; *Sixtieth ARSOGS* (Sacramento: 1975), 39-40, 85-87.

99. Robert H. Sollen, "Area oil production drops; prices keep revenues up," *SBNP*, January 8, 1975; Robert H. Sollen, "Oil production continues decline here during 1975," *SBNP*, January 8, 1976; Robert H. Sollen, "North County oil fields drying up," *SBNP*, March 11, 1976; Robert H. Sollen, "Report on county oil production shows minimum decline for '76," *SBNP*, December 30, 1976; "Onshore output up slightly in '77," *SBNP*, January 15, 1978; :oil production in California increased 8.2% last year," *SBNP*, February 15, 1978; Robert H. Sollen, "Oil production in county continues steady decline," *SBNP*, January 10, 1979; "State oil production up slightly in '79,"

SBNP, February 14, 1980; Robert Sollen, "Onshore production of oil shows gain," *SBNP*, July 19, 1981.

100. The annual production of South Cuyama fell from 11.2 million barrels in 1961 to 392,000 barrels in 1984. That of Russell Ranch plummeted from 1.7 million barrels in 1961 to 177,000 in 1984. In contrast, the 1984 output of Cat Canyon, Santa Maria Valley, Casmalia, and Orcutt fields still exceeded their respective 1961 totals (*Forty-Seventh ARSOGS*, 86-87; *Seventieth ARSOGS*, 55-72).

101. *Sixtieth ARSOGS*, 85-87; *Seventieth ARSOGS* (Sacramento: 1985), 15-17, 55-72.

102. *Seventieth ARSOGS*, 5-9. Three platforms were in OCS fields off Ventura County: Gina at Hueneme (Union) and Grace (Chevron) and Gilda (Union) at Santa Clara. Texaco's Platform Habitat produced natural gas from Pitas Point field. State tidelands leases contained seven platforms, two of which (Texaco's Herman and Helen, at Conception and Cuarta fields, respectively) no longer produced oil. Humble was renamed Exxon Corporation in 1972. Standard changed its name to Chevron in 1984.

103. IWR; Union became a unit operator for Santa Maria Valley in 1965, which initially diminished the number of operators in the field by nearly 50 percent. New entrants thereafter kept the average number of operators between 15-20 through 1985 (IWR).

104. IWR. Ventura had many more onshore producing fields than did Santa Barbara County. For instance, in 1974, Santa Barbara County had 13 active onshore fields; Ventura County had 35.

105. IWR.

106. Cowan and Hagar, "Major US oil firms"; "The OGJ 400," *OGJ*, October 17, 1983.

107. IWR; "Whatever happened to Getty and Gulf?" *The Economist*, February 21, 1987; "How Texaco lost sight of its star," *The Economist*, April 18, 1987; Marcia Parker, "Industry braces for new round of major oil firm mergers," *OGJ*, November 12, 1984; Lenzner, *The Great Getty*, 220-228.

108. IWR; "The OGJ 400: Big firms do well; most small ones don't," *OGJ*, September 10, 1984; "Plans unveiled for Chevron/Gulf operations," *OGJ*, December 3, 1984; "Whatever happened to Getty and Gulf?" *The Economist*, February 21, 1987; *Seventieth ARSOGS*, 32; Parker, "Industry braces" (quote).

109. Parker, "Industry braces"; "FTC approves Mobil's acquisition of Superior," *OGJ*, May 21, 1984; "Mobil Company History," Mobil webpage, November 13, 1997.

110. IWR; "Marathon to acquire Husky Oil Co,." OGJ, November 1981; "Marathon buys Husky's upsstream assets," OGJ, June 11, 1984.

111. "The wasteful games of America's corporate raiders," *The Economist*, June 1, 1985.

112. "More pickings," *The Economist*, December 8, 1984; "Phillips battle paces merger activity," *OGJ*, December 17, 1984; "Market discipline," *The Economist*, March 9, 1985; "More arms, more raiders," *The Economist*, April 20, 1985; "Once and future raiders," *The Economist*, May 25, 1985.

113. Edward G. Jefferson quoted in Richard Wheatley, "DuPont, Conoco agree to big merger," *OGJ*, July 13, 1981.

114. Oil prices fell from $30 per barrel to $10-12 in 1986-7.

115. "Big oil turns manic depressive," *The Economist*, February 15, 1986.

116. Berry Petroleum Company, 10-K report for fiscal year 1995 (SEC EDGAR database).

117. Bob Williams, "Gaining more access is focus on West Coast," *OGJ*, March 14, 1988; Don Cowan and Rick Hagar, "Major US oil firms stress efficiency, productivity," *OGJ*, May 2, 1983.

118. For instance, "Government Point" OCS field, discovered in 1968, "Sacate" OCS field, discovered in 1970, "Santa Rosa" OCS gas field, discovered in 1978, and "Gato Canyon" and "Smugglers Cove" OCS fields, both discovered in 1985, remain undeveloped. In several cases, operators have relinquished their leases (James M. Galloway, "Chronology of Petroleum Exploration in the Santa Barbara Channel," Minerals Management Service, Office of Resource Evaluation, Camarillo, California, undated). Thirty leases remain untapped in OCS waters off the north Santa Barbara County coast. As of October 1997, Shell and Mobil, via their joint venture Aera Energy LLC, owned 23; Torch Operating Company retained seven (Melinda Burns, "Oil, gas proposal stirs debate in San Luis Obispo," *SBNP*, October 26, 1997).

119. *Eighty-First ARSOGS*, 10-11, 63; Brett Johnson, "Oil dumping fuels heated safety wrangle," *VCS*, October 14, 1997 (table).

120. IWR; "The axeman cometh," *The Economist*, May 5, 1985; "Refining the oil industry," *The Economist*, May 11, 1985; "Capping oil's big gusher," *The Economist*, January 17, 1987; Robert J. Beck and Laura Bell, "The OGJ 200: Consolidation Shrinks List of US Companies," September 2, 1996.

121. "Big Oil turns manic depressive," *The Economist*; February 15, 1986; "Even Big Oil must shrink," *The Economist*; April 5, 1986; "Skidding, all in a row," *The Economist*; November 22 1986; Jim West, "Crash of '86 jolts independents' operations, " *OGJ*, October 27, 1986; "Oxy plans $1.4 billion in asset purchases, sales," *OGJ*, May 26, 1986. Occidental's plight owed much to debts incurred to finance its $4.1 billion acquisition of Cities Service of Tulsa in December 1982.

122. IWR; Glenda Smith, "More companies in OGJ400 made more money in fiscal 1987," *OGJ*, September 12, 1988.

123. IWR; Sage Energy 10-K for fiscal year ending June 30, 1995 (SEC EDGAR database).

124. "A soothing sound of drills," *The Economist*; November 21, 1987; "Call up the reserves," *The Economist*; September 3, 1988.

125. IWR; "Lean machines," *The Economist*; September 23, 1989; *VCS*, August 17, 1990.

126. IWR; *VCS*, April 6, 1993.

127. IWR; Vintage Petroleum 10-K for fiscal year 1996 (SEC EDGAR database); Beck and Bell, "Consolidation Shrinks List."

128. IWR; "Industry Briefs," *OGJ*, February 26, 1996; Nuevo Energy Company 10-K for fiscal 1996 (SEC EDGAR database); *Nuevo Energy Company Annual Report to Shareholders for 1996* (Houston: 1997). Torch remains the operator of Barham Ranch and Lompoc fields and of six platforms in the Santa Barbara channel. Nuevo operates three channel platforms in three OCS fields (Pitas Point, Dos Cuadras, and Point Pedernales). Although Torch and Nuevo are now separate firms, both have the same "parent" in Torch Energy Advisors. Indeed, as of 1997 Division of Oil and Gas records show Torch to be the operator of many of the onshore properties that Nuevo acquired from Unocal.

129. IWR; *A New World, A New Unocal: 1996 Annual Report* (El Segundo: 1997); *Eighty-First ARSOGS*, 29, 35.

130. IWR; Saba Petroleum 10-K for fiscal 1995 (SEC EDGAR database); Saba Petroleum 10-KSB for fiscal 1996 (SEC EDGAR database); Hallador Petroleum Company 10-K for fiscal 1995 (SEC EDGAR database).

131. IWR; Berry Petroleum Company 10-K for fiscal year 1995 (SEC EDGAR database); IWR; Pyramid Oil Company 10-K for fiscal year 1995 (SEC EDGAR database).

132. IWR; Fortune Petroleum 10-K for fiscal year 1996 (SEC EDGAR database).

133. IWR; Petrominerals Corporation 10-K for fiscal year 1996 (SEC EDGAR database).

134. IWR; Johnson, "Oil dumping" (table).

135. IWR; *Personnel Directory of the Conservation Committee of California Oil & Gas Producers* (Bakersfield: CCCOGP, 1996.

136. This supports the conclusion that Relative to industries such as autos, chemicals, pharmaceuticals, and steel, as an extractive industry the upstream sector of the oil industry remains competitive. Barriers to entry remain lower. Moreover, as a commodity, price is a given to any single operator. Thus, as long as the economics of extracting crude oil reserves remain favorable, a variety of firms will compose the industry structure at the local level even as it becomes more concentrated at the state and national level. This contrasts with downstream refining and marketing functions, which remain in the hands of far fewer, better capitalized firms.

Table 3.2.1: Leading tri-county oil producers, December 31, 1949

	Producing or potentially producing wells	Percentage of CA production in tri-counties
1. Union Oil Company	910	45
2. Shell Oil Company	492	21
3. Tidewater Associated Oil Company	294	15
4. The Texas Company (Texaco)	259	26
5. Richfield Oil Corporation	257	29
6. Pacific Western Oil Corporation	176	37
7. General Petroleum Corporation	121	7
8. Signal Oil & Gas Company	113	33
9. Chanslor-Canfield Midway Oil Company	105	12
10. Continental Oil Company	98	49
11. Hancock & General	61	100
12. Sunray Oil Company	51	98
13. Bell Petroleum Company	47	100
14. F.E. Fairfield	40	100
15. Standard Oil of California	38	1
16. Barnsdall Oil Company	36	12
17. Bishop Oil Company	34	16
18. Rice Ranch Oil Company	29	100
19. Lloyd Corporation	28	90
20. Superior Oil Company	27	8
20. Los Nietos Company	27	44
22. The Hancock Oil Company of California	17	16
22. Bankline Oil Company	17	15
24. Douglas Oil Company of California	16	73
25. Thornbury Drilling Company	16	100

Source: *Thirty-Fifth Annual Report of the State Oil and Gas Supervisor* (San Francisco: Division of Oil and Gas, 1950).

Table 3.2.2: California crude oil production, December 1950

	Producing wells (January 1950)	1950 Adverage production (barrels per day)
1. Standard Oil Company of California	3,758	98,403
2. Shell Oil Company	1,743	65,955
3. Union Oil Company	1,536	53,219
4. Richfield Oil Corporation	608	56,983
5. City of Long Beach	384	42,142
6. Tidewater Associated Oil Company	878	36,988
7. Union Pacific Railroad Company	498	35,222
6. General Petroleum Corporation	1,192	34,889
8. Southwest Exploration Company	200	26,675
9. Signal Oil & Gas Company	274	20,675
10. Barnsdall Oil Company[a]	220	19,364
11. The Texas Company	677	17,331
12. Continental Oil Company	170	14,507
13. Superior Oil Company	241	11,832
14. Chanslor-Canfield Midway Oil Company	761	10,864
15. The Hancock Oil Company of California	109	9,352
16. Western Gulf Oil Company	137	7,927
17. Pacific Western Oil Corporation	414	7,392
18. Universal Consolidated Oil Company	206	6,913
19. Honolulu Oil Corporation	284	5,975
20. Jergins Oil Company	177	5,151
21. Lloyd Corporation, Ltd.	30	4,643
22. Amerada Petroleum Corporation	106	4,074
23. Kern Oil Company Limited	389	3,712
24. Belridge Oil Company	123	3,448
25. Bankline Oil Company	85	3,429
Total Six Major Companies (General Petroleum, Richfield, Shell, Standard, Texas, Union)	11,208[b]	318,757
Principal Minor Companies	7,536[b]	304,352
All Other Companies	8,329[b]	272,485
Total California	27,073[b]	895,594

Notes: [a]- Sunray Oil Corporation acquired Barnsdall as of August 1950: Barnsdall production figures are for January 1950.
[b] - December 1950 figures.

Source: *Annual Review of California Crude Oil Production* (Los Angeles: Conservation Committee of California Oil Producers, 1951).

Table 3.2.3: Leading Santa Barbara County oil producers, December 31, 1949

	Producing or potentally producing wells
1. Union Oil Company	732
2. Richfield Oil Corporation	137
3. Shell Oil Company	110
4. Pacific Western Oil Corporation	78
5. Signal Oil & Gas Company	77
6. Hancock & General	61
7. Sunray Oil Company	51
8. Bell Petroleum Company	47
9. General Petroleum Corporation	43
10. Barnsdall Oil Company	36
11. Standard Oil Company of California	30
12. Rich Ranch Oil Company	29
13. Bishop Oil Company	27
14. Tidewater Associated Oil Company	19
15. Douglas Oil Company of California	16
15. Thornbury Drilling Company	16
17. Superior Oil Company	15
18. Bankline Oil Company	11
18. Crown Oil Company	11
20. W.R. Gerard	10

Source: *Thirty-Fifth Annual Report of the State Oil and Gas Supervisor* (San Francisco: Division of Oil and Gas, 1950).

Table 3.2.4: Leading Santa Barbara County oil producers, December 1960

	Producing wells
1. Union Oil Company	624
2. Richfield Oil Company[a]	375
3. Signal Oil & Gas Company	83
4. Shell Oil Company	71
5. Socony Mobil Oil Company	71
6. Sunray Mid-Continent Oil Company	68
7. Standard Oil Company of California	59
8. Getty Oil Company	52
9. Tidewater Oil Company	37
10. Douglas Oil Company	23
11. Rice Ranch Oil Company	20
12. MJM&M Oil Company	18
13. Monterey Oil Company	8
14. Victory Oil Company	7
14. W.R. Gerard	7

Notes: - Includes joint operations.
[a] - Includes 306 wells operated as unit operator in Cuyama South and Russell Ranch fields.

Source: *Forty-Sixth Annual Review of California Crude Oil Production* (Los Angeles: Conservation Committee of California Oil Producers, 1961).

Table 3.2.5: California crude oil production, December 1960

	Producing wells	1960 Adverage production (barrels per day)
1. Standard Oil Company of California	5,511	116,308
2. Richfield Oil Corporation	1,027	81,967
3. Union Oil Company	2,253	74,416
4. Shell Oil Company	2,907	73,826
6. Socony Mobil Oil Company	2,333	51,963
7. Signal Oil & Gas Company	1,005	46,175
8. Tidewater Oil Company	2,223	43,639
9. Texaco, Inc.	1,333	41,351
10. City of Long Beach	796	35,219
11. Union Pacific Railroad Company	282	19,423
12. Superior Oil Company	262	18,689
13. Honolulu Oil Corporation	329	12,754
14. Monterey Oil Company	411	11,545
15. Sunray Mid-Continent Oil Company	348	11,459
16. US Navy	269	11,066
17. Chanslor Western Oil & Development	1,040	9,435
18. Belridge Oil Company	903	9,398
19. Humble Oil and Refining Company	120	8,926
20. Continental Oil Company	244	8,287
21. Reserve Oil & Gas Company	97	6,650
22. Producing Properties, Inc.	547	6,430
23. Texaco Seaboard, Inc.	13	6,424
24. Gulf Oil Corporation of California	286	6,260
25. Universal Consolidated Oil Company	256	6,091
Total Six Major Companies (Socony Mobil, Richfield, Shell, Standard, Texaco, Union)	15,364	439,831
Larger Independent Companies	13,032	332,006
All Other Companies	7,313	58,899
Total California	35,709	830,736

Note: Actual production includes unit interest; number of wells includes only company-operated wells and joint operations.

Source: *Annual Review of California Crude Oil Production* (Los Angeles: Conservation Committee of California Oil Producers, 1961).

Table 3.2.6: Leading tri-county oil producers, December 1960

	Producing wells[a]	Percentage of CA production in tri-counties [b]
1. Union Oil Company[c]	909	40
2. Shell Oil Company	840	29
3. Richfield Oil Company[d]	489	32
4. Tidewater Oil Company	388	17
5. Texaco, Inc.[e]	323	22
6. Socony Mobil Oil Company	209	9
7. Standard Oil Company of California	200	4
8. Chanslor Western Oil & Development	162	16
9. Continental Oil Company	142	58
10. Getty Oil Company	141	35
11. Lloyd Corporation	86	97
12. Signal Oil & Gas Company	83	8
13. Sunray Mid-Continent Oil Company	68	20
14. Humble Oil & Refining Company	46	38
15. Producing Properties, Inc.	28	5
16. Superior Oil Company	27	10
17. F.E. Fairfield	24	100
17. Monterey Oil Company	24	6
19. Douglas Oil Company	23	32
20. British-American Oil Producing Company	22	92

Notes:
[a]- Includes joint operations.
[b]- Assumes net wells equal to 80 percent of gross wells in unit operations where firm performed as operator of the unit; otherwise, unit operations not factored in.
[c]- Includes 16 wells operated as unit operator in South Mountain field.
[d] - Includes 306 wells operated as unit operator in Cuyama South and Russell Ranch fields.
[e]- Includes 73 wells operated as unit operator in Shiells Canyon field.

Source: *Forty-Sixth Annual Review of California Crude Oil Production* (Los Angeles: Conservation Committee of California Oil Producers, 1961).

Table 3.2.7: California crude oil production, December 1970

	Producing wells	1970 Adverage production (barrels per day)
1. City of Long Beach	762	163,539
2. Standard Oil Company of California	6,663	151,528
3. Getty Oil Company	4,817	104,615
4. Union Oil Company	1,836	77,286
5. Shell Oil Company	4,087	66,312
6. Mobil Oil Corporation	1,903	60,493
7. Texaco, Inc.	1,354	44,825
8. Signal Oil & Gas Company	835	42,389
9. Atlantic-Richfield Oil Company	993	42,032
10. Chanslor Western Oil & Development	1,476	27,639
11. Union Pacific Railroad Company	136	27,234
12. Gulf Oil Company	920	23,876
13. Belridge Oil Company	1,882	16,601
14. Occidental Petroleum Corporation	142	15,570
15. Phillips Petroleum Company	72	14,585
16. Continental Oil Company	309	13,084
17. Tenneco Oil Company	839	12,445
18. Humble Oil and Refining Company	620	11,674
19. Sun Oil Company	406	8.717
20. Superior Oil Company	182	7,591
21. Westates Petroleum Company	362	6,605
22. M.H. Whittier Corporation	270	4,930
23. G.E. Kadane & Sons	173	3,568
24. US Navy	149	3,252
25. McCulloch Oil Corporation	197	3,028
Total Six Major Companies (Mobil, Atlantic-Richfield, Shell, Standard, Texaco, Union)	16,836	442,476
Larger Independent Companies	16,709	539,898
All Other Companies	4,185	36,612
Total California	37,730	1,018,986

Note: - Actual production includes unit interest; number of wells includes only company-operated wells and joint operations.

Source: *Annual Review of California Crude Oil Production* (Los Angeles: Conservation Committee of California Oil Producers, 1971).

Table 3.2.8: Leading tri-county oil producers, December 1970

	Producing wells	Percentage of CA production in tri-counties
1. Union Oil Company[a]	937	51
2. Shell Oil Company	756	18
3. Atlantic-Richfield Oil Company[b]	427	38
4. Getty Oil Company	407	8
5. Texaco, Inc.[c]	294	21
6. Standard Oil Company of California	293	4
7. Continental Oil Company	231	75
8. Chanslor Western Oil & Development	132	9
9. Mobil Oil Corporation	117	6
10. Lloyd Corporation	76	100
11. Phillips Petroleum Corporation	72	100
12. Signal Oil & Gas Company	55	7
13. Home-Stake Production Company	36	92
14. Sun Oil Company	29	7
15. Gulf Oil Company	28	3
15. Norris Oil Company	28	85
17. Superior Oil Company	25	14
18. Humble Oil & Refining Company	23	4
19. Wilfred G. Haigh	18	100
20. Ojai Oil Company	14	100

Notes: - Includes joint operations.
- Assumes net wells equal to 80 percent of gross wells in unit operations where firm performed as operator of the unit; otherwise, unit operations not factored in.
[a] - Includes 16 wells operated as unit operator in South Mountain field and 164 wells operated as unit operator in Santa Maria Valley field.
[b]- Includes 234 wells operated as unit operator in Cuyama South and Russell Ranch fields.
[c]- Includes 32 wells operated as unit operator in Shiells Canyon field.

Source: *Fifty-Sixth Annual Review of California Crude Oil Production* (Los Angeles: Conservation Committee of California Oil Producers, 1971).

Table 3.2.9: California crude oil production, December 1980

	Producing wells	1980 Adverage production (barrels per day)
1. US Navy	1,112	128,241
2. Chevron Corporation	6,625	127,942
3. Getty Oil Company	5,637	114,383
4. Shell Oil Company	3,646	84,153
5. City of Long Beach	774	71,505
6. Kernridge Oil Company	3,053	49,083
7. Mobil Oil Corporation	2,268	43,304
8. Texaco, Inc.	1,144	43,224
9. Union Oil Company	1,861	42,240
10. Santa Fe Energy Company	2,264	28,035
11. Atlantic-Richfield Oil Company	958	25,814
12. Aminoil, Inc.	424	24,726
13. Sun Exploration & Production Company	546	20,344
14. Tenneco Oil Company	753	20,086
15. Gulf Oil Company	1,192	14,081
16. Champlin Petroleum Company	105	13,026
17. Exxon Corporation	299	12,941
18. Conoco, Inc.	374	12,866
19. Superior Oil Company	125	5,945
20. Occidental Petroleum Corporation	179	5,846
21. Berry Companies	745	4,934
22. Phillips Petroleum Company	49	4,714
23. Petro-Lewis Corporation	519	4,322
24. Husky Oil Company	72	2,975
25. Grace Petroleum Corporation	358	2,746
26. Argo Petroleum Corporation	135	2,719
Total Six Major Companies (Mobil, Atlantic-Richfield, Shell, Chevron, Texaco, Union)	16,502	376,677
Larger Independent Companies	21,783	570,676
All Other Companies	3,399	26,658
Total California	41,684	974,011

Note: - Actual production includes unit interest; number of wells includes only company-operated wells and joint operations.

Source: *Annual Review of California Crude Oil Production* (Los Angeles: Conservation Committee of California Oil Producers, 1981).

Table 3.2.10: Leading tri-county oil producers, December 1980

	Producing wells[a]	Percentage of CA production in tri-counties[b]
1. Union Oil Company[c]	966	49
2. Shell Oil Company	459	13
3. Atlantic-Richfield Oil Company[d]	424	33
4. Conoco, Inc.	323	86
5. Texaco, Inc.[e]	305	21
6. Getty Oil Company	295	5
7. Chevron Corporation	225	3
8. Grace Petroleum Corporation	164	46
9. Santa Fe Energy Company	150	7
10. Mobil Oil Corporation	120	5
11. Husky Oil Company	72	100
12. Sun Exploration & Production Company	58	111
13. Phillips Petroleum Corporation	49	100
14. Argo Petroleum Corporation	37	27
15. Exxon Corporation[f]	34	10
16. Gulf Oil Company	29	2
16. McFarland Energy	29	12
17. Central Lease, Inc.	23	100
18. Gato Corporation	22	100
19. Cabot Corporation	20	100
19. Richards Oil Company	20	83

Notes:
[a] - Includes joint operations.
[b] - Assumes net wells equal to 80 percent of gross wells in unit operations where firm performed as operator of the unit; otherwise, unit operations not factored in.
[c] - Includes 15 wells operated as unit operator in South Mountain field and 76 wells operated as unit operator in Santa Maria Valley and Orcutt fields.
[d] - Includes 202 wells operated as unit operator in Cuyama South and Russell Ranch fields
[e] - Includes 32 wells operated as unit operator in Shiells Canyon field.
[f] - Includes 11 wells operated as unit operator in South Mountain field.

Source: *Sixty-Sixth Annual Review of California Crude Oil Production* (Los Angeles: Conservation Committee of California Oil Producers.

Table 3.2.11: Leading Santa Barbara County oil producers, December 1980

	Producing Wells
1. Union Oil Company[a]	514
2. Richfield Oil Company[b]	277
3. Getty Oil Company	268
4. Conoco, Inc.	181
5. Chevron Corporation	157
6. Shell Oil Company	90
7. Husky Oil Company	72
8. Texaco, Inc.	64
9. Phillips Petroleum Company	49
10. Sun Exploration & Production Company[c]	36
11. Mobil Oil Corporation	33
12. Grace Petroleum Corporation	26
13. Gato Corporation	22
14. Richards Oil Company	20
15. Roger T. Lane	19
16. Occidental Petroleum Corporation	17
17. Petrominerals Corporation	15

Notes: - Includes joint operations.
[a] - Includes 76 wells operated as unit operator in Santa Maria Valley and Orcutt fields and 25 wells in Dos Cuadras OCS field as operator for itself, Mobil, Texaco, and Gulf.
[b] - Includes 202 wells operated as unit operator in Cuyama South and Russell Ranch fields.
[c] - Includes 2 wells in Carpinteria OCS field and 14 wells in Dos Cuadras OCS field as operator for itself, Marathon, and Superior.

Source: *Sixty-Sixth Annual Review of California Crude Oil Production* (Los Angeles: Conservation Committee of California Oil Producers, 1981).

Table 3.2.12: Leading California crude oil producers, 1990

	Barrels per day[a]
1. Shell Oil Company	208,623
2. Chevron Corporation	132,241
3. Texaco, Inc.	123,588
4. Mobil Oil Corporation	77,067
5. US Department of Energy	61,618
6. City of Long Beach	51,444
7. Union Oil Company	46,710
8. Atlantic Richfield Corporation	46,205
9. Santa Fe Energy Company	42,452
10. Exxon Corporation	31,459
11. Oryx Energy Company	27,033
12. Berry Petroleum Company	8,682
13. Occidental Petroleum Corporation	7,474
14. Union Pacific Resources	7,319
15. FPCO Oil & Gas Company	6,181
16. Conoco, Inc.	5,860
17. M.H. Whittier Corporation	5,162
18. Exxon San Joaquin, Inc.	4,435
19. McFarland Energy, Inc.	3,249
20. Four Star Oil & Gas Company	2,968
Total Six Major Companies (Mobil, Atlantic-Richfield, Shell, Chevron, Texaco, Union)	634,434
All Other Companies	326,267
Total California	960,701

Note: [a] - Includes joint operations and unit interests.

Source: *Seventy-Sixth Annual Review of California Crude Oil Production* (Los Angeles: Conservation Committee of California Oil Producers, 1991).

Table 3.2.13: Leading California crude oil producers, 1995

	Million of barrels per day
1. Cal Resources LLC (Shell)	48,132
2. Mobil Oil Corporation	38,396
3. Texaco, Inc.	37,675
4. Chevron USA, Inc.	29,739
5. Bechtel Petroleum Operations, Inc.	22,657
6. Santa Fe Energy Resources, Inc.	17,710
7. ARCO Oil and Gas Company	16,567
8. THUMS Long Beach Company	16,457
9. Union Oil Company of California	9,043
10. Vintage Petroleum Inc.	5,213
11. Tidelands Oil Production Company	3,961
12. Stocker Resources, Inc.	3,334
13. Berry Petroleum Company	3,252
14. Oxy USA, Inc.	1,921
15. Exxon Company USA	1,658
16. M.H. Whittier Corporation	1,617
17. McFarland Energy, Inc.	1,575
18. Four Star Oil & Gas Company	1,069
19. Signal Hill Petroleum	1,068
20. Breitburn Energy Corporation	738
Total Six Major Companies (Mobil, ARCO, Shell, Chevron, Texaco, Union)	179,552
All Other Companies	99,347
Total California	278,899

Note: Unit Interests Allocated to Operator; federal OCS not included.

Source: *Eighty-First Annual Report of the State Oil and Gas Supervisor* (Sacramento: Division of Oil, Gas, & Geothermal Resources, 1996).

Table 3.2.14: Leading tri-county oil producers, 1995

	Producing wells	Percentage of CA production in tri-counties
1. Vintage Petroleum	783	69
2. Union Oil Company	416	23
3. Cal Resources LLC (Shell)	328	4
4. Texaco Exploration & Production	260	4
5. Saba Petroleum	140	67
6. Seneca Resources Corporation	112	100
7. Hallador Petroleum Company	101	100
8. Torch Operating Company	96	100
9. Magness Petroleum Company	63	93
10. Chase Production Company	54	100
11. Sierra Resources	51	100
12. Phoenix Energy	35	100
13. Fortune Petroleum	30	100
14. CBASE Corporation	28	100
14. Mirada Petroleum	28	100
14. Oryx Energy Company	28	100
17. Mobil Oil Corporation	26	1
18. The Termo Company	26	21
19. Crimson Resources Management	24	28
20. Richards Oil Company	22	100
21. Berry Petroleum Company	21	2
22. Gato Corporation	19	100
23. B. E. Conway Energy	18	100
24. Venoco, Inc.	17	33
25. Ojai Oil Company	16	100

Note: Federal OCS not included.

Source: *Eighty-First Annual Report of the State Oil and Gas Supervisor* (Sacramento: Division of Oil, Gas, and Geothermal Resources, 1996).

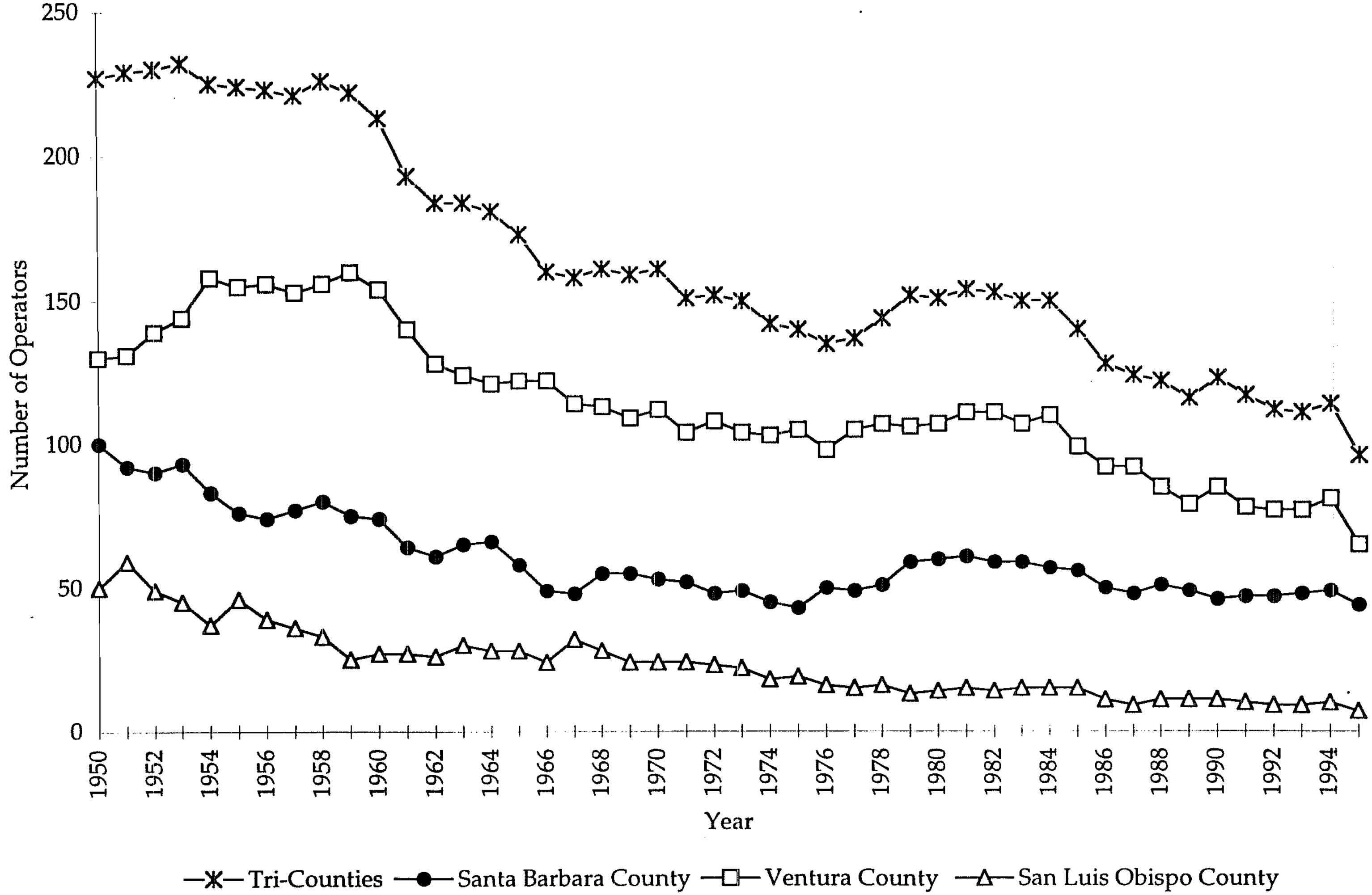
Table 3.2.15: Leading Santa Barbara County oil producers, 1995

	Producing wells
1. Saba Petroleum	139
2. Union Oil Company	130
3. Vintage Petroleum	108
4. Hallador Petroleum Company	101
5. Texaco Exploration & Production	90
6. Torch Operating Company	80
7. Sierra Resources	51
8. Magness Petroleum Company	35
8. Phoenix Energy	35
10. Mobil Oil Corporation	26
11. Richards Oil Company	22
12. Gato Corporation	19
13. B.E. Conway Energy	18
14. B.E. Conway	13
15. Geo Petroleum	8

Note: Federal OCS not included.

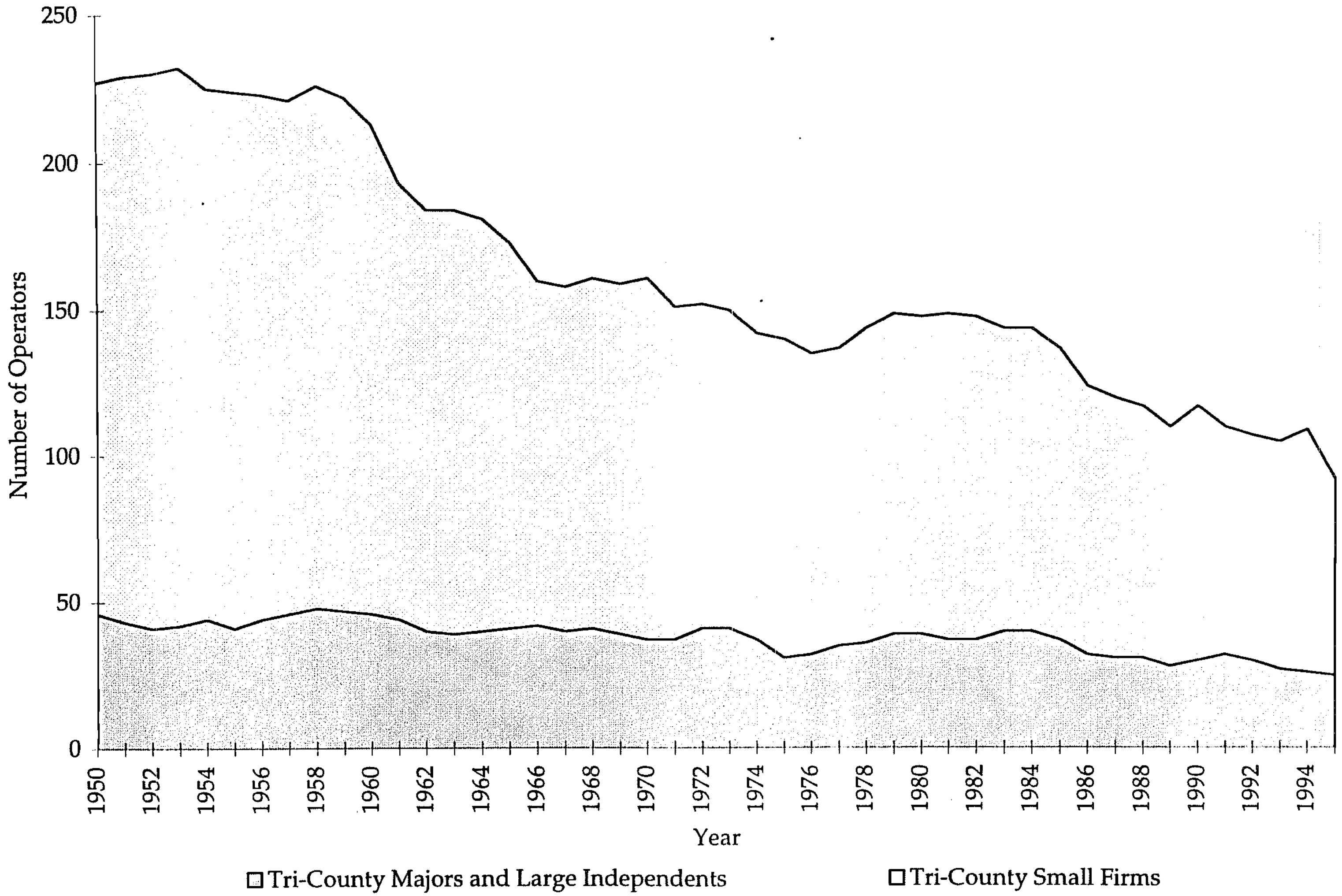
Source: *Eighty-First Annual Report of the State Oil and Gas Supervisor* (Sacramento: Division of Oil, Gas, and Geothermal Resources, 1996).

Figure 3.2.1: Tri-county oil well operators, 1950-1995



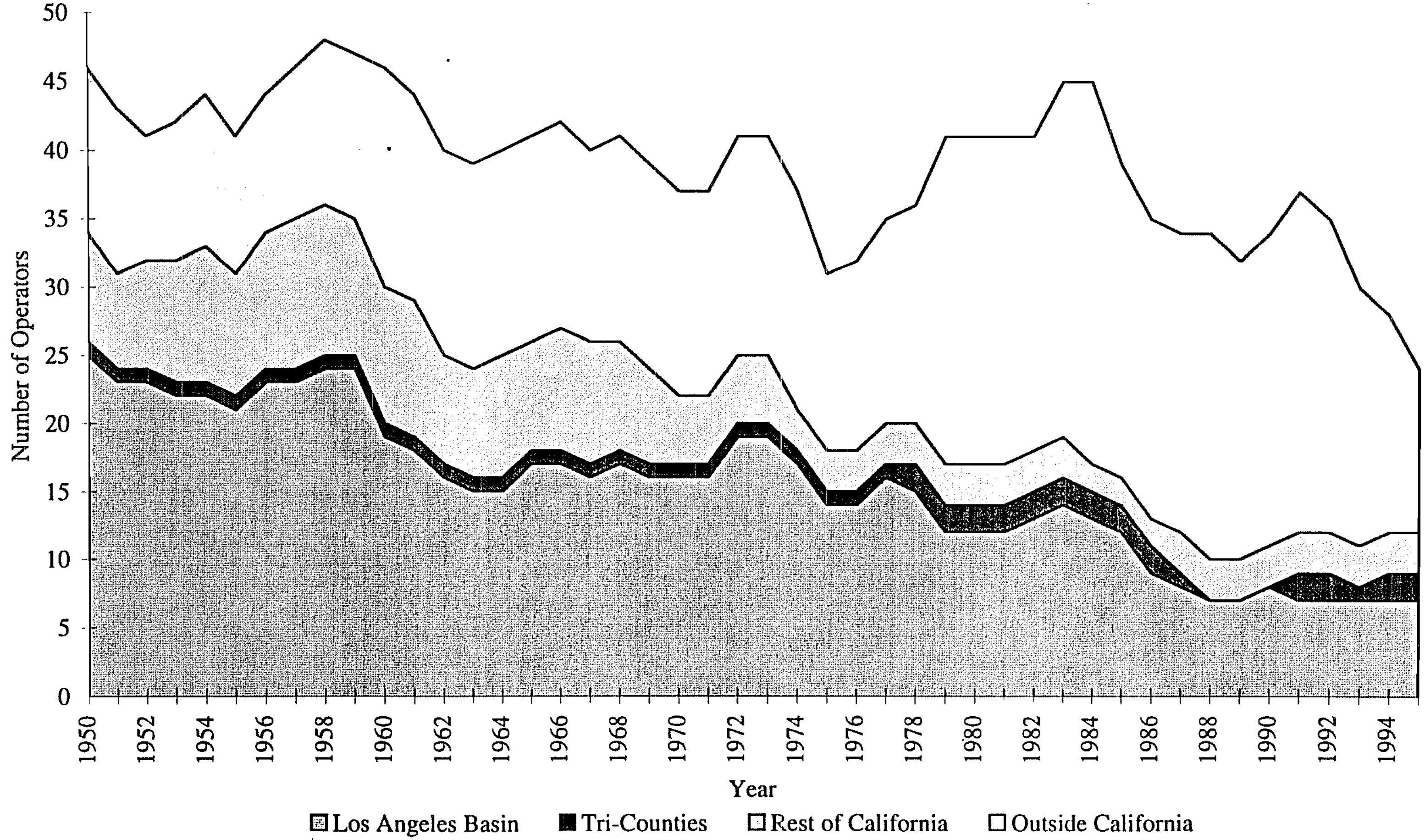
Source: Index of Well Records, California Division of Oil, Gas and Geothermal Resources.

Figure 3.2.2: Tri-county Oil Well Operators By Type, 1950-1995



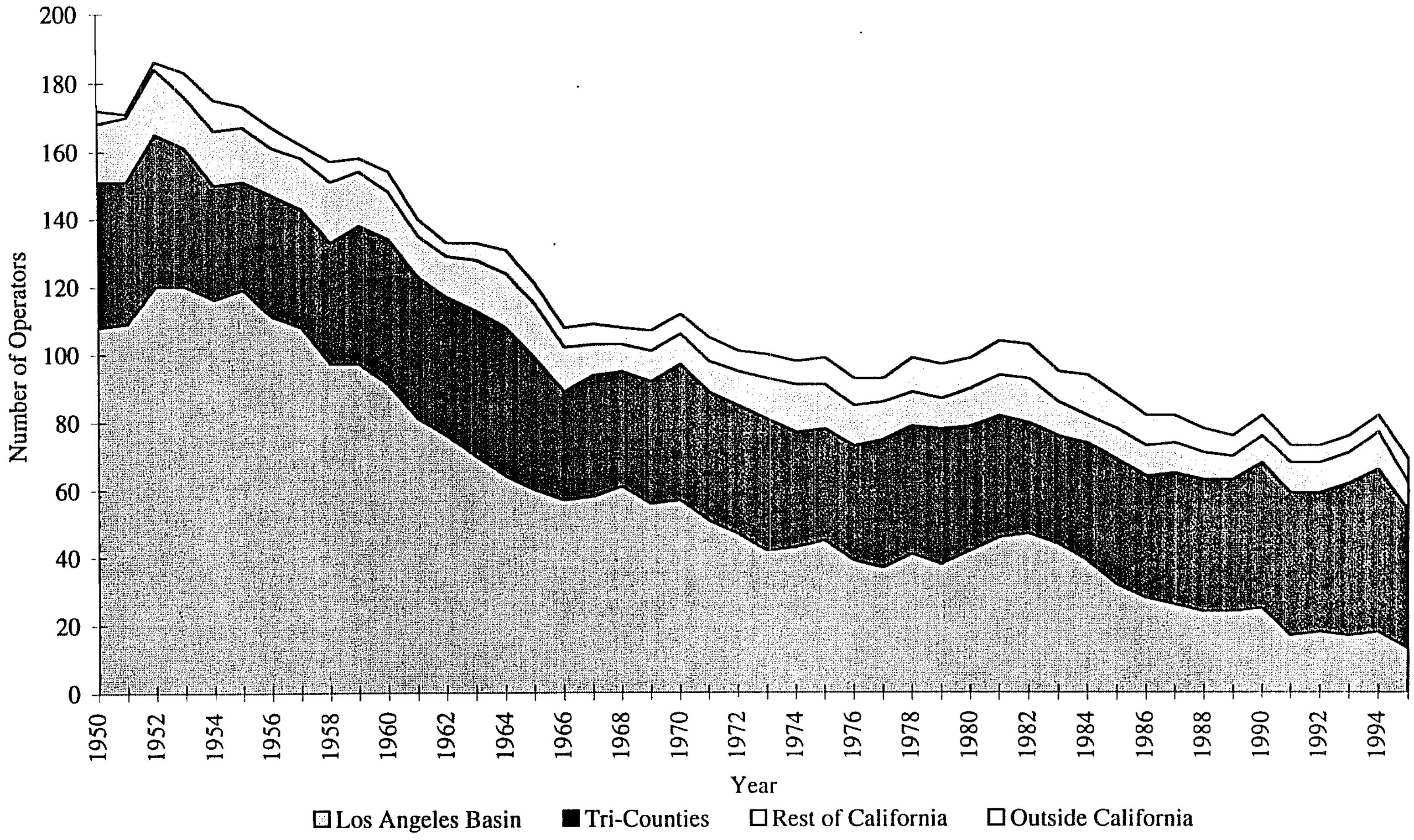
Source: Index of Well Records, California Division of Oil, Gas and Geothermal Resources.

Figure 3.2.3: Large tri-county oil well operators by location, 1950-1995



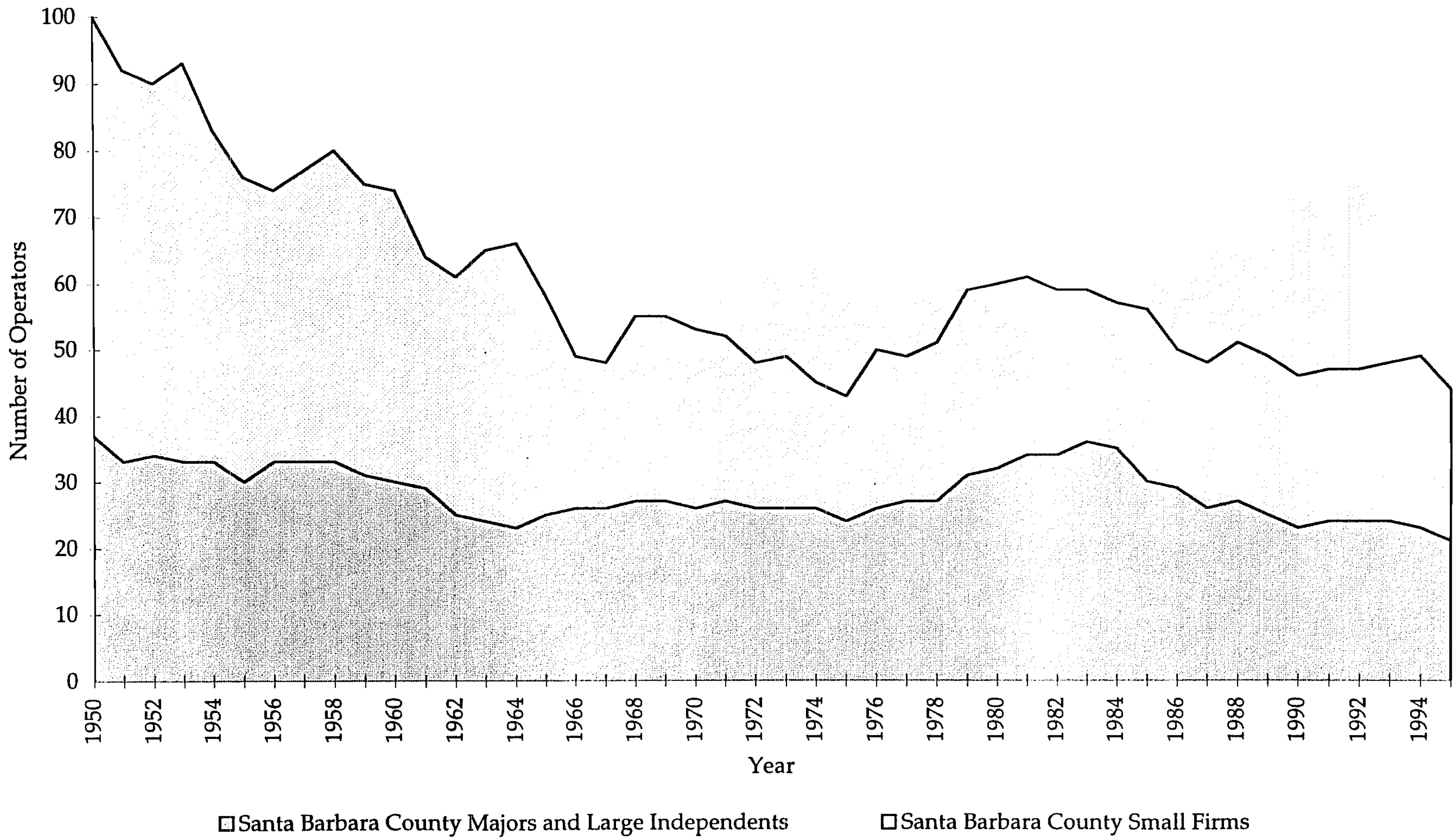
Source: Index of Well Records, California Division of Oil, Gas and Geothermal Resources.

Figure 3.2.4: Small tri-county oil well operators by location, 1950-1995



Source: Index of Well Records, California Division of Oil, Gas and Geothermal Resources.

Figure 3.2.5: Santa Barbara County Oil Well Operators By Type, 1950-1995



Source: Index of Well Records, California Division of Oil, Gas and Geothermal Resources.

Section 3.3
Adaptation and Diversification

In this section, we discuss local transformations of an ancillary yet vital segment of the oil industry: the oil supply and service sector. Tool companies, engineering firms, mud suppliers, equipment rentals, and similar firms sell needed services to oil well operators who do not maintain these services in-house (see Section 3.1: Basic Processes and Linkages). Much smaller in corporate scale than either major or independent oil companies, the oil supply and service sector consists of small to mid-size firms that are often locally or regionally headquartered. For this reason, they provide an important barometer of the industrial development that oil may bring to a region like Santa Barbara County. Below, we describe how some firms in the tri-county oil supply and service sector have adapted to industry-wide declines occuring since the mid-1980s (described in Section 3.2: Producers, Fields, and Corporate Forms). Although there were other periods of decline in earlier eras (in terrestrial operations), earlier types of adaptation that might have occurred are not practically accessible (the principals are deceased, etc.). Hence our analysis pertains only to the most recent era examined in this report.[1]

1987-1996

As onshore oil fields mature, and offshore development requires ever more capital-intensive technology, oil well operators are not the only kind of oil-related firm to be affected. Since the mid-1980s, contraction in both the number of oil well operators and the scale of oil production has tended to reduce the number of ancillary supply and service firms working in or offshore from Santa Barbara County. This is a consistent pattern in declining sectors, be they mineral extraction or the defense industry. Without adaptation, departure or cutback by core firms triggers a corresponding departure or cutbacks by peripheral support firms (see Romo and Schwartz, 1995; Freudenburg and Gramling, 1993).

The crucial question is how firms adapt to declining oil production. Short of folding—the expected result of industry contraction—there are several ways that individual oil-related firms which service local oil may accomodate declining business. First, a local firm (either a corporate subsidiary or local start-up) may adapt by *branching* to market its wares in other regions, even as it remains part of the oil industry. Second, a firm may adapt by *diversifying* to move into products or services that are unrelated to oil. Third, a firm may both branch and diversify, thereby *transforming* itself to a substantial degree. Finally, a firm may not adapt at all but remain *static*, continuing to serve local oil as it traditionally has.

Have local oil supply and service firms adapted to declining oil production? A recent study addressed this question to all oil supply and service firms operating in the Santa Barbara Channel tri-county region—that is, onshore in Santa Barbara, Ventura, and San Luis Obispo Counties, and offshore in the Santa Barbara Channel. The study found that while many of these firms have remained, most have adapted in many of the ways described above (Molotch et al., 1998). At the end of this section, Table 3.3.1 illustrates the extent of adaptation by local oil supply and service firms. For methodological reasons, the study by Molotch and his colleagues could not survey those firms that folded, and so it is impossible to predict the likelihood of firm adaptation as a response to declining production.[2] Yet the fact that two-thirds of all surveyed oil supply and service firms have somehow adapted beyond their traditional local oil business suggests that folding firms and local industry contraction does not describe all the economic impacts from declining local oil production. Instead, local firms may use the local region as a base for launching into other regions or other markets.

Specific firm traits correspond to the modes of adaptation firms may take. Branchers are more likely to be nonlocal corporate subsidiaries than local start-ups and more likely to have institutionalized ties outside the Channel region. Branchers of this kind include Tidewater Marine Supply (a local subsidiary of the largest commercial sea vessel operator) and Petroleum Helicopters, Inc. (a local operator of the world's largest private helicopter fleet); these firms use their local offices to branch into other offshore regions like Alaska and Huntington Beach. A completely local brancher is Port Hueneme Marine Supply Co., a start-up that takes part in simulated emergency exercises mandated after the 1969 Channel oil spill and now exports its services to other locations (for example, during the Exxon *Valdez* spill in Alaska).

In contrast to branchers, diversifiers are more likely to be local start-up firms than nonlocal corporate subsidiaries and more likely to be involved in building a diversified local economy. As a consequence of new markets, diversification often leads to branching, and many local diversifiers later became transformers as well. Diversifiers of this kind include Diving Systems International, formed by two oil installation construction divers who built diving helmets in a home garage to sell to other Channel oil divers. With broad scuba diving experience, the firm's founders developed the first commercially successful fiberglass diving mask that eventually became the oil industry's standard (a case of branching); declining oil activities led them to diversify into developing general diving products (masks, underwater communications devices, etc.). Another diversifier (and later transformer) is HEMEC Communications, an electronics service firm that originally serviced the local offshore oil industry's communications gear before branching into satellite communcation activities. While oil remains an important market, this firm's current clients include international television networks, telecommunications agencies, and the White House.

This level of local firm adaptation is modest but impressive, since it suggests a different outcome to the usual "boom-bust" cycle that typically characterizes resource-extracting regions. Can the firm adaption found here be generalized to other oil-producing regions? Or, conversely, are there traits particular to the Santa Barbara Channel region that make adaptation more likely than it would be elsewhere? The latter may be the case, as the Channel region and Southern California contain several aspects outside and within the oil industry that encourage firms to adopt a dynamic outlook. The region provides a rich industrial environment that may faciliate business formation and expansion, with a diverse array of business support services (such as marketing consultants and specialized law firms), ample venture capital, major research universities, and a history of high-technology innovation. As part of the larger Los Angeles conurbation, the region contains industrial sectors of all kinds, from agriculture to manufacturing to software, which makes possible the "new combinations" of materials and production forces that (social scientists have long believed) support industrial innovation and growth.

Even static firms that seek to remain in the region to service local producers have in some cases availed themselves of the high-technology resources and innovators found in the local industrial environment. For instance, Litton Guidance and Control Systems in Santa Barbara recently parlayed a federal-state defense conversion contract to modify its inertial missile navigation system for use in drilling measurement and surveying in down-hole oil wells. At least one oil service firm has contracted with Litton to obtain the resulting technology. In the process, Litton has subcontracted engineering and machining to other local high-technology firms, thereby expanding the technological expertise in oil-related applications.

Perhaps just as important to the dynamics of oil service firm adaption are the tri-county region's amenities: its temperate weather, beaches, cultural and recreational attractions. In interviews, some local oil service firms told us these amenities created special incentive to "make it work" through firm adaptation in order to stay in the region, rather than follow the oil industry to other oil centers. Several local oil supply and service firms owe their existence and/or adaptation to "fun" aspects of the local environment, like scuba diving or sports fishing.

Even local oil-related regulations and constraints, while frequent sources of frustration for the oil industry, may reinforce the dynamic outlook that makes firm adaptation more likely. By putting an end to "business as usual," regulations compel many firms to adapt or get out. For example, HEMEC Communications acknowledges that the Channel drilling moratoria of the 1970s caused the firm to diversify into other communications fields. In many cases, products and services developed in heavy regulatory environments can be applied to other regions as regulations spread (see Porter, 1990). Some local firms' growth has been directly tied to regulation; several gained business because of standards they helped enforce (in areas like inspection and training) or equipment they devised or marketed to support regulation elsewhere. As in other industries, oil regulation enforces development of "new skills" that can have wider (and more profitable) application (see Estrada et al., 1996: 76).

Notes

1. Much of this section comes from the research by Harvey Molotch, John Woolley, and Teri Jori on Santa Barbara County oil firm adaptation (Molotch et al., 1998), which in turn was a product of their Minerals Management Service-funded evaluation of the Santa Barbara Channel Socioeconomic Monitoring and Mitigation Project (see Molotch and Woolley, 1993).

2. For this study, the researchers mailed surveys to all oil supply and service firms involved in the Santa Barbara Channel (a total of 113 firms) and received 60 responses (a 53 percent response rate). From this sample, 12 firms were excluded since they were initially established as part of another industry beside oil. Follow-up interviews were carried out with 18 of the responding firms to hear how the individual firm specifically adapted: into what new industries, new regions, and so on (see Molotch et al., 1998: 141).

Table 3.3.1: Adaptation by Santa Barbara Channel tri-county oil supply and service firms

type of firm adaptation	percentage of surveyed firms
branchers	21%
diversifiers	29%
transformers	17%
static	33%

Source: Molotch et al. (1998: 143).

Section 3.4
Environmental Consulting

In researching the growing number of large and small post-petroleum remedial projects taking place around the tri-counties, we found that one of the legacies of the petroleum industry and future growth areas in the region is environmental consulting. Similar to the discussion of industrial adaptation related in Section 3.3: Oil and Other Sectors, Santa Barbara in particular has experienced growth in a sector of the oil economy it seems willing to embrace: while potentially polluting upstream segments of extraction and refining have been resisted, the hi-tech, professional, and environmentally conscious segments appear to thrive unimpeded. The growth of these sectors is a recent phenomenon, and our discussion chiefly pertains to the most contemporary historical period of this study, 1987-1996.

In addition to the permanent presence of large consulting companies (for example, Arthur D. Little, Dames and Moore, and Tetra Tech), a number of smaller environmental consulting firms flourish in the tri-county region. Beyond these locally based firms are those who have come to the region to produce environmental impact reports, apply cutting edge environmental remedial strategies, develop new technologies for the clean-up of oil infrastructures and aid in the abandonment of Santa Barbara Channel platforms. The use of innovative methods[1] are currently being applied to such post petroleum wastes as old oil sumps, underground spills and contamination, offshore platform abandonment, the decommissioning of refining facilities and tank farm storage units, and the survey of pipeline systems and throughways (for more pointed information on strategies and technologies, see Section 7.0: Technological Innovations).

Because the area's petroleum production history is of a moderate scale compared to national and world standards, and because the population is limited, we found the proliferation of environmental consulting firms worthy of further investigation. We hypothesized that the tri-county area's confluence of a stringent regulatory environment, a high level of environmental consciousness among its citizens (including a sizable activist contingent), and a history of extractive industry, contributed to the proliferation of this kind of firm. To gain empirical insight into whether the density of environmental consulting was indeed a unique occurrence we compiled an inventory of the firms that reside in cities of interest to us: Santa Barbara, Santa Maria, Ventura, and San Luis Obispo. Because such a list does not exist, our search for environmental consulting firms used an electronic "yellow pages" database which includes business SIC codes to generate a list of environmental consulting firms. The codes utilized for this purpose were Environmental Engineering Firms (8711m) and Environmental Protection Organizations (8641C).[2]

Next, we compared our findings for these cities to cities throughout the country that match our cities at various levels: in the size of their local petroleum industry, in their community identity, in population size, and in their history with heavy industry. The cities we have used for the sake of comparison are: (1) "oil hub" cities (population less than 400,000): Bakersfield, CA; Shreveport, LA; Tulsa, OK; Oklahoma City, OK; Corpus Christi, TX; Galveston, TX; Lubbock, TX; (2) cities of similar socio-demographic, commercial character, environmental aesthetic, as well as being university towns (population less than 400,000): Santa Cruz, CA; Eugene, OR; Boulder, CO; (3) and finally cities with industrial pasts other than oil (population less than 400,000): Flint, MI; Youngstown, OH. Our raw count of consulting firms shows Santa Barbara compares as or more strongly than both local cities and those selected for comparison (see Table 3.4.1: Consulting and petroleum support firms and Figure 3.4.1: Environmental support firms).

As a point of comparison we then assessed the size of each of the "oil hub" cities in terms of their oil support infrastructures, hypothesizing that the larger the petroleum support sector is, the greater the corresponding number of environmental consulting would be. To accomplish this we inventoried the oil support firms in these oil hub cities using the following SIC codes: Oil Field Equipment Supply and Rentals (7359L), Oil Field Contractors (1629L), and Oil and Gas Field Services (1389). Using these SIC code listings, we generated a relatively reliable measure of petroleum support firms for each city. At the end of this section, the total number of environmental consulting firms is seen side by side with the number of petroleum support firms in that city (see Figure 3.4.2: Environmental engineering firms and oil hub support firms).

As the numbers in Table 3.4.1: Consulting and petroleum support firms demonstrate, the cities of Santa Maria and especially Santa Barbara have their fair share of environmental consulting firms—in fact, a disproportionate share given the density of the industry in each of the cities of interest. The regional abundance of environmental engineering firms holds true even when we control for variables that might influence our results (the size of each city's petroleum sector, population size) when we compare cities of similar socio-demographic character (university towns, environmentally conscious, tourist locations), as well as when we compared with non-petroleum industrial cities (of a similar population size). Furthermore, when we controlled for the number of petroleum support firms and population size by looking at the density of consulting firms (for example, by dividing the number of consulting firms by the city's population and/or the number of oil support firms), the actual difference between the tri-county cities and the control groups is magnified. Figure 3.4.3 graphically represents the ratio of environmental engineering firms to the cities local petroleum support infrastructure. In Figure 3.4.4: Ratio of environmental engineering firms to population size, one can see that even when the population size of these cities is accounted for, Santa Barbara has far and away the highest proportion of environmental engineering firms across cases.

This trend is also reiterated in the other tri-county cities of Ventura and San Luis Obispo, with a high proportion of consultants appearing in each. Ventura, while having fewer than Santa Barbara, still boasts more total consultants and more in proportion to its population size than similar cities used for comparison. As for the other tri-county city of interest, San Luis Obispo has the smallest share of the regions environmental consulting firms. Yet, given the size of its population, its local economy, its petroleum support sector, and proximity to Santa Barbara (which has a disproportionate share for its size), that San Luis Obispo has much of a consulting sector at all is a surprise.

Based on a number of factors, Santa Barbara has seen a surprising amount of growth in its consulting sector. These factors would include resident concerns with regional aesthetics and a cultural connection with the surrounding natural environment, a university that supplies a labor pool of technical professionals, as well as proximity to the petroleum industry. When placed in conjunction with federal and state policies which call on agencies and extractive industries to submit environmental impact reports produced by impartial third parties (consultants), these factors have led to a burgeoning consulting sector in Santa Barbara. In sum, given its "good fit" in the city of Santa Barbara, we can only surmise that the consulting sector will continue to be a viable contributor to the local economy.

Notes

1. This is in juxtaposition to the traditional "dig it up and move it to a storage location." Many of the sites that have been found to need remediation—from contaminated land to ocean abandonments—are in fragile ecosystems which we now realize are easily damaged and can be slow to repair. Consequently, less stressful alternatives are being developed to produce cleanup regimes that are more benign than those that would "destroy the sites" in order to remediate them.

2. These inventories did not come without a certain amount of "lumping" of extraneous firms. We therefore developed a three part method to weed out those firms which did not fit our interests (our target was firms that sell their technical expertise as a product/service). First, we scanned entry names for exclusions (*for instance, Landscapers Ltd.*) Second, because a majority of the firms named listed other SIC codes along with the codes targeted, we scanned those for exclusions. Firms were excluded if they included the following SIC code entries: Retail of any sort, Irrigation Systems, Attorney Services, Landscape Design, City and Urban Design, General Contracting, Manufacture (of any type), Rubbish Removal, Septic, Sewer, Drain Installation and Removal, Asbestos Removal, Drilling Outfits, Equipment Sales or Rentals, Fish Hatcheries, Hauling and Trucking Services, Air, Water, and Solid Waste Management, Specialty Cleaning and Sanitation, Truck and Car Washing, Pumps Wholesale, Machine Rebuilds; and if name included "Supply Co." or Real Estate Sales and Management. Third and finally, all firms that had only one SIC code designation whose company name did not exclude them were included.

Table 3.4.1: Consulting and petroleum support firms

	Environmental Engineering Firms by SIC: 8711M, 8641C	Number of Petroleum Operators by SIC: 7359L, 1629L, 1389	Ratio Environmental Engineering by Oil Support Firms	US Census Population	Ratio Environmental Engineering by Population per 10,000
Tri-Counties Cities					
Ventura, CA	31	108	0.287	87,000	3.56
Santa Barbara, CA	48	8	6	86,154	5.57
Santa Maria, CA	11	36	0.306	67,012	1.64
San Luis Obispo, CA	14	3	4.667	42,433	3.30
Oil Hub Cities					
Bakersfield, CA	60	531	0.113	205,000	2.93
Shreveport, LA	23	249	0.092	191,558	1.20
Tulsa, OK	50	459	0.109	378,491	1.32
Oklahoma City, OK	2	22	0.091	46,985	0.43
Corpus Christie, TX	37	372	0.099	280,260	1.32
Galveston, TX	2	17	0.118	60,048	0.33
Lubbock, TX	10	52	0.192	193,565	0.52
University Cities					
Santa Cruz, CA	15	0	0	51,155	2.93
Eugene, OR	2	0	0	123,718	0.16
Boulder, CO	21	0	0	90,928	2.31
Former Industrial Cities					
Flint, MI	10	0	0	134,881	0.74
Youngstown, OH	8	0	0	87,405	0.92

Figure 3.4.1: Environmental engineering firms

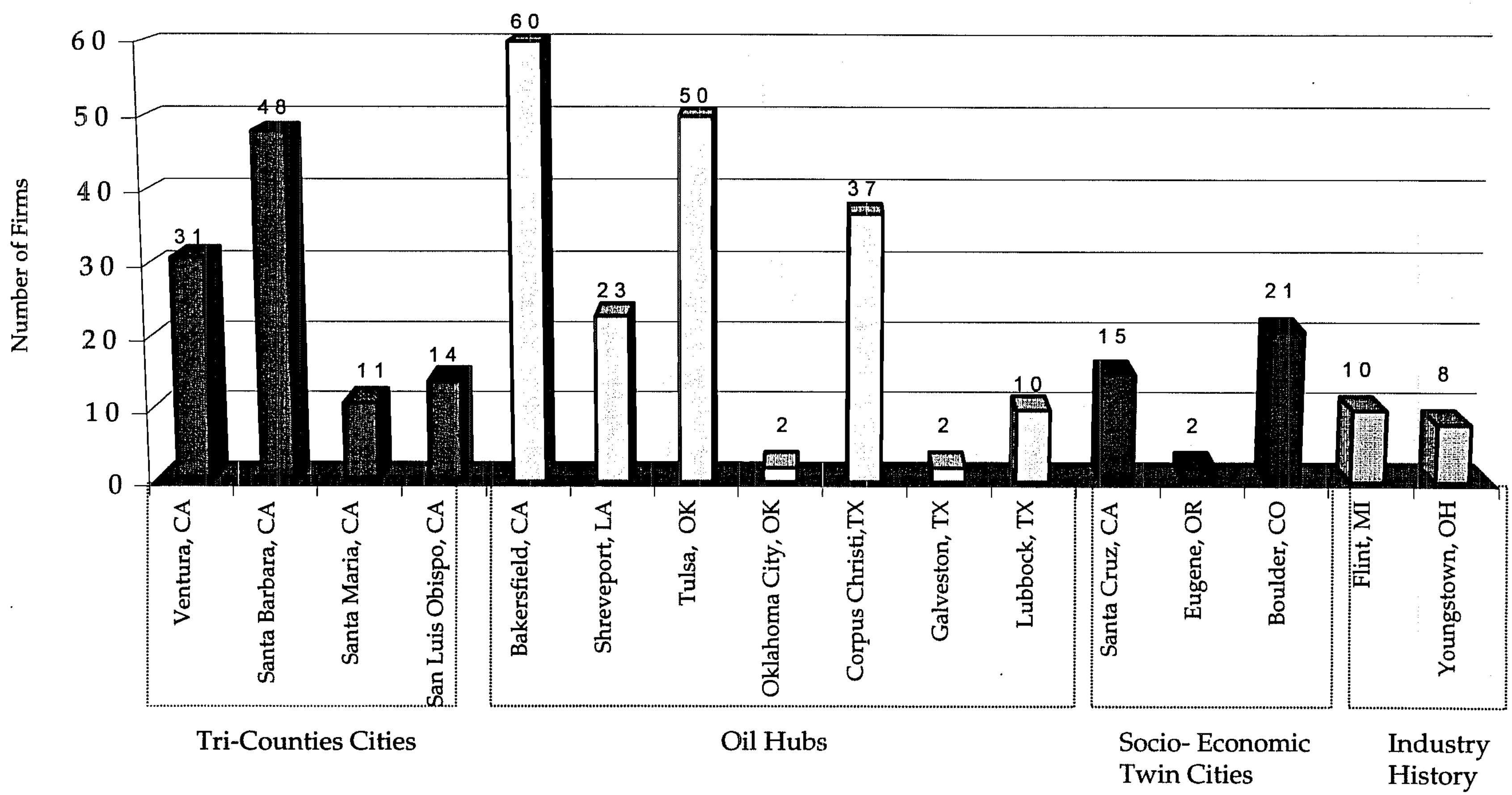


Figure 3.4.2: Environmental engineering firms and oil hub support firms

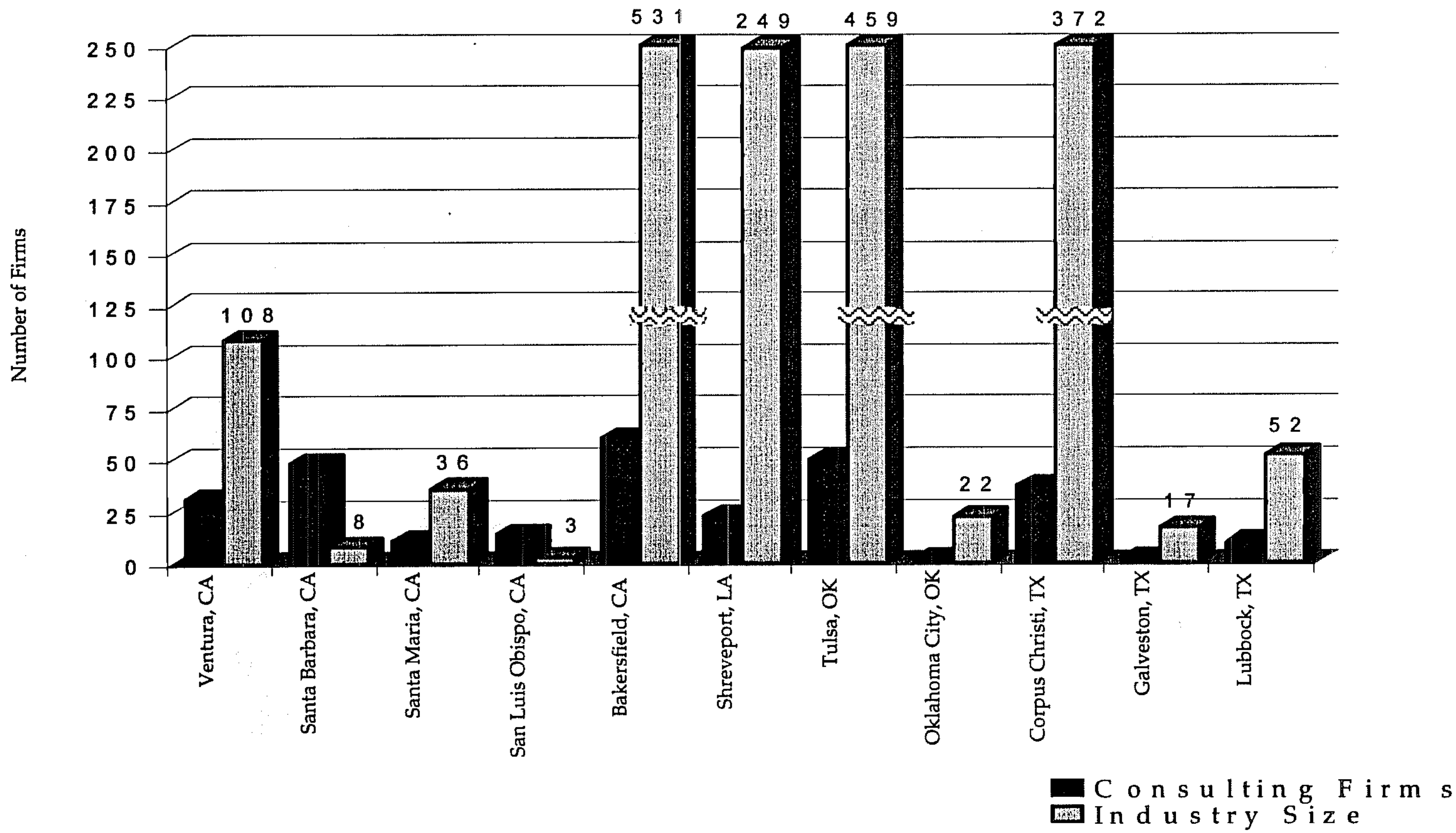


Figure 3.4.3: Ratio of environmental engineering to petroleum support firms

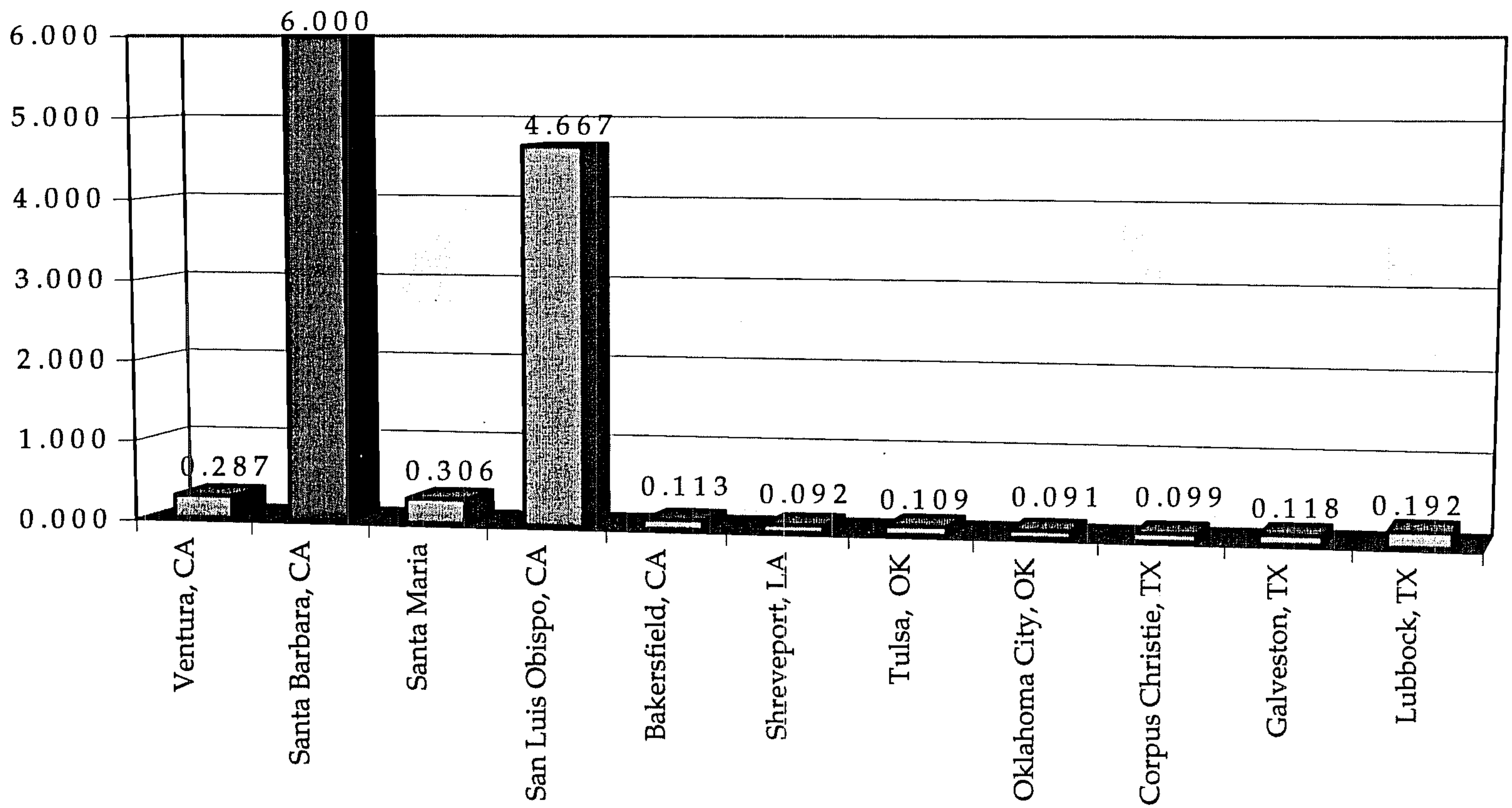
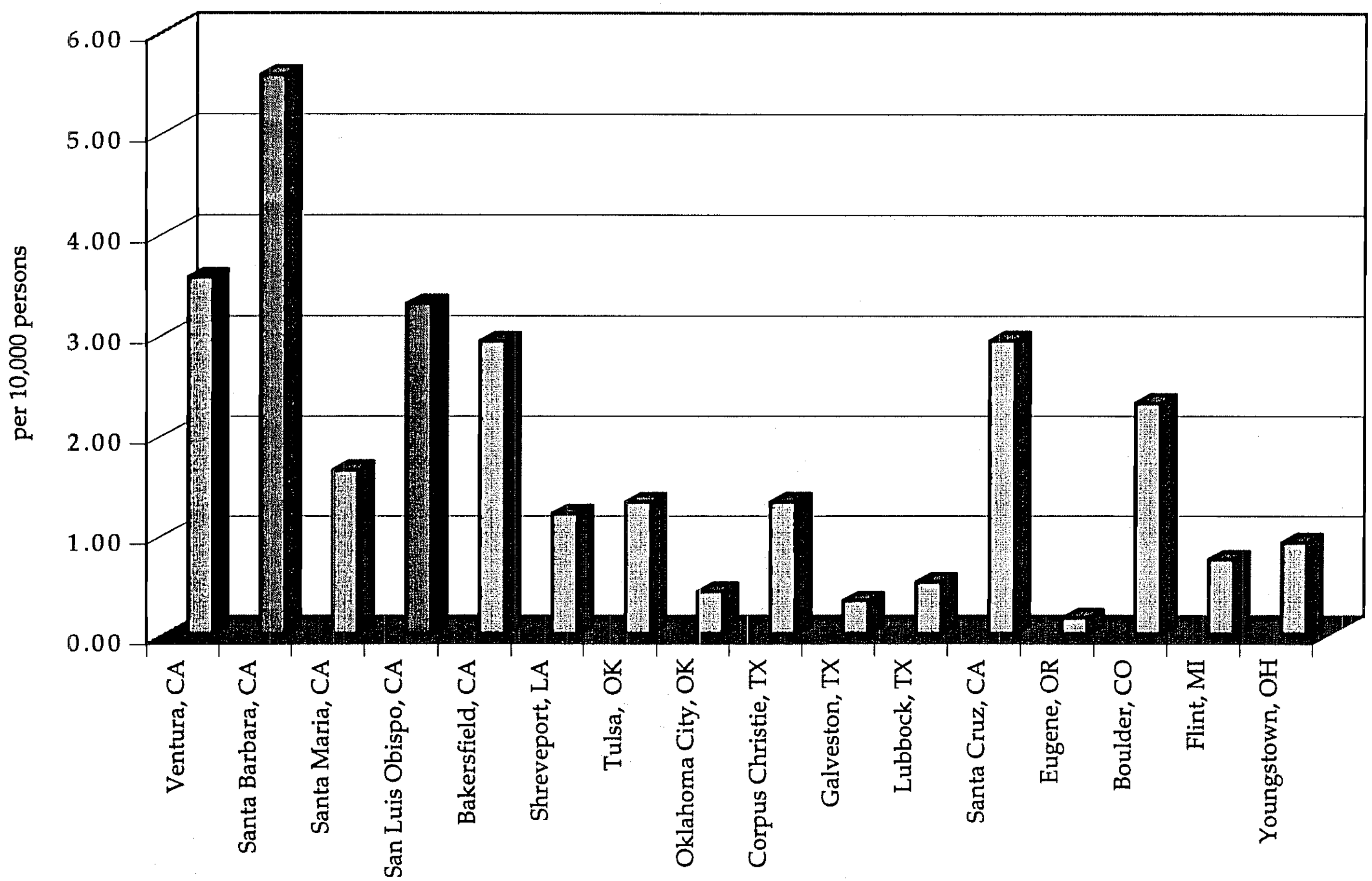


Figure 3.4.4: Ratio of environmental engineering firms to population size



Section 4.1
Local Support and Opposition

This section reviews the history of community sentiment and mobilization in relation to oil activity in Santa Barbara County. The events related below happened simultaneous with the industry events and trends described throughout this report. Although this section follows the same chronological periodization used elsewhere (1950-68, 1969-86, 1987-96), we begin with a brief description of the intensive oil development and community accommodation which occurred prior to 1950.

1950-1968 (and before)

Oil development has been a fundamental factor in the history of Santa Barbara County for nearly as long as oil has been extracted in North America. Oil reserves are widespread throughout the county, with significant reserves concentrated in the two regions of human settlement. The southern portion of the county, or "South Coast" as it is often called, saw the first recorded offshore oil piers (at Summerland), and the region continues to witness extensive offshore oil development in the Santa Barbara Channel. The North County holds several important onshore oil fields in California history (Santa Maria, Orcutt, Cuyama Valley) and has served as a regional industry center for oil development in California's Central Coast region. However, a brief review of the county's history reveals that despite its physical ubiquity, oil development has reinforced dramatic economic and cultural differences between these two regions.

The South Coast (containing the cities of Santa Barbara and Carpinteria, as well as the localities of Summerland, Montecito, Goleta and Isla Vista) has always been the county's governmental center as well as more significant in terms of population, economic activity, and scale of cultural institutions. Renowned for its scenic amenities, the South Coast attracted early migrations beginning in the turn of the 20th century by Southern Californian and Midwestern elites (although residents of all classes continue to be represented in this region). These newcomers set in place the South Coast's long-standing orientation toward quality of life issues, which have in turn been supported by the typically white collar character of the region's industries: university, government, tourism, and (increasingly) health care and high-technology sectors. Importantly, many in the South Coast have opposed oil extraction on the basis of its ecological, economic, and aesthetic impacts, as well as industrial and urban development in general.

By contrast, the North County (containing the cities of Santa Maria, Lompoc, Buellton, and the localities of Orcutt and Guadalupe) has historically been less populated and less well connected to the Los Angeles metropolis than the South Coast. Although it too had a Spanish colonial legacy that created vast agricultural landholdings, by the 1900s population in the North County communities of Santa Maria and Orcutt settled chiefly in small homestead households. This set in place a regional demographic profile (rural, working-class) that still contrasts with the typically more urban and educated residents to the south. The North County's civic traditions have been influenced by its dominant industries—agriculture, oil, and military—and its citizens and political leaders have consistently tended to support the oil industry, just as they have been sympathetic to development in general.

Contrasts in the modes of oil development and the public attitudes towards oil between the South Coast and North County appeared with the onset of oil development in the late 19th century. Onshore oil prospecting in the county began as early as 1865, with the pronouncements of Yale University chemist Benjamin Silliman (see Johnson and Nye, 1979: 188). On the South Coast, onshore exploration began in Summerland in 1887; before the century was over, this exploration moved offshore with the first recorded offshore derricks in history (Fuller and Olson, 1980: 76; Franks and Lambert, 1985). While oil prospects enticed many entrepreneurs to make their play on the South Coast, oil development was not especially lucrative in this region, and its visible clustering around cherished coastlines produced local opposition that was often strident. As early as 1899, residents took direct action when oil drilling moved into view. A front-page news story at the time reported:

> That the property owners on the sea front are determined that no unsightly oil derrick shall disfigure the beautiful views of land and sea was demonstrated last night, when a party of the best known society men of Santa Barbara armed to meet any resistance, and with workmen employed for the purpose, utterly demolished a new oil derrick that was erected yesterday at Miramar (*Santa Barbara Morning Press*, August 3, 1899).

Local antipathy to South Coast oil development was furthered by the region's lack of economic and social connection to the oil industry. In an area of large estates, a resort-retirement economy, and a general level of economic security, oil development tended to benefit few except those particular individuals and firms with a specific stake in it. Given these circumstances, it was perhaps not surprising that aesthetic concerns regarding local oil impacts would count as much as economic hopes for local oil profits.

By contrast, when onshore oil development struck big in the Santa Maria Valley after the turn of the century, it did so in a more conducive environment with sparse human settlement and little economic development beyond agriculture. A 1902 strike in Lompoc rewarded the fledgling Union Oil Company's massive North County lease acquisition campaign and earned its chief engineer Warren

Orcutt his reputation as "dean of petroleum geologists" (Franks and Lambert, 1985: 21). Union Oil's find also triggered significant prospecting activity by other small oil companies, many led or backed by local businessmen. One important consequence was the founding of Orcutt, a Union Oil company town, as an infrastructural center for oil development complete with its own private water and sewer system to service boarding houses, dormitories, and family cottages. A local historian recalls:

> [T]he Union Oil company town... had transformed a placid grain field into the busy trading and supply center for the North County's oil district, which at the time also included Lompoc and nearby Casmalia. Hundreds of workers and their families arrived from oil fields as far east as Pennsylvania, Ohio, and West Virginia. There were drillers, tool dressers, blacksmiths, teamsters, rig builders, pipe fitters, boilermakers, carpenters, electricians, engineers, and dozens of unskilled laborers (Nelson, 1987: 17).

Union Oil's fantastic blowout at "Old Maud" in the Orcutt field cemented the oil industry's prominence in the North County. Thereafter, local fortunes would continue to rise—by 1903, the Santa Maria Valley helped make California the nation's largest oil producer (Johnson and Nye, 1979: 188)—and fall with oil. The region's oil industry suffered hard times after World War I (in part resulting from new conservation measures like oil well spacing) but rebounded to new peaks in 1934 with the Santa Maria Field and again in 1948 with the Cuyama Valley fields (some 50 miles east from Santa Maria). Over four decades, oil created a social infrastructure of roads, housing, schools, utilities, and other urban basics that would have otherwise been impossible. The oil industry laid down important roots in this period—pipelines and pump stations, refineries and absorption plants, small gasoline plants, and a regional corporate office (located in Orcutt until 1995)—thereby making the Santa Maria Valley a regional industry center for Central California until it was eventually eclipsed by the San Joaquin Valley in the 1950s (described in Section 3.1: Basic Processes and Linkages).

The reception oil received in the South Coast at this time could hardly be more different. In the first half of the 1900s, locals raised specific points of contention that continue to focus anti-oil sentiments to this day. The perceived blight of oil operations and the potential for accidents created an early impetus to keep the oil industry's activities out of Santa Barbara; by 1908, the Santa Barbara Chamber of Commerce officially opposed industry access to the city's major wharf. A visible spate of drilling in Santa Barbara's residential Mesa neighborhood beginning in 1922 produced more local ill will than industry profits, and by 1929 the local government had banned drilling within city limits. Nevertheless, in this period South Coast residents tended to tolerate oil development as long as it remained confined to remote locations far out of sight, as demonstrated by the relative lack of local concern over extensive development in the Ellwood Field (discovered in 1927), just west of where the University of California at Santa Barbara is today.

Tempering South Coast opposition to oil development was the fiscal benefit local residents received from oil fortunes through county tax revenues. Most prominently, the Santa Barbara County Courthouse, the architectural centerpiece of Santa Barbara with its Spanish Mission Revival motif, was built largely with tax revenues from oil properties then producing vigorously in both North and South County fields.[1] Oil production continued to generate a substantial part of county tax revenues: for example, 33 percent in 1953, by one industry estimate (*Santa Barbara News-Press*, October 2, 1954). School districts were also fiscal beneficiaries of oil; in 1959, Standard Oil alone channeled $1,050,000 in taxes to one local high school district (*Santa Barbara News-Press*, June 19, 1959). Some companies (for example, Signal Oil) challenged their local tax assessments as too high, foreshadowing a source of conflict that continues to the present.

Many companies took visible efforts to be the "good neighbor." The list of civic projects paid for by the oil companies is extensive and goes back a long time. A Union Oil engineer and school board member, Ralph Dunlap, supervised building the Orcutt School in 1923, one of the first structures to use electricity in the area, with the oil company providing materials, funds, and trucks to haul in supplies (Nelson, 1987: 85-86). In the same year, Shell paid for the first community swimming pool in the Santa Maria Valley in Orcutt (when it acquired the Bicknell oil lease [Nelson, 1987: 48]). In 1928, Union provided the building for the first Orcutt Volunteer Fire District structure (Simon, 1990: 44, 53). In 1937, Union Oil donated its 3000+ capacity Union Oil picnic grounds to the community of Orcutt. Perhaps most notably, Union Oil "saved" Lompoc's treasured La Purisima Mission, which it acquired in 1903 as part of its general land acquisition, by transferring ownership to the county for restoration by the Civilian Conservation Corps during the Depression (Savage, 1991: 13).

In contrast to the political calm around onshore development in Santa Barbara County (at least outside the South Coast), the specter of offshore development in the Santa Barbara Channel by the late 1940s heightened local concern. With its giant platforms and sea-going vessels, offshore activity focused anti-oil sentiment well before the famous 1969 Santa Barbara Channel oil spill. Most notably, the Humble Oil Company's 1953 efforts at offshore development galvanized South Coast activists to lobby the state and national legislatures, generate media attention, and relate to the larger public the perceived injustice in oil development without local consent.

South Coast oil opponents could not stop the federal and state momentum to expedite offshore development, however. Two 1953 federal laws—the Submerged Lands Act (which deeded title and ownership of "tidelands" to the states) and the

Outer Continental Shelf Lands Act (which designated the area outside state limits as OCS under exclusive federal jurisdiction)—cleared up somewhat the controversy over which offshore territories fell under federal or state jurisdiction by granting California ownership of tidelands up to three miles from the coastline.[2] The door for offshore leasing in the Santa Barbara Channel was thereby opened at a fortunate time for the oil industry in Santa Barbara County. Following steady production declines in Cuyama Valley (the county's last great onshore field), large oil companies had turned their gaze from land to sea, giving them renewed incentives for staying in the county.

As state-controlled tidelands parcels were rapidly leased and federal OCS parcels were first put to bid by 1965, oil companies looked to coastal territories to site the necessary onshore processing facilities (the functions of which are described in Section 3.1: Basic Processes and Linkages) in the 1950s and 60s . Coastal onshore facilities became another issue of contention for South Coast oil opponents, who sought to banish facilities from the county. In some cases they succeeded, but oil opponents failed to stall oil development, as the facilities simply moved down the coast to neighboring Ventura County.

1969-1986

The 1969 blowout from Union Oil's Platform A amplified South Coast protests to heretofore unimaginable levels. Often attributed as the spark to the national environmental movement (see Easton, 1972), the resulting oil spill blackened not only the Santa Barbara Channel but the oil industry's reputation as well, as news media transmitted daily images of spill-related devastation to the world. In Santa Barbara, the social consequences were even greater. Residents took to the streets, occupied Santa Barbara's wharf, halted oil trucks, and vented their anger in other forms of civic disobedience. Get Oil Out!, Inc., a local anti-oil organization, was founded on the day of the oil spill, to be followed over the years by the creation or renewal of local environmental organizations that to this day remain powerful actors in Santa Barbara County politics. A South Coast anti-oil coalition formed across party lines, generations, and ethnicities. For the next decade local businesses, newspapers, politicians, and activists would come together to advocate oil-related restrictions and regulations—even when they would rarely unite over much else. Consequently, the oil industry lost much political support from the often-sympathetic Santa Barbara County Board of Supervisors, thereby establishing to this day a pattern of oil industry appeals of county rejections to state or federal levels. Only supervisors from the North County remained reliable allies of oil. In the future, they would muster decisions in the industry's favor whenever they could get the crucial swing vote on the five-seat Board.

The spill triggered state and national legislation to regulate oil development in the Channel. Most importantly, offshore marine sanctuaries prohibited oil drilling or transport within three miles of their borders (extended to six miles in 1980). Other legislative consequences included the creation of federal and state legislation, like the National Environmental Protection Act and the California Environmental Quality Act, that allowed input by the public and local governments in the decision-making processes for offshore lease sales, onshore facility siting, and other environmentally significant activities. As a result, South Coast anti-oil activists and county regulatory agencies transformed the politics of oil development into a two-way endeavor between the oil industry and public representatives, at first characterized by contentious negotiation, frequent lawsuits, and the growth of oil-related legislation and bureaucracy. For the remainder of the 1970s, this unprecedented way of "doing business" extended the siting and permitting procedures for onshore facilities from several months to a number of years.

In the late 1970s, presidents Jimmy Carter and later Ronald Reagan moved to expedite offshore oil leasing. After a frustrating decade since the 1969 oil spill, the oil industry again looked to the Santa Barbara Channel with anticipation when the discovery of vast offshore reserves (like the Point Arguello field) triggered renewed activity by large operators in capital-intensive offshore drilling. For several years in the early 1980s offshore production levels set new records for Santa Barbara County. Offshore development also gave new life to small ancillary oil-related firms in Santa Maria, although increasingly they were overshadowed by others in more important nearby oil regions, particularly Ventura and Bakersfield. Much to the chagrin of South Coast oil opponents, the pace of development increased throughout the first half of the decade and abated only by 1986 after the global price of oil plummeted.

1987-1996

By 1987, the drop in the price of oil brought on a contraction of the local oil industry, particularly in Santa Maria, that continues to the present. Smaller onshore operators and local service firms were particularly hard hit, thereby diminishing the size and vitality of the North County's oil industry. Due to the county's relatively less valuable grade of crude, onshore drilling became far less economical, and long-time onshore operators like Arco would eventually sell their holdings to smaller independents. For many in and out of the oil industry, the timing of this industry decline could hardly come at a worse time, since the 1986 explosion of the US space shuttle *Challenger* had triggered simultaneous contractions in the North County's military economy.

However, the 1986 price drop did not stop onshore processing projects from proceeding through the permitting "pipeline," although it may have reduced the oil and gas volumes these projects might otherwise handle. Most notably, after four years of permitting controversy, Chevron's Gaviota facility came on-line in 1987 albeit not without 11th hour hurdles; the county's approval of Chevron's permits narrowly survived a county referendum (described further in Section 4.2: Campaign Contributions). Many South Coast oil opponents resented Chevron's perceived failure to mitigate the facility's visual impacts as promised; for example, one former county administrator we interviewed described the facility as "a spectacular monstrosity right there on the coastline." Visible to drivers on the state's major coastal highway, the Gaviota facility would symbolize for many oil opponents an industrial legacy that intruded on other local industries like tourism.

In the 1990s, the polarization of attitudes on oil between the North County and the South Coast continues. Many operators have abandoned development in the Channel and onshore, mostly due to brighter oil prospects overseas but at least in part due to the political environment faces in Santa Barbara County. The CEO of one major oil company active in the Santa Barbara Channel claimed local environmental regulations and bureaucratic intervention were so strong that the former Soviet Union was more supportive of oil activity than what he called "the People's Republic of Santa Barbara County" (*Dallas Morning News*, June 16, 1996). The exodus of major oil companies from the county has been particularly dramatic for the North County. Most prominently, in 1995 Union Oil (now known as Unocal)—once so important to the economy, philanthropy, and social life of the North County—sold off all its California properties, including its Orcutt office, to Torch, an independent oil company.

Yet while the fates of individual oil-related projects in the county still cannot be guaranteed, some evidence suggests anti-oil opposition has recently dropped off. For example, South Coast residents helped halt Mobil Oil's proposed "Clearview" slant-drilling project in a 1996 county referendum (Measure A) that limits such coastal development to existing consolidated sites for onshore facilities. However, the South Coast-based county newspaper and business community defected from this hard-line position, in contrast to their historic anti-oil alignment.

Although anti-oil sentiments may be softening in the South Coast, the county's economy moves further away from an industrial or fiscal dependence on oil development, particularly when compared to growth in other sectors. In the South Coast, health care and high-tech are the fastest growing sectors, while the downsizing of Vandenburg Air Force Base has created some momentum in the North County to look to commercial space ventures for economic opportunity. Educational levels throughout the county are rising, as is the proportion of jobs taken up by people who rely on such education. Even agriculture, long a pillar of the county's economy, is shifting toward high-value, culturally "sophisticated" forms like wine vineyards (which sometimes double as upscale tourism destinations). While these social transformations do not preclude oil development from finding a hospitable reception in the future, they suggest a growing chasm in Santa Barbara County between resource extraction and the sectoral and demographic profile that traditionally accompanies it.

Notes

1. In spring of 1929, Rio Grande Oil executive (and later Atlantic Richfield CEO) Charles Jones appeared before the Santa Barbara County Board of Supervisors to protest a $650,000 tax bill. The board chairman reportedly told him, "Charlie, we are building a new courthouse, and you are going to pay for it. Now please redo the tax bill in any way that pleases you, as long as you don't change the amount of tax on the bottom line. We may even name the courthouse for you" (Jones, 1972: 53).

2. Other states' tidelands jurisdictions extend further than three miles from the coastline. The state of California continued to press claims that its jurisdiction began seaward of the Channel Islands until 1965, when the US Supreme Court ruled otherwise. Newly authorized by this decision, the federal government prepared to issue the first federal OCS lease in the Santa Barbara Channel that same year (Lima, 1994: 232).

Section 4.2
Campaign Contributions

As a part of our study of the oil industry's social impacts, we have examined how the industry has influenced county politics. As we have seen, Santa Barbara County has a history of oil related regulatory initiatives (see Section 4.1: Local Support and Opposition). In this section, we analyze all of the initiative campaigns of the past from a contemporary standpoint. First, however, we examine campaign contributions from the industry to candidates for the county board of supervisors.

Previous studies of state and federal campaign financing have used campaign contributions as an indicator of electoral success, finding that eighty percent of candidates with the most money win (Cronin, 1989). However, our study of electoral contests between candidates for the Santa Barbara County Board of Supervisors (since 1976) has found that candidates with the most money win only approximately fifty percent of the time.

Approximately one-half of all candidates for the board of supervisors receives contributions from oil companies. Of the candidates who receive industry money, industry giving composes an average of two percent of their total campaign contributions. In the North County, where industry activity is greatest, five percent of contributions come from the industry. From 1976 to 1990, industry contributions to candidates remained relatively low, never exceeding four thousand dollars. However, this trend changed with the supervisorial campaign of North County rancher Willy Chamberlin. Industry giving reached a record high in 1992 ($7,101) when candidate Chamberlin received all but $150 of the industry's contributions. Furthermore, industry giving reached another all time high in 1996 ($14,690) when candidate Chamberlin received all but $2,200 of the industry's contributions.

Campaign contributions from the oil industry to Santa Barbara County supervisorial candidates seem to be greatest to candidates that have a shared interest with the industry. In this regard, aside from Willy Chamberlin's participation in county politics, he also has over three million dollars personally invested in mineral rights. However, campaign contributions to Santa Barbara County supervisors are relatively minor when compared to industry giving to campaigns opposing countywide, regulatory initiatives and referenda.

Initiatives and referenda are two mechanisms that both citizens and industry can use to nullify or enact public policy decisions. Such campaigns put an issue on the minds of both voters and policy makers, influencing public discourse and the agenda of county government (Thomas, 1990). Both San Luis Obispo and Santa Barbara Counties have had several regulatory initiative campaigns while Ventura has had none, reflecting how production is relatively non-controversial in the latter county.

1950-1968

The first referendum to regulate production in the tri-counties took place in Santa Barbara County. Following a 1968 County Board of Supervisors decision to permit a Humble (latter named Exxon) processing plant in Carpinteria, a citizen committee collected signatures to place a repeal referendum on the ballot. While a majority of voters in northern Santa Barbara County and Carpinteria supported the plant, oppositional votes from the county's South Coast prevented the construction of the facility (Sollen, 1998: 43; *Santa Barbara News-Press*, February 23, 1975).

1969-1986

In 1975, the County Board of Supervisors permitted Exxon to build a processing facility (at Las Flores Canyon). In an effort to repeal the supervisors' decision, the County Environmental Alliance led a petition drive to put a repeal referendum, "Proposition A," on the ballot. While 58 percent of South Coast voters opposed the facility, North County votes were responsible for the narrow defeat of the referendum. The County Environmental Alliance spent $23,793 on their unsuccessful campaign to reject the facility, while the industry gave approximately $300,000 to an opposing campaign that supported the construction of the facility (Sollen, 1998: 102-103).

Aside from referenda concerning a particular facility, several county initiative campaigns attempted to make future OCS development more difficult by requiring voter approval for the construction of each new OCS-related onshore facility. In 1985, Citizens for Responsible Oil Policy led a campaign to place a voter approval policy on the ballot. The so-called "Measure A" would have required voter approval of any new onshore developments located outside of one South Coast site (at Las Flores Canyon) and another site in the North County. Furthermore, the measure called for improved air quality regulations and required that shipments be made by pipeline (as opposed to tankering). Unlike Measure A, which was put on the ballot by a citizen organized signature drive, an opposing "Measure B" was put on the ballot by the Board of Supervisors. Measure B called for many of the same reforms of Measure A; however, Measure B was an advisory poll which was not legally binding. Citizens for Responsible Oil Policy raised

$103,557 for their unsuccessful campaign to support Measure A. The successful campaign to oppose Measure A was led by County Citizens for Local Controls; their campaign was by five times the most expensive in the county's history, spending $1,220,000 ($28.18 per vote). Over ninety-nine percent of contributions to County Citizens for Local Controls came from the industry. Measure A did not receive a majority of votes in any of the county's precincts (Rankin and Dalton, 1985).

1987-1996

A second voter approval initiative dubbed "Measure A" was put on the ballot in 1996, requiring voter approval for new onshore facilities that serviced offshore platforms on the South Coast (located outside of Gaviota and Las Flores) (see Section 4.1: Local Support and Opposition). While this measure locally controlled OCS developments on the South Coast, it did not apply to the North County, where onshore support facilities did not require voter approval. The Coalition for Voter Approval raised $102,620 for their successful campaign to support Measure A. The measure was opposed by Taxpayers for Full Disclosure who spent $105,400 to oppose the initiative. Over ninety-nine percent of their contributions came from the industry, and much of the campaign staff was composed of company staff (*Santa Barbara News-Press*, March 27, 1996). Thus, while the oil industry is not a regular player in candidate elections, oil companies play a strong role in initiative and referenda campaigns where their interests are directly at stake.

A North-South Split?

As we have seen, throughout Santa Barbara County's history of oil related initiatives, voter attitudes toward the oil industry have been divided between the North County (including the cities of Santa Maria, Guadalupe, Lompoc and Solvang) and the South Coast (including the cities of Santa Barbara and Carpinteria). Table 4.2 shows the percentages of votes cast for and against Santa Barbara County's regulatory initiatives. The split between the North County and South Coast is strongest in 1975 and 1985. In 1975, 74 to 85 percent of North County voters supported the construction of the processing facility (at Las Flores Canyon), while 39 to 58 percent of South Coast voters opposed the facility. In 1985, the regulatory Measure A received the most support from the South Coast and the least support form the North County (as little as fifteen percent in Santa Maria and Guadalupe).

However, this voter pattern changes in the 1996 Measure A vote. While a greater percentage of South Coast voters supported the regulatory measure than in the North County, North County votes are relatively evenly split on the issue. The dramatic increase of North County voters has also given rise to more mixed voter attitudes towards the oil industry. During our study period, the number of registered North County voters increased from under 19,000 in 1975 to almost 48,000 in 1996. These patterns suggest that, while North County voters are still not as opposed to the oil industry as South Coast voters, North County sentiment toward oil is becoming increasingly diverse.

Table 4.2.1: Percentages of votes cast

	A 1975 (Y/N)	A 1985 (Y/N)	B 1985 (Y/N)	A 1996 (Y/N)
Carpinteria	61% / 39%	34% / 66%	75% / 25%	54% / 46%
Guadalupe	80% / 20%	15% / 85%	69% / 31%	43% / 57%
Lompoc	74% / 26%	30% / 70%	76% / 24%	48% / 51%
Santa Barbara	42% / 58%	49% / 51%	83% / 17%	63% / 37%
Santa Maria	85% / 15%	15% / 85%	73% / 27%	44% / 56%
Solvang		37% / 73%	80% / 20%	49% / 51%

Source: Santa Barbara County Elections Division.

Section 5
Labor

In this section we describe the culture, politics, income, racial, and gender composition of California petroleum labor. Many of our sources focus on oil labor in the Western United States, the state of California, and the Central Valley. We used these sources in conjunction with interviews with tri-county oil workers, tri-county union representatives, contractors and corporate personnel, and local archival documentation. We provide the reader with a historical context that begins in the 1900s. During the early years California's oil labor force was unique compared to its counterparts in other US oil producing states. This unique character resonates in later decades and provides a context for oil labor trends that are specific to California. The description of the later periods (1950-1968, 1969-1986, and 1987-1996) focuses specifically on the tri-counties by utilizing personal interviews, local archival documents and statistical data.

Early Twentieth Century

The popularity of the automobile in the early 1900s, the United States' involvement in World War I, and the demand for petroleum products stimulated oil exploration and production in California (Williams, 1997). Large and small firms from other parts of the US converged on the state to extract oil and needed laborers that were innovative and savvy about the elusive California geology. Their geological expertise and willingness to improvise standard drilling techniques of the time distinguished the California workers from oil workers elsewhere in North America. While California crude sprung to the surface, oil well workers were becoming an effective political force in Central California and the tri-counties. They changed the organization and compensation of oil employment, thereby creating a unprecedented climate compared to oil production work in other states. In so doing, the workers embodied a distinctive "working man's" culture that was exclusively white, male, and resistant to outsiders throughout the majority of twentieth century.

Early 20th century oil production entailed a 12-hour-a-day/seven-day-a-week shift, a wage that fluctuated according to a given day's oil price, and inconsistent hiring and firing practices governed by nepotism. Field and refinery foremen ran their oil fields as if they were small fiefdoms run by "little kings" (White, 1962: 522). According to oil historians, the route to promotion in the oil field often depended upon familial connections, friendship with a boss, or "skill on the baseball diamond" rather than one's dedication to the job (White, 1962: 523; see also Quam-Wickham, 1994; Davidson, 1986). Aside from being subjected to the will of "the man" in charge by being hired or fired without any warning, the oil field workers were also estranged from their families due to long work hours. Employment practices involved hiring native-born Americans, few women, and primarily men under 40. Management did as it pleased so long as operations were conducted efficiently and company profits were maintained (White, 1962: 522). This approach to doing business led field workers in both large and small companies to form deep cultural and social bonds with one another and motivated them to unionize.

United States oil producers came under criticism by field workers who used unionization and strikes as methods to gain just treatment and fair compensation for their work. For instance, a 52-day strike was held on December 22, 1917 along the Gulf Coast. The Gulf Coast workers made modest demands for an eight-hour workday; they struck but eventually went back to work defeated without any concessions. In 1915 the Bayonne, New Jersey, Standard Oil refinery also experienced troubles. Refinery workers at the Bayonne plant went on strike to demand the eight-hour workday, as well as more pay. Standard, under the guidance of John D. Rockefeller, Jr., took a heavy-handed approach to controlling the workers by hiring gunmen. This strike ended after a bloody confrontation between workers and the company when nine strikers were killed and 50 were wounded. After this melee, the workers were demoralized and afraid to continue unionizing efforts (Davidson, 1988).

At the same time, workers in California began to organize, but their situation was different than in the Gulf Coast and New Jersey. First, due to Standard's unpopular public persona in the wake of anti-trust legislation and tumultuous relations with eastern workers, Rockefeller sought to enhance the company's public image by bargaining with strikers and agreeing to some of their requests. Second, many of the oil workers in California migrated from other oil producing states, bringing with them years of oil production experience.[1] In addition, their years in California brought them a keen understanding of California geology that was invaluable to many oil producers, both large and small, who converged on the state. California workers had priceless "on-the-job" experience extracting oil that gave them bargaining leverage to gain concessions from western oil producers that their laboring counterparts on the East Coast and in the Gulf States did not have.

The early 20th century California oil field worker had experience in dealing with a deceptive geology that led historian Quam-Wickham to conclude that many early California oil producers were defeated by the state's unusual geological formations. She notes that "millions of years of seismic activity had uplifted, tilted, warped, folded, and compressed the strata, leaving pockets of petroleum trapped in deep formations impossible to reach with the drilling technologies of the time" (Quam-Wickham, 1994: 6). Thus, oil well workers often used their ingenuity and experience to modify fishing tools or old drill bit designs in order to manage harsh California geologic conditions (Quam-Wickham, 1994).[2] Early California oil workers were thought to be familiar with better extractive strategies, and firms searched for the most knowledgeable and experienced workers to hire. These firms' expectations of their workers perpetuated an unusual labor relationship where management often deferred to their workers. This deference led to "a pattern of industrial relations accentuating workers' initiative, inventiveness, and autonomy that would remain unchallenged until the progressive era" (Quam-Wickham, 1994: 7). Years of drilling experience became an expectation as well as a necessity in the California oil field. These requirements perpetuated a distinct oil field culture. Even today, when technology has displaced the keen senses of the oil driller, the pride inherent to oil field culture perseveres.

Given these unique working conditions of the early 20th century in California, the oil worker engaged in camaraderie that consisted of sometimes brutal humor against novice oil workers due to their perceived inexperience in the field. Many field workers and managers expected that an oil field worker was a "special breed" (Quam-Wickham, 1994).[3] New workers to the California oil field often experienced harsh initiation rituals that would differentiate a worker who "fit in" to the prevalent masculine culture from those who did not: "Initiation rituals affirmed the 'special character' of oil field work, highlighting the manliness of older workers' experience and skill by emphasizing a novice's sexual, social, and occupational inferiority—basing inferiority on his lack of skill" (Quam-Wickham, 1994: 45). These initiation practices had two purposes: to differentiate the weak from stronger, more reliable workers, and to create worker solidarity against the harsh practices of management (Quam-Wickham, 1994).

By 1916, union activism in California oil fields was on the rise. California oil workers wanted an eight-hour day, similar to oil workers on the East Coast and the Gulf States. However, California workers also demanded a six-day work week and wanted consistent pay rates that were independent of the fluctuating oil prices. California oil workers had more success obtaining concessions from the operators due to three major factors: more valuable on the job experience, supportive social networks, and local political support (Davidson, 1988; Quam-Wickham, 1994).

Early on, women, while not officially hired by oil producers, also began a long history in oil and oil unionism. Many workers had unlimited support from their wives who would personally benefit if their husbands unionized.

In a documented example of how oil field wives were implicated in the everyday work of their husbands, wives ran the fields while male field workers took lunch breaks (Quam-Wickham, 1994). In addition, the women were often left behind by their husbands, who could be transferred without warning or compensation to new work sites by the company. The wives of the transferred oil field workers would stay behind to pay off bills, take kids out of school, enroll them into new schools, pack all the family's belongings, and sell the house in order to join their husbands and set up their new residences (Quam-Wickham, 1994). Their uncompensated labors persuaded women to participate in oil union meetings and strikes. Women became a significant force during the 1916-1922 oil labor strikes and encouraged their working husbands to strike in hopes they would gain more reasonable working hours and better pay (Davidson, 1988).

The pressure placed on companies in Kern County, Santa Maria, and Orcutt came from not only oil workers' wives; in the case of the 1921 Kern County strike, it also came from the local sheriff's department (Quam-Wickham, 1994; Davidson, 1988). During this strike, the Kern County sheriff "deputized about 100 men, of whom all but fifteen were reported to be strikers" (Quam-Wickham, 1994: 233). This kind of community support empowered the International Association of Oil Field, Gas Well, and Refinery Workers of America and forced some companies into negotiations with workers. Central California oil workers built a union that was a political machine from 1916 to 1922. The tri-county workers in 1917, who today are believed by many to be the most difficult group of workers to organize,[4] had one of the biggest bargaining units in California. For example:

> Union organizers claimed that 90 percent of the oil workers in the Santa Maria oil district were organized, their collective power "casting a large shadow" over industry in that region. Approximately 11,000 workers had joined Oil and Gas Well Workers' federal union locals by the end of November 1917, making the oil workers, according to one State Federation of Labor official, the largest group of organized workers in any single industry in the San Joaquin Valley (Quam-Wickham, 1994: 163).

California oil workers gained power during the early 1920s that would be unequalled throughout the rest of the century.

With greater economic resources, large international operators had economic and political power over smaller companies and were interested in undermining the power of organized labor at any cost. For instance, Standard Oil of California instituted the eight-hour workday and standardized the pay rate without signing union contracts (Quam-Wickham, 1994; White, 1962;

Davidson, 1984). This move compelled smaller operators to maintain open shop bargaining units that averted the power of organized oil labor by satisfying workers with minor concessions. Small contracting firms also instituted the eight-hour workday as a reaction to Standard's move. To discourage these trends, representatives from other large firms convinced smaller firms and contracting firms to keep the 12-hour workday by threatening to withhold future drilling contracts. Some smaller oil companies also fought hard against the union and succeeded in maintaining an open shop because larger more powerful firms "doggedly rejected unionism" (Quam-Wickham, 1994: 167). The oil union struggled throughout the rest of the century to regain the bargaining power it once had, and it began lobbying congress for industrial workers rights in general (Davidson, 1988; Quam-Wickham, 1994; White, 1962). Throughout the 20th century, most oil workers in Southern California were unaware how much the union continued to negotiate with companies and the federal government in the interest of workers. For instance, major worker health and safety legislation passed Congress in to the oil workers union's efforts.[5] However, even though the collective bargaining power of oil labor began to diminish at the workplace in the 1930s, oil work retained its status as a well paying job up to the present.

1950–1968

Industry Trends

Our data show that from the 1950s on, oil workers were better paid than their manufacturing and retail trade counterparts.[6] This trend is a result of early oil labor demands and union activism that was unique to California oil labor. Figure 5.1, at the end of this section, shows that in 1950 petroleum workers in California earned an average wage of $3,916 a year, which was more than California manufacturing employees who earned a yearly income of $3,400. The state's retail trade employees earned an average yearly wage of $2,737.[7] The earning gap between petroleum industry workers and the other two employment sectors remained consistent in 1955 when petroleum workers made an average yearly wage of $5,063, manufacturing workers made an average yearly wage of $4,432, and the retail trade workers averaged a yearly wage of $3,348. Our data continue to show this consistent trend in the 1960s. For instance, in 1960 California petroleum workers earned an average wage of $6,048, manufacturing employees earned $5,423 a year, and retail trade employees earned $4,077. Towards the end of this time period in 1965, petroleum work continued to be a better paying job than the other two sectors with an average yearly income of $7,142. California manufacturing employees came in second with an average yearly wage of $6,343, and California retail trade workers earned $4,850 during 1965, which was the lowest average yearly wage of the three sectors. Working for California petroleum firms provided higher pay than the other two job sectors. The industry also provided its blue collar workers with benefits that were commonly associated with white collar professionals. For instance, major oil producers often offered their workers stock plans, family health care (including dental, sick leave) and vacation time.

More mineral extraction workers lived in Ventura County than in Santa Barbara County during this first period.[8] For instance, as seen in Figure 5.2 at the end of this section, in 1960 the number of mineral extraction workers residing in Ventura County was 2,800, while in Santa Barbara County there were only 900. In 1965 the volume of tri-county residents working in mineral extraction industries changed slightly. For instance, during this year 2,400 Ventura County residents were mineral extraction employees, which is a 400 person difference from 1960. In Santa Barbara County during the same year, the number of persons working for the mineral extraction industry went up by 100 to 1,000 people. These numbers remained constant in the 1970s and increased during the 1980s as oil activity increased off the tri-county coast.

The 1950s brought technological advancement that further undermined the collective power of labor. As previously stated, workers during the early part of the century had expertise and knowledge about California geology that was relied upon by managers. This relationship began to deteriorate in the late 1930s, when oil firms began hiring formally schooled engineers to create more efficient drilling processes, machines, and tools to extract oil. Computers and state of the art automation promised efficiency that surpassed oil field worker ingenuity and reliability. Ideas and new products were manufactured by engineering firms that specialized in design and construction of fabricated offshore oil rigs and state of the art drilling machinery that could tap oil reserves previously deemed impossible to reach (see Section 7: Technological Innovation).

An overall industry trend during the 1950s, across the US, was to change traditional work practices. For instance, trained machinists were being told to do work outside their craft (see Davidson, 1988), and companies began to rely more heavily on oil field contract workers who were called in to fix sub-surface equipment, change corrosive pipes, replace pumper rods, and perform down-hole fishing jobs. The development and initial implementation of sophisticated technology and advanced machinery further eroded the influence which oil workers once had. Oil field and refinery foremen began cutting labor costs, due to the implementation of new technology that allowed management to maintain high production with fewer workers. In addition to lay-offs, other labor trends included cross-craft assignment and the transfer of employees to refineries and oil fields in the Los Angeles Basin and other California regions outside the tri-counties.

Regulating and diversifying

Following World War II, women, initially hired to fill vacant positions, were laid off to make room for the returning veterans. According to Quam-Wickham (1994), female presence in the oil field was always peripheral prior to World War II, and the only time women were hired in blue collar refinery jobs was during the war. This female presence in oil was short lived, and even then it was exclusively in the refineries. By the 1950s, the demographics of the industry reverted back to the traditional hiring practices of employing predominantly white, American men. For example, it was understood that in 1958 when Platform Hazel was built in the Santa Barbara Channel, women were "not allowed." This fact was noted in a 1958 *Santa Barbara News-Press* article where the reporter proclaimed, "It has been a man's world so far" (Schermerhorn, 1958). Even though women were not allowed on the oil platforms, they did obtain jobs in local compnay offices and research laboratories.

Throughout the 1950s and 1960s, there were accomplished tri-county female residents who worked for oil companies as not only secretaries but geologists, physicists, and chemists. Although they worked in comparable male professional jobs, their talents and expertise were underestimated by the companies they worked for. The women's individual contributions were belittled by the job titles they were given. For instance, the *Ventura County Star-Free Press* (October 16, 1954) reported about Virginia Tondel, who was employed in the Ventura offices of the Shell Oil Company in 1954. Tondel studied at Cambridge, where she received her Bachelors of Science degree in chemistry, and later obtained a Masters of Science in chemistry at the University of California in Los Angeles (where she also taught physics courses). At Shell Oil, she compiled statistical information on the permeability of oil sands for the entire Ventura Avenue Field. Still, the oil industry referred to Tondel as a "clerk." This alludes to how, aside from being completely excluded from working in refineries and on production rigs, professional women's contributions were systematically undervalued in the petroleum industry.

The presence of women in the oil industry during the 1950s and 1960s is exemplified by the prevalence of the Desk and Derrick Club, which originated in 1949 (*Ventura County Star-Free Press*, 1957). The Desk and Derrick Club's main purpose was to provide women who worked in the petroleum industry with a means of understanding the oil industry that "they serve" (*Ventura County Star-Free Press*, 1957). Although it was defined as a women's "club", rather than a professional association, the Desk and Derrick Club did organize technical and educational symposia around contemporary petroleum issues that served women chemists, geologists, and others in their oil work. In addition, the Desk and Derrick Club provided a forum where women shared research discoveries and innovations with each other. While women were being hired in peripheral tasks or were not getting the recognition they deserved, during this period minorities were non-existent in the tri-county industry. The homogenized racial character of the oil industry would change later in the century due to affirmative action laws.

Unionism

Oil remained an industry of good wages and employment benefits even as the union waned as a counterforce to management. Union decline was most prevalent in the tri-counties. Workers became more apathetic towards the union and many deemed the union as unnecessary. Most of this indifference was tied to the oil producers' public relations strategy to convince the workers that any concessions they received were voluntarily granted by the oil producers (Davidson, 1988). From the 1950s to the present, the tri-county workers were known for being "not pro-labor," according to an Oil, Chemical and Atomic Worker's International Union AFL-CIO (OCAW) western regional representative. One example, among others, of how anti-union sentiment in the tri-counties was perpetuated during the 1950s relates to the structure of offshore oil work. To begin with, oil platforms are primarily run by automated machinery and computers that have the ability to produce oil without the constant attention or presence of individual workers. In addition, workers were more isolated from onshore workers in the Santa Barbara Channel which acted as a strike deterrent.

Another aspect that has weakened the petroleum workers' union since its inception is the fact that the industry is an "open-shop" which lessens the workers' willingness to join and pay the required union dues.[9] In contrast to anti-union sentiments expressed by platform workers in our interviews, according to one union representative refinery workers in Los Angeles and the Bay area were more supportive of labor organizing. Another element that dissuades workers participation in the union is that the tri-counties primarily consist of upstream production.[10] For instance, onshore field workers in the region are dispersed, while offshore workers are isolated and well paid. These factors make union solidarity and organization difficult.

Industry Trends

During the late 1960s, 1970s and 1980s oil work maintained its status as a well paying job compared to other comparable California employment sectors. Figure 5.1: Yearly wages by California industry, at the end of this section, shows that in 1970 petroleum workers had the largest average income compared to manufacturing and retail trade.[11] During this year California petroleum workers made a wage of $9,569 a year. Manufacturing employees came in second with an average yearly earning of $7,825 a year, and California retail trade offered employees the lowest wage for that year, $6,064. In 1975, the state's petroleum workers continued to earn a high average wage of $17,732. Manufacturing employees earned an average yearly wage of $10,702, and retail trade employees earned the lowest average yearly wage of the three industries at $7,956. This trend remained consistent through 1980 when California petroleum workers earned an average wage of $22,984. Manufacturing employees earned an average wage of $15,816, and retail trade was low paying with a wage of $11,506. The figures for 1985 show petroleum workers earning a $28,964 average wage. California manufacturing earned a $21,155 average wage. Finally, retail trade earned an average of $15,017. These figures illustrate that petroleum work remained a comparatively well paying job.

The 1969-1986 period is characterized by slight increases in the number of Ventura and Santa Barbara Counties residents who worked for mineral extraction industries. According to Figure 5.2, at the end of this section, the number of mineral extraction workers who resided in Ventura County in 1970 was 1,800, while only 1,000 extraction workers resided in Santa Barbara County. In 1975, 2,000 Ventura County residents worked for the mineral extraction industry, while in Santa Barbara County only 900 residents held similar jobs.[12] In 1980, our data show that 2,600 Ventura County residents worked for the mineral extraction industry, compared to 1,500 Santa Barbara County residents. In 1985, 3,300 Ventura County residents worked for the mineral extraction industry while only 1,500 did so in Santa Barbara County.[13]

Regulating and diversifying

Oil producers during this era were confronted with a barrage of local, state, and federal governmental regulations. These regulations required many tri-county companies to decrease their industrial pollution, encourage diversity in the predominantly white male workforce, and ensure workers' health and safety while on the job. Many of these regulatory changes were met with resistance from oil firms and their workers. The continued adherence to traditional ways of doing business led to discrimination suits and federal oversight regarding workforce diversity. In addition, governmental pollution fines were levied against individual workers and/or the company. Even though California industry was the center of public scrutiny and environmental regulation, this trend was intensified in the tri-counties by the 1969 Santa Barbara Channel oil spill (for more information on community reaction to the spill, see Section 4.2: Local Support and Oppostion). This increased public attention has influenced the way oil work is accomplished in the tri-counties. Furthermore, this public scrutiny has altered the way some individual workers view their relationship to the environment, which has long term implications for petroleum production in the region.

New technologies, instruments, and systems were introduced to meet environmental regulations. Oil field workers (especially platform workers) were forced to learn about new equipment and to have a working knowledge of environmental regulations that were relevant to oil production. Companies found it necessary to send workers to training classes to brush up on old and new laws. Basic oil production processes that came under strict environmental regulation included waste water production and air emissions (see also Section 7: Technology). Workers in the Channel had to monitor and fix leaky pipes, flanges, and valves, or they would be held financially responsible for pollution resulting from carelessness while on the job. Performing environmental safety tasks monopolized a quarter of each oil platform worker's 12-hour workday.[14] For instance, governmental regulators assured compliance to all pertinent regulations by forcing companies to monitor the workers strictly. Each task required a certain amount of paper work to assess its environmental or safety impacts. The regulatory requirements fostered change in tri-county oil workers' perceptions of pollution, from a normal, insignificant part of production to something that should be prevented.

In our interviews, tri-county workers claimed that they did not want to harm the surrounding environment, saying things like, "I don't want to violate anything or make things dirty," as one platform worker commented. The changing attitudes of oil workers exemplified a transition from traditional assumptions regarding oil field work and how the oil workers saw themselves. In the following, a worker employed offshore Santa Barbara relates a conversation she had with an agency representative who held a traditional view of what it meant to be an oil worker.

> He said, "How do you know so much about all this [environmental regulation]?" I said, "Well I am an environmentalist; I care about the environment." He said, "Well you are in the wrong job." I said,

"Actually no I don't think so. What better place for me to be than right here on the wellhead where everything's happening. Really, you should have more environmentally sensitive people if you really want to watch-dog the place."

Aside from environmental regulations in the 1970s, the federal government also began requiring companies to diversify their workforce. Major oil companies were required by the federal Equal Employment Opportunity Commission (EEOC) to comply with federal affirmative action standards.[15]

Tri-county oil producers were audited for the diversity of their workforce by the EEOC every two years or when the agency deemed it necessary (this depended on an industry's diversity reputation). Companies are required to compile data sheets regarding racial and sexual composition of their workforce. The EEOC compares the expected national percentages for each place of operation to each companies' data sheets. If a company is found to be out of compliance with EEOC expectations, they receive a letter of "non-compliance" and a recommendation sheet advising change. If the company continues to be in non-compliance with EEOC rules, that company risks losing future federal contracts (Parikh, 1997; Graham, 1990). Thus, oil operators in the tri-counties during the 1970s and 1980s began to actively recruit women and people of color to work in their tri-county production facilities. The late 1970s and early 1980s brought more platforms to the Santa Barbara Channel, which in turn provided women and people of color an opportunity to work in oil. These newcomers met resistance from the predominantly white, male workforce that resented the forced integration producing a more racially and sexually diverse workforce.

There was initial overt resistance among many of the white, male employees towards the hiring of women and people of color. Most of these newcomers, unlike their white male counterparts, claim to have had minimal or no familial connections to the oil industry or previous oil experience. These workers attributed their employment to affirmative action policies.[16] Thus, aside from being of a different race or sex than the traditional oil field worker, these new workers were further alienated from their white male coworkers due to their inexperience within the industry. The tension between old ways of doing work made many new recruits uncomfortable in their new oil field jobs.

New tri-county recruits during the 1970s and 1980s learned to use tools, run drilling rigs, and "get along" with their coworkers. The women that came on board in the 1970s and early 1980s knew the male workers resented them because their male work culture was being infringed upon by inexperienced outsiders. According to a woman who was employed in 1977 as a roustabout oil field worker, she was initially surprised by the prevailing work culture:

> Here I come from a little banking industry. You don't hear people using foul language all day long. Every word that comes out of [the oil worker's] mouth is son-of-a-bitch this... God damn that.... It just made me cringe every time I heard it, at first. I had no idea that people talked like that all the time every day. It was a manly thing. They didn't talk like that while they were at home; they just did it while they were at work.

She goes on to explain that as the newcomer in the field, she was told to do the least desirable jobs; she also related how before she arrived at the field, the men had placed bets on how long she would last:

> They felt that I was a woman taking away a man's job.... So I went through a lot of really cruel abuse on a daily basis. They already had bets out on how long I was going to last when they found out I was coming on. Some of them said two weeks. Some said a month. Some said I'll give her two months. They didn't think I would survive, that I was going to cut it.

Many of the hardships the oil field women experienced during the first years on the job mirrored this woman's experiences. Men's resistance led some women to complain to management, file sexual discrimination suits, or quit their jobs. Conflict between "old timers" and these new arrivals became a point of contention which manifested itself in the courts when charges were filed against companies for harassment and discrimination.

These suits encouraged tri-county companies to implement policies that prevented workers, at all levels, from engaging in discriminatory behavior and sexual harassment. Some companies in the tri-counties went so far as to require sensitivity training programs that schooled workers on company policies against harassment of any kind. In addition, companies created processes for making anonymous complaints to management regarding any forms of harassment, ranging from off-color jokes to pornography to verbal abuse and physical attacks while on the job. Due to these company programs, policies and the proliferation of sexual harassment suits, workers engaged in more covert styles of "horseplay" and were more careful with whom they joked. According to the reflections of one old timer, who worked on the platforms and in tri-county processing plants since the 1950s, some of the jokes that were told to his female coworkers would not be tolerated today:

> Yep, I saw a whole lot of it which would definitely be considered discrimination today. And it was, but it wasn't done that way. It was done in a friendly, joking manner. But you wouldn't do it today. Your boss would have to get you and say, "God damn it you don't do that!" You would have to counsel the person, and put it in his record! You just can't do that! And that is fair enough. You shouldn't. I was as guilty, maybe more so than anyone, as I think back. And I have thought back many times and thought about how ridiculous it was. Really, what might have been funny to some other guy, it sure as hell wasn't funny to the gal.

Even though policies were implemented, teasing amongst the workers became less obvious, and "oil field culture" persisted more subtly. The women that were most likely to experience success in oil field work in the 1980s and 1990s were those that would stand up for themselves when they felt they were being treated unfairly. They also had a willingness to work hard, get dirty, and engage in oil field humor without being offended. Today some women still work in the tri-county oil fields—some are electricians, some are operators, and others have moved up to field supervisor positions. Many of these successful women felt they "proved themselves" in the field by working hard, learning fast, and getting along with their predominantly male coworkers. In many cases, the women claim that they have to work harder and better than the men in order to gain equal recognition. A woman could find herself being harassed incessantly by her male coworkers if she allowed them to push her around, if she was too sensitive about the joking, horseplay, and foul language, or if she showed weakness by crying and being afraid of the work. According to this woman, a 20 plus year veteran in the oil field and currently working in the tri-counties:

> You have to be a strong willed type of person, and you must be able to stand up for yourself.... You have to be assertive. You have to be outspoken. You have to be willing to do whatever the job is and give it your best shot. You have to be a team player not just a team member. You got to contribute something and make people hear what you have to say.

Industry adherence to affirmative action regulations resulted in the change of popular perceptions regarding oil field workers. Unlike the 1950s article from the *Santa Barbara News-Press* noting the exclusion of women from the male dominated platform jobs, during the 1980s the *Santa Barbara News-Press* celebrated the inclusion of women in the oil field:

> The job sometimes involves tending an offshore oil platform alone overnight in a storm, but Barbara Haunsen said getting the job "is the

> best move I ever made." She is one of four women in Chevron's offshore production department who take the operation of a platform with 20 to 50 wells in stride. "We had power dips during the recent storms, but no long-term problems," said Miss Haunsen. "That's what we're there for—to see that everything runs right" (Sollen, 1983).

A third type of regulation that altered oil workers' lives was worker safety. These regulations were supported by the oil workers' union which, although diminished in strength since the 1930s, continued to lobby for improved working conditions.

Unionism

In the 1969-1986 era, workers tended to join the unions but remained skeptical of the union by claiming that the union was weak or "hand in hand with the company" (Oil Platform Worker, 1998). Many complain that the union will do whatever the companies want it to do, regardless of what the workers desire. Other oil workers do not like the idea of getting equal pay for unequal work, claiming that "some of the workers are really lazy and they get paid the same because of union policy."

The Oil, Chemical and Atomic Workers International Union, AFL-CIO (OCAW) was the largest affiliated oil union in the tri-counties at this time.[17] It represented Shell workers, Santa Fe Energy workers, Texaco workers, and Arco workers. Another union in 1964 became affiliated as the International Union of Petroleum and Industrial Workers, SIUNI AFL-CIO (IUPIW). During this period it represented Chevron offshore and onshore, Unocal onshore and offshore, and a couple tri-county contractors. Aside from these unions, some independent unions in the tri-counties were not affiliated. Exxon was a major oil producer in the tri-counties that refused to recognize any union; its workers were organized into a federation of workers who were not protected by the AFL-CIO and did not have similar bargaining power with the company. Among these unions and worker organizations, the OCAW had the biggest western region, including 12 other states besides California. Furthermore, the OCAW was the most politically vocal. For instance, in the late 1960s, the OCAW lobbied congress for the first worker health and safety legislation, the Occupational Safety and Health Act.

In the late 1960s the Occupational Safety and Health Act was strongly lobbied for by the OCAW; the law was passed in 1970. The act was written for the health and safety of industrial workers throughout the US, and the law was enforced by the Labor Department. The Labor Department made sure that companies were providing safe and healthy work environments and that the employees had a working knowledge of how to handle dangerous chemicals. The OCAW continued to fight for more stringent health and safety laws throughout the 70s and 80s by concentrating on the three fronts—education, political action, and collective bargaining—to make companies take responsibility for the chemicals the workers were required to handle.

Even though this union was active in trying to make better working conditions for oil labor and was successful on the health and safety front, workers in the tri-counties continued to be apathetic toward their union. Realizing this, the union avoided using strikes as a tool to gain concession from companies. In addition, throughout the state of California, the use of contractors and plant automation undermined the effectiveness of potential strikes because production could continue through the duration of a strike. Below, one union representative explains how a company's public image becomes part of the union's bargaining strategy:

> Automation [of production] could run right through the strike. The companies don't have to rely on trucks because they have pipe lines.... So a strike is not as effective as it used to be. Public image is. The perception of the public is something that is near and dear to these oil companies. So if we go on strike, it has to be an issue of safety or health or whether or not that refinery is being run safely.... Public opinion is the only way to affect the companies. It used to be that you shut down operations.

Beginning with the Anti-Trust Act of 1911 and early 20th century labor unrest, oil companies have been concerned with their public image. During this time period the union's strategy changed from direct confrontation to gaining political leverage through public opinion.

1987-1996

Industry Trends

According to Figure 5.1, at the end of this section, petroleum work from 1990-1995 was still a well paying job compared to the other comparable industries. For instance, California oil workers in 1990 earned an average yearly wage of $40,109. Manufacturing employees came in second with a yearly average wage of $24,237. Retail trade employment remained the consistently low paying job with an average yearly wage of $13,482. Similarly, in 1995 petroleum work proved to be the best paying job out of the three with an average yearly wage of 48,307, over $20,000 higher than manufacturing and $30,000 higher than retail trade.[18]

During the 1990s Ventura County continued to have more residents working for the mineral extraction industry than Santa Barbara County. According to Figure 5.2, at the end of this section, 2,300 Ventura County residents worked for the mineral extraction industry in 1990, compared to 1,100 Santa Barbara County residents. In 1995, the number of Ventura County residents working for mineral extraction went down to 1,900, while in Santa Barbara County the number declined from the 1990 figure by only 100 people to 1,000.[19]

Regulating and diversifying

During this period, many large firms sold their tri-county operations and began leaving the area. Major companies Unocal, Mobil, Arco and Chevron began selling their leases and equipment to smaller companies like Torch/Nuevo and Tosco. The majors moved their operations out of the tri-counties in order to take advantage of cheaper labor, lower environmental standards and the rich, untapped oil deposits of South America, Southeast Asia and the former Soviet Republics (Kraul, 1998; Risen, 1998). Employment opportunities in the tri-county oil industry during the 1990s were low and non-existent. Some tri-county workers began requesting domestic and overseas transfers. Other workers rationalized that domestic jobs were not available and began looking for jobs outside of the oil industry. Still others maintained their jobs but became insecure about their futures.

Tri-county workers who decided to stay with the companies were often asked to perform platform abandonment and dismantling tasks. Some companies reacted to worker exodus from platform operations by "freezing" all transfers or, in other words, requiring that workers stay in their jobs. The possible risk incurred from losing so many experienced workers from offshore production was too great to allow those remaining on the job to leave prior to the completion of abandonment. Many workers who left the industry found that their oil field skills were marketable in local high-tech firms. For instance, many workers in the Channel acquired jobs with the Ventura based biotech firm, Amgen. Others chose to work for themselves by starting their own businesses. One processing plant worker we talked to wanted to start her own antique shop in Carpenteria, while another male platform worker living in Santa Barbara wanted to become a massage therapist. Another female worker living in San Luis Obispo wanted to put her future sights into cosmetology, while yet another looked to marketing as a viable future.

Some workers decided to take early retirements rather than deal with transfers or risk working for smaller companies. Adding to the erosion of worker power in the fields was the plain fact that much of the work done, including cleaning and maintenance, was contracted to outside companies. Workers also claimed that the smaller companies tended to pay less than the majors, did not provide comparable benefit packages, and were less likely to have the economic resources to run safe operations. These smaller companies were also not required to recognize the unions. For instance, Torch, who bought Unocal's facilities, refused to recognize the oil workers' union.

Unionism

In 1998, the International Union of Petroleum and Industrial Workers SIUNA AFL-CIO (IUPIW) tried to negotiate a contract (similar to the one they had with Unocal) with Torch. Torch refused to recognize the IUPIW, which forced the union to file a lawsuit against the company. By 1998 the union was still involved in litigation with the company. The IUPIW in the tri-counties during the 1990s represented Chevron onshore and offshore and Tosco Pipeline. Chevron was another company that was decommissioning their facilities, which further threatened the IUPIW's representation base. This union tried to affiliate with the OCAW, a much larger union that had bargaining units across the nation. In response to the oil company exodus from the California OCS, the IUPIW began to diversify their representation to include trucking companies and other industries not affiliated with California oil industry.

During this period, the OCAW represented Santa Fe Energy statewide and had a bargaining unit of 187 workers (22 percent were non-members or "free riders"). Texaco production was also represented in the tri-counties and had a state wide bargaining unit of 253 employees, 35 percent of which were non-members. Texaco Pipeline was represented by a separate contract from Texaco production, and this bargaining unit was specific to the tri-counties with 33 workers; 39 percent of that bargaining unit were non members. According to a union representative, Arco and Shell tried to decertify the union but 75-80 percent of the employees who voted were against de-certification. This situation caused the union representative to claim, "Even those people who are not members vote for the union. Because they have the protection. They just don't want to pay the money."

Notes

1. It has been documented that Standard oil during this time period had influence over other oil companies' policies. For example, if Standard treated its workers better, other companies often followed. If Standard chose to break a strike, then other companies again followed (see Quam-Wickham, 1994; Davidson, 1988; White, 1962).

2. Modified fishing tools were used to pull broken drill bits and other obstructions from the bottom of a well hole.

3. Through the use of historical documentation and interviews, Quam-Wickham concludes that western extractive industry in general was "peopled with masculine heroes, images of men 'conquering' the resources of Nature—an oil worker might have to be... 'big,' 'rough,' 'strong,' and have experience" (Quam-Wickham, 1994: 42).

4. We obtained this information from interviews with tri-county oil workers and two union representatives for the tri-county region.

5. During the time of health and safety legislation, the union was named the Oil, Chemical and Atomic Worker's Union.

6. All employment figures were obtained from the California Statistical Abstracts. Manufacturing wages were averaged from a series of employment figures that included: factory work, defense related (electrical machinery, aircraft and instruments), metals and metal products (primary metals, fabricated products, machinery and transportation equipment), other durables (lumber, wood products, furniture, stone clay and glass), food and kindred products, textiles and apparel, paper, printing and publishing, and finally other non-durable (chemicals, petroleum and coal, rubber, leather and tobacco). Manufacturing allowed us to compare the average wages of many employment sectors to that of the petroleum industry. In addition, we chose to compare manufacturing, retail trade, and petroleum industries because a person who has a high school diploma can usually find work in these industry sectors. Generally speaking, these sectors do not require their employees to have a college degree or prior technical training. Thus, a person out of high school would do well financially to get a job in the oil industry as opposed to getting hired in a retail trade job or a manufacturing job. Note that 1950s yearly wages included Crude Petroleum and Natural Gas. Figures referring to oil industry profiles like average age, education, and marital status could not be obtained for this study.

7. We obtained California petroleum industry average yearly wages from *The California Statistical Abstract*. Although these figures are not exhaustive they do provide a "ball park" figure of the tri-county oil worker yearly income. The number of mineral extraction workers who are tri-county residents was also obtained from the *California Statistical Abstract*, which is tri-county wide but excludes figures for San Luis Obispo.

8. Excludes figures for San Luis Obispo and employment totals for 1950s.

9. "Open shop" means that an individual worker can choose whether to be a union member or not. By contrast, a "closed shop" means that everyone who is employed by a company has to join the union and pay union dues.

10. Upstream production refers to the actual process of pulling oil out of the ground, while downstream production refers to refining and other post-extraction activities (see also Section 3.1: Basic Processes and Linkages).

11. All these employment figures were obtained from the *California Statistical Abstracts* and have not been adjusted for inflation.

12. 1970s employment totals refer to crude petroleum and natural gas workers.

13. 1980s employment totals include bituminous coal mining and oil and gas extraction. Note that bituminous coal mining is a minor industry in the tri-counties.

14. Onshore workers still have the eight-hour maximum schedule. Platform workers are exempt from this agreement.

15. The Civil Rights Act passed congress in 1964 and motivated the creation of federal agencies like the Equal Employment Opportunity Commission (EEOC). The goal of the EEOC was to audit the diversity of firms who have 15 or more employees. Companies that received federal contracts were subjected to the EEOC affirmative action policies. According to EEOC rules, a company's employee diversity must represent the national averages for every location that the company does business.

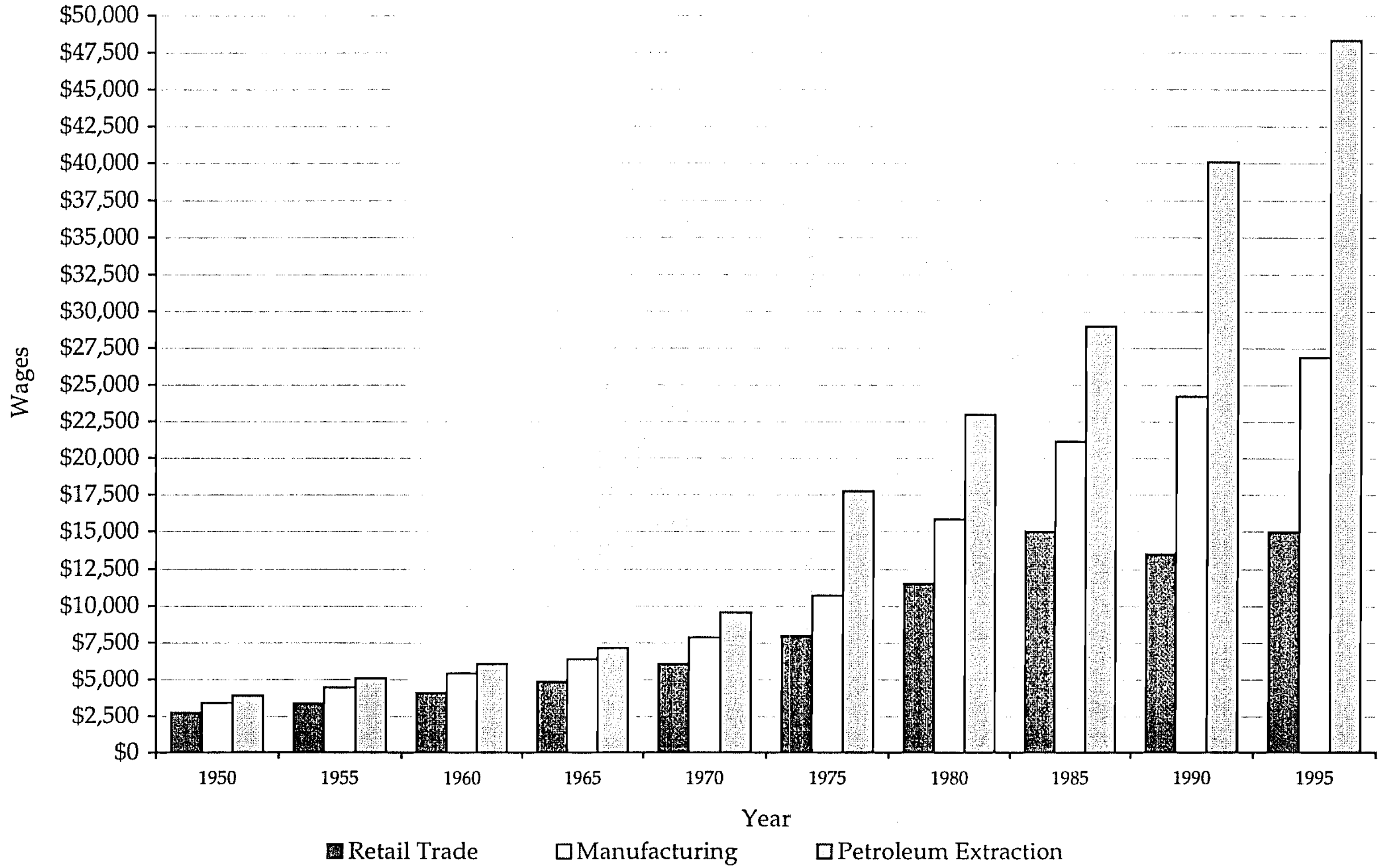
16. Most of our minority informants claim to have heard about the possible job openings in the oil industry from friends and acquaintances but had no direct family connections or close ties to the business.

17. Affiliation refers to unions that are under the umbrella of the AFL-CIO. Affiliated unions are legally protected by Article 20 of the Taft Hartley Act, which states that one union can not take over other unions. For instance, Retail Clerks, a union for the grocery business, cannot take members from the oil industry because these workers are members of the OCAW. Furthermore, affiliation with the AFL-CIO provides a smaller union with more resources for litigation against companies and provides information resources.

18. Oil platform workers in the Santa Barbara Channel claimed to make $50,000.00 and more. This information was acquired by our interviews with oil platform workers.

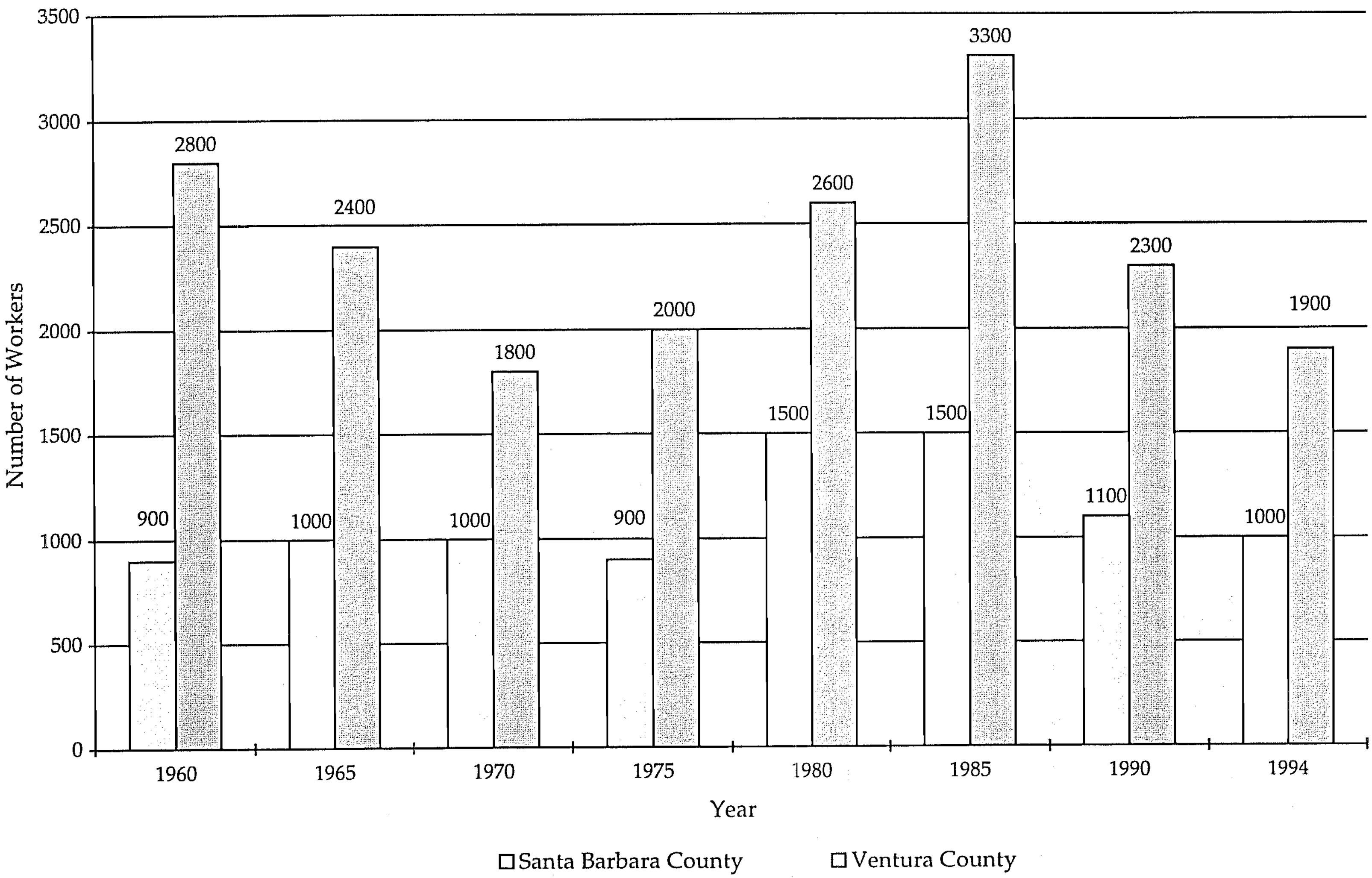
19 . The 1990s employment figures include oil and gas extraction and coal mining. Note that coal mining in the tri-counties is non-existent.

Figure 5.1:
Yearly wages by California industry, 1950 - 1995



Source: California Statistical Abstract.

Figure 5.2: Number of mineral extraction workers in Santa Barbara and Ventura Counties, 1960-1994



Source: California Statistical Abstract.

Section 6.1
Regulations

In the following section, we pay explicit attention to the nexus of environmental regulation and industry in the tri-counties. The petroleum industry has increasingly had to address environmental concerns across the range of their activities from exploration, extraction, and refining to current projects that include abandonment. While eventually 28 federal, state, and local agencies will exercise some element of environmental review and oversight of their activity, for much of the industry's history it was free of such regulation (local regulation and permit authority will be addressed in Section 6.2: Local Oversight). Beyond these agencies there are currently some 35 federal and state environmental and safety statutes, as well as a large number of local and regional ordinances that currently circumscribe industry activities. Regulated activities can be functionally broken into nine areas that include: produced waste; waste management; emergency preparedness and response; land access, land use, and endangered species; air quality; toxic air contaminants; hazardous materials handling and storage; transportation and pipelines; and oil spill prevention and response (State of California, Department of Conservation, Division of Oil & Gas, 1986).

In the following pages, we characterize by historical period the regulatory climate that prevailed at the time, as well as the impacts these regulatory trends have had on the industry. Included with our account of the regulatory climate is an Agencies and Policies Summary that outlines the relevant environmental regulators, policies, and statutes the industry has had to address when producing in the tri-counties (see Agencies and Policies Summary below).

1950-1968

Setting the Stage

Federal and state environmental regulation over the first half of the twentieth century can be characterized as meager, at best. Until 1948, the only environmental acts of any significance were the federal government's Refuse Act of 1899 which forbade the dumping of waste in navigable waters, the Public Health Act of 1912 which was initiated to stem disease by keeping waterways clear of debris associated with bacterium, and the Oil Pollution Act (OPA) of 1924 which banned oil discharge in coastal waters. The last of these specifically targeted petroleum discharges because the law in place at the time (the Rivers and Harbor Act of 1899) had proven itself ineffective in the face of new conditions not prevalent at the time of its enactment. The rapid expansion of the petroleum industry following World War I lead to a crisis in coastal water quality that focused regional and national attention on such degradation (Pratt, 1978). While the act was important in establishing the legal basis for pollution control, it had only modest (if any) impact on the petroleum industry because of limited enforcement powers.

The Water Pollution Control Act of 1948 was the federal government's first clear step toward a genuine environmental initiative oriented toward issues of pollution abatement. Although the act had limited enforceability, like the earlier OPA of 1924,[1] it did lend recognition to water pollution as a national problem. Similarly, the Air Pollution Control Act of 1955, while also largely a token gesture, worked to give air pollution and related issues a forum they had not yet had. Beyond the symbolic, these acts set the stage for local and regional regulation of industrial discharge, which would have a telling effect on petroleum operators in the future. Through federal financial assistance to state governments, the development of a public body of knowledge concerning pollution, and a concomitant growth in the number of experts, the public sector would for the first time be able to critically address issues of pollution control (Pratt, 1978).

Following these early Acts, the federal government would increasingly move toward establishing itself as the primary enforcement body behind its regulatory legislation. What had through the 1950s been left to local authorities and private industrial initiative would now become the domain of federal regulators. The first of the federally enforced environmental initiatives was the Clean Air Act of 1963, which imposed national clean air standards and gave federal authorities the power to mandate compliance. The act was significant in three primary ways: it set forth clean air criteria, it required state and regional plans for implementation, and it ceded enforcement powers to federal regulators. Setting the tone for future environmental legislation, the federal government in the 1960s solidified its responsibility as an "environmental protector" (Colella, 1981).

In sum, while the era saw a wealth of environmental acts and amendments passed that were unprecedented up to this time, the period is best characterized as setting the stage for what will be a proliferation of environmental legislation in the late 1960s and early 1970s. The pollution control initiatives brought forth in 1950s and 1960s, while symbolically important, were yet to have full and far reaching impact on the how the petroleum industry operated. However, even for a petroleum industry which had historically been largely immune to federal and state interventions, pollution was no longer an issue that could be ignored. As we will see in the next section, pollution abatement and public agency enforcement (federal, state, and local) would begin to play an increasingly significant role in how petroleum production is done throughout the nation and in the tri-counties.

1969-1996

Petroleum Extraction and Regulatory Contexts[2]

Beginning with the historic 1969 passage of the National Environmental Policy Act (NEPA), this era (corresponding to the last two periods of our study) was witness to a number of environmental acts that set standards, outlined enforcement powers, and laid down assessment and mitigation protocols. In the case of NEPA, and to a lesser extent the others, the burden of proof would be placed on the producer, by way of environmental impact statement, to ensure that the quality of the human environment would not be compromised by their activities (Bradely, 1996). Included with the promulgation of such acts and provisions was the creation of new agencies and divisions to handle concerns over environmental degradation and species loss. Those that have held special significance for tri-county producers include the National Environmental Policy Act, the Coastal Zone Management Act, the Federal Water Pollution Control Act, the Endangered Species Act, and the California Environmental Quality Act, among a handful of others (see Regulatory Summary below for a comprehensive listing of relevant Acts).

According to our informants and petroleum industry sources (Exploration and Production Regulatory Reform Task Force, 1995; California Oil Survival Team, 1993; Horner, 1984), the requirements posed during this era by environmental regulations, both in the extraction and in post-extraction phases of oil production, contributed to a significant increase in capital costs for US producers. These requirements have limited the scope and number of sites open to exploration as well as raising the costs associated with exploiting those reserves that are already being tapped. As Figure 6.1.1: US petroleum industry environmental compliance expenditures, located at the end of this section, illustrates, the cost increases associated with environmental regulations, as they apply to the petroleum industry in the US, have risen since 1966. This increasingly stringent regulatory environment has been a primary reason, according to petroleum operators, that exploration, development, and production of oil reserves in the contiguous US have decreased precipitously over the last twenty years.

If the US is characterized as "heavily regulated," then California presents an even more pronounced and restrictive version of this larger regulatory environment (Kallman and Wheeler, 1984). The industry has consistently complained of overlapping federal and (California) state environmental regulation, overly stringent enforcement, and standards that are expensive and time consuming (Exploration and Production Regulatory Reform Task Force, 1995; California Oil Survival Team, 1993; Kallman and Wheeler, 1984). Adding to the impacts of California's demanding regulatory environment are the relatively low overall petroleum yields associated with its deposits; these deposits generally require higher finding costs and yield smaller discoveries. The regional predominance of low grade and viscous oil further tightens the profit to cost ratio as direct lifting expenditures can often cost as much as a barrel of oil will fetch in the market. The average direct lifting (extraction) costs for a barrel of oil for the nation is estimated at $4.72; the base line or direct lifting cost estimate for California's heavy crude hovers at $6.90 a barrel, putting it $2.18 per barrel above the costs found in other regions to lift that same barrel of oil (Exploration and Production Regulatory Reform Task Force, 1995; California Oil Survival Team, 1995) (see Figure 6.1.2: Lifting costs). Outside of direct lifting costs, the total lifting cost for California crude oil is also appreciably higher than other US petroleum regions. Total lifting costs include both the direct costs of extracting petroleum as well as other associated costs of production (that is, transportation costs, local, state and federal taxes, regulatory compliance, and a range of other outlays) (Exploration and Production Regulatory Reform Task Force, 1995).

In addition to the high costs of producing crude in California, there has also been a precipitous decline over the last decade and a half in the prices paid for a barrel of oil. Unable to maintain the kind of profits attained through the 1970s, when prices went as high as $40 and $50 dollars a barrel, producers have had to cut back on exploration, streamline operations, and abandon unprofitable operations throughout the tri-counties. With the exception of the 1990-1991 Gulf War price spike, wellhead prices in California have regularly been close to the total lifting costs associated with producing and marketing a barrel of oil. The environmental costs associated with lifting a barrel of oil out of California's major petroleum reservoirs are outlined in Figure 6.1.3: Environmental regulation compliance costs (aggregate). When seen on a per barrel basis, costs are more easily visualized in Figure 6.1.4: Environmental compliance costs (per barrel).

Regardless of one's position on the current regulatory environment in the US generally and California specifically, the stringent rules, procedures, and safeguards that have been adopted in the wake of significant pollution events like the 1969 Santa Barbara oil spill have had a major impact on oil production in the tri-county region. Environmental restrictions on offshore petroleum activity, in particular, were of secondary importance until the Union Oil Platform "A" blowout. The highly publicized event organized the region's environmental sentiment into a politically potent force (Bradely, 1996). According to oil historian Joseph Pratt:

> The national outcry helped convince the US congress to pass a wave of strict environmental regulations and the spill focused strong public sentiment in California against the further development of offshore oil deposits. Things were never quite the same offshore California. Even when leasing and development opened up again after the furor over the Santa Barbara oil spill subsided, the permit process had become so complicated, convoluted, and time consuming that the twenty seven month turnaround on (Platform) little Eva in the mid- 1960s seemed like some sort of mythological event from a far distant past (Pratt et al., 1997).

Reflecting the new environmentalism and the drilling moratorium it motivated, the total activity that would be observed in the Channel during the 1969-71 period would be less than in the single year proceeding the accident (Bradley, 1996).

A better impression of regulatory impact, in terms of time, money and innovation, can be gained by using Exxon's Platform Hondo as an empirical example. After purchasing offshore tracts in the Santa Barbara Channel in the 1968 Los Angeles OCS lease sales for some $13 million dollars, Exxon initiated exploratory steps to establish the location of viable oil deposits.[3] The following year they discovered the Hondo reservoir, the Channel's largest. Initial development of the tract, however, would be postponed because of the drilling and development moratorium imposed by the federal government in the aftermath of the 1969 Santa Barbara oil spill. Seven years later, with the cessation of the drilling moratorium, new federal standards based in the National Environmental Policy Act would require Exxon to produce an environmental impact statement (EIS) to address the potential impacts associated with a platform installation in federal waters. The EIS would have to be completed and approved before placement could proceed.

In addition to the platform Exxon wanted to create a onshore storage and refining facility. Mirroring federal protocols, the onshore support facility also required potential impacts to be assessed. The state called on Exxon to identify potential impacts to the coastal zone through an environmental impact report (EIR) as dictated by the state's newly enacted California Environmental Quality Act.[4] In 1976, having completed these assessments, Exxon signed a memorandum of agreement with the state of California in which they agreed to mitigate seventy permit qualifications the state and local regulators had raised as an outcome of this EIR process (*Offshore Magazine*, July 1976: 51-55).

Frustrated with the long delays and expenditures, Exxon dropped its onshore plans, opting instead for a relatively new offshore production terminal referred to as a single anchor leg moorage system (SALM) to transfer and initially refine platform Hondo's crude oil. Although not as contentious a proposition as the planned land-based facility, the SALM was also subject to regulatory scrutiny. In response, Exxon developed a number of offshore firsts in pollution abatement technology to meet the regulation driven demands (see Section 7: Technological Innovations).

The development of the Hondo Field would take thirteen years to go on line and produce its first barrel of oil in 1981. The platform itself would cost Exxon $67 million dollars with the subsequent assessments, moratorium, and modifications imposed by the state and federal governments rounding out, according to Exxon, in the $500 million dollar range (*Offshore Magazine*, 1977: 43-47). Initial projections for both Hondo's costs and the profits Exxon expected were based on the mid-1960s unparalleled $40-$50 dollar a barrel price for crude oil. In the 1980s a significant price drop to $28-$31 dollars a barrel put a damper on Exxon's expectations. They claim that a large part of their expenditures can be imputed to the post 1969 Santa Barbara spill moratorium and the subsequent strict regulatory environment found in the Channel. For the sake of juxtaposition, industry advocates point out that in those same thirteen years it would take Exxon to comply with state and federal requirements, operators had largely developed the entire North Sea region, consisting of scores of offshore platforms of comparable size and complexity (Kallman and Wheeler, 1984).

As discussed above, watershed events such as the Santa Barbara oil spill focused national public attentions on the potential damage incurred through oil spillage. The attention the issue received culminated in legislative action. This pattern of post-disaster policy reaction continued in the wake of the March 1989 Exxon Valdez Tanker accident. Beginning in 1975 efforts to create a comprehensive federal oil spill liability, compensation, and response bill intensified based on a handful of national spill events (Birkland, 1998). However, it would be more than a decade before Congress would agree on a solution to the direct threat posed by petroleum spills. Part of this delay was attributable to congressional attempts to incorporate oil spill policy with concurrent and emerging hazardous waste legislation(s) (Birkland, 1998). Other concerns that foiled attempts to systematize oil spill response and liability were based in state resistance to a federally based response system that would preempt state law and jurisdiction (Jones, 1989).

Thus, legislation concerning oil spill response and liability was still fragmented at the time of the Valdez Tanker accident. Until 1990, the statutes that addressed oil spills (indirectly) were the Waterways Safety Act of 1972 and Federal Water Pollution Control act of 1973. The Exxon Valdez spill would give congress the impetus to pass stringent oil spill legislation they had until this time resisted. A direct result of this spill, the Oil Pollution Act of 1990 (OPA 1990) amends the Federal Water Pollution Control Act (also known as the Clean Water Act). OPA 1990 systematized response to emergency petroleum release and the reporting requirements of the responsible party. In doing so, the intent was to alleviate confusion and duplication, and thus bring about quicker and more effective response to large scale petroleum releases. OPA 1990 also instituted tougher penalties, outlined responsible party liabilities, and allocated more resources to emergency response systems. Finally, OPA 1990 set up a $1 billion dollar fund (financed by the oil industry) to defray the costs of an emergency response in the event of a similar future spill event.

While opinions vary on whether the current rigorous regulatory environment is constructive (environmentally) or destructive (economically), it has sponsored a change in the relationship between industry, government, and the public. California in general, and the tri-counties in particular, have confronted the oil industry with demands the industry has been unaccustomed to. Beyond developing the ways and means to enhance their exploration, extraction, and production, the industry has also been forced to develop technologies to reduce emissions, to guard against spills, and to address the aesthetic concerns of citizens sensitive to the sight, smell and sound of industrial machinery—especially those associated with oil production. We discuss these technological responses in Section 7: Technological Innovation.

Notes

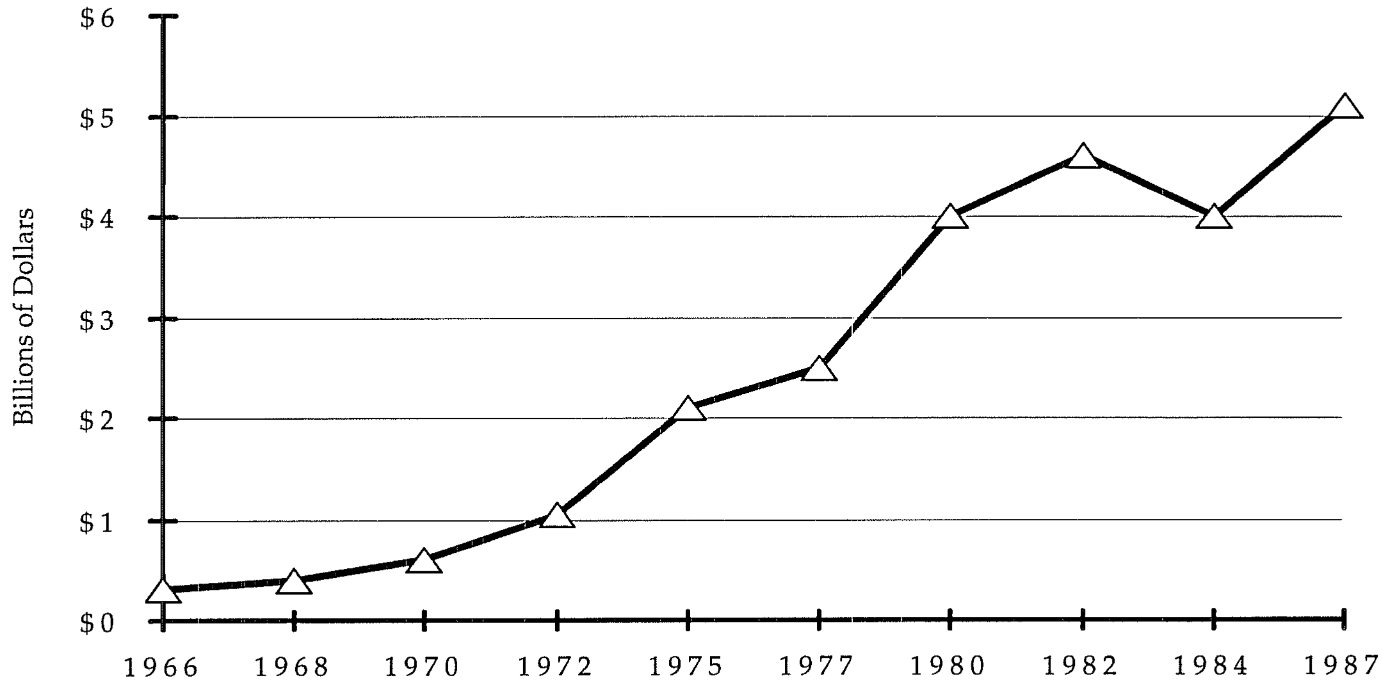
1. The Water Pollution Control Act of 1948 mainly provided a conduit for the states to receive research funds and technical assistance when such needs arose.

2. For a view of the relevant regulatory agencies and acts see Regualtions Summary at the end of this section.

3. The tracts reservoirs are collectively referred to as the Santa Ynez Unit and cost Exxon $218 million (See *Offshore Magazine*, November 1981: 151).

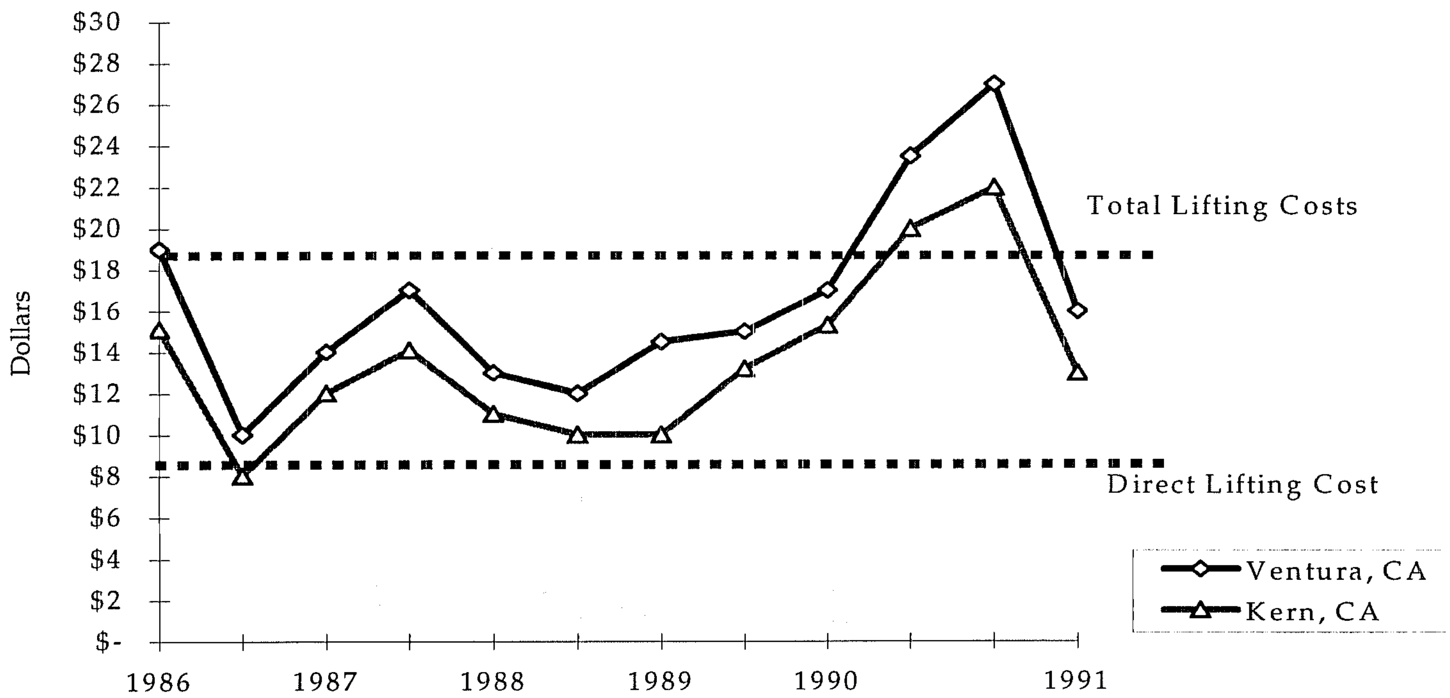
4. This is the first year that the California Coastal Commission became active.

Figure 6.1.1: US petroleum industry environmental compliance expenditures



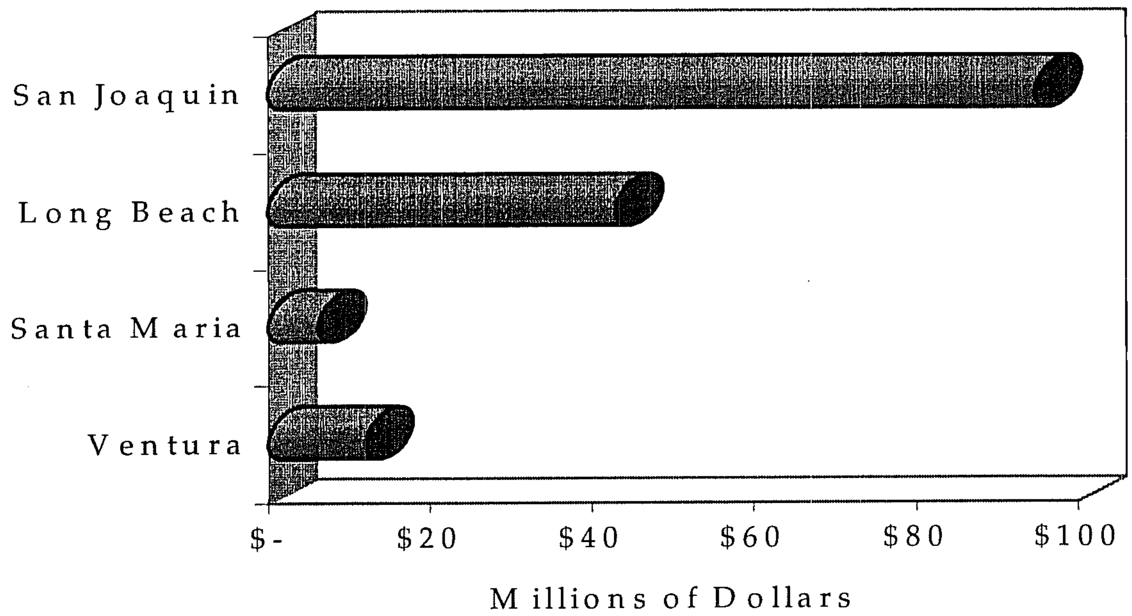
Source: Workshop Proceedings; California Oil Survival Team (COST), title, "Environmental and other Issues Confronting the California Petroleum Industry." November 1993.

Figure 6.1.2: Lifting costs



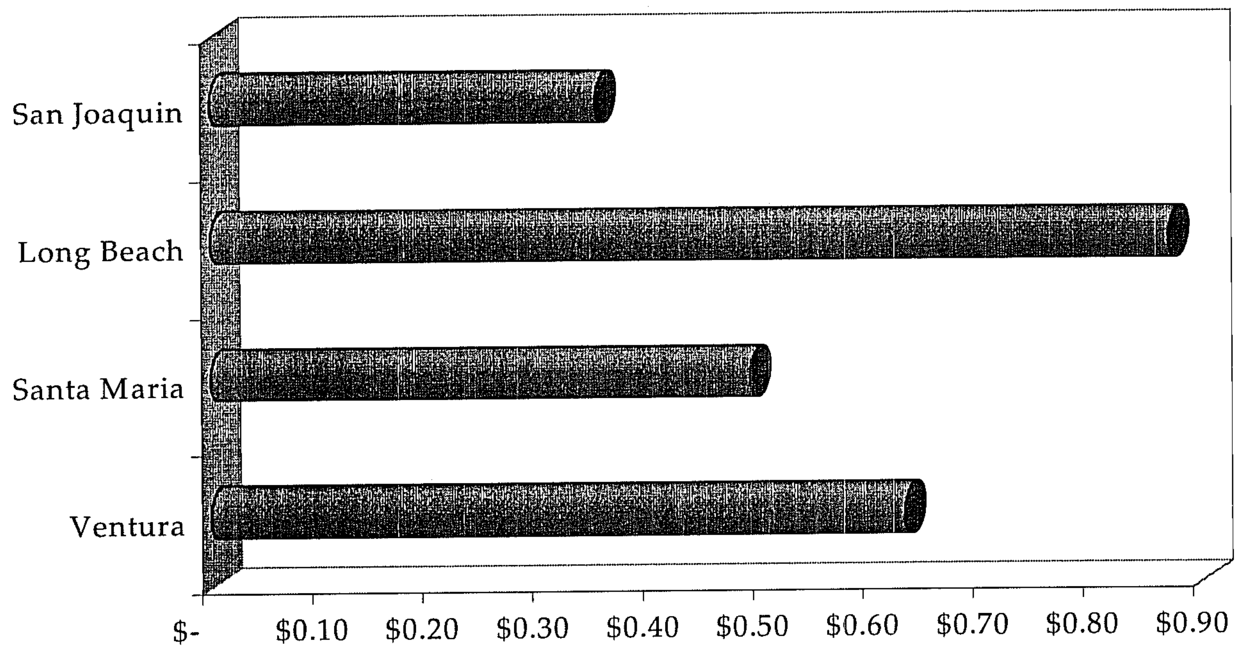
Source: Workshop Proceedings; California Oil Survival Team (COST), title, "Environmental and other Issues Confronting the California Petroleum Industry." November 1993.

Figure 6.1.3: Environmental regulation compliance costs (aggregate)



Source: Report to the Environmental Protection Agency, "Environmental Streamlining, Findings and Recommendations Regarding the Exploration and Production Industry," Exploration and Production Regulatory Reform Task Force. April 1995.

Figure 6.1.4: Environmental compliance costs (per barrel)



Source: Report to the Environmental Protection Agency, "Environmental Streamlining, Findings and Recommendations Regarding the Exploration and Production Industry," Exploration and Production Regulatory Reform Task Force. April 1995.

Agencies and Policies Summary:
Environmental Laws and Regulations Governing Oil and
Gas Exploration and Production

In the following, we summarize the regulatory "domains" the industry must address when producing oil in the tri-counties. Functionally, regulated activities can be broken into nine general categories (see Tables 6.1.1-6.1.9):

1. Produced Water Management
2. Waste Management
3. Emergency Preparedness and Response
4. Land Access, Land Use, and Endangered Species
5. Air Quality
6. Toxic Air Contaminants
7. Hazardous Materials Handling and Storage
8. Transportation and Pipelines
9. Oil Spill Prevention and Response

Each of these areas are detailed further below. Following the summary is a list of agencies and environmental acts for more specific reference.

Produced Water Management: Produced water refers to water that is taken out of the ground along with petroleum. California's oil activities generate 2.5 million barrels annually. That is nearly seven barrels of water for every barrel of oil produces (State of California, Department of Conservation, Division of Oil & Gas, 1986). Produced water can contain a number of chemicals which would make disposal a significant problem (see Agencies and Policies Summary: Table 6.1.1).

The regulation of produced water crosses a number of California state jurisdictions, depending on how the water is being treated, where the water ends up (re-injected into wells, into local sewer systems, or in standing ponds), and if an accidental discharge has taken place. The oversight agencies include: California Division of Oil, Gas, and Geothermal Resources; the California Regional Water Quality Control Board; the California Department of Toxic Substances Control; the California Department of Fish and Game; and the US Fish and Wildlife Department.

Waste Management: In California, waste management is divided into two components: solid and hazardous wastes. Due to the limited number of landfills, concerns over the contamination of ground water supplies, and the recent generation of a high volumes of toxic waste based in its large urban population and manufacturing sector, California's waste management laws are, generally speaking, more strict than those found in the rest of the country and than the federal governments.

The impact of these tight regulations on petroleum producers has been quite heavy. The oil and gas industry produce one million tons of solid waste annually with 140,000 tons or 14 percent of this being classified as hazardous by California standards. In comparison, by federal government standards 35,000 tons of the same material is considered hazardous (see Agencies and Policies Summary: Table 6.1.2).

Emergency Preparedness and Response: Fifteen federal, state, and local agencies play a part in preparing for and responding to emergencies. For the oil industry emergencies can involve oil spills, accidental release of hazardous substances, and blowout and discharge prevention and containment. The responsibilities which comprise this category of regulation are broken further into three jurisdictional classifications: Oil Spills, Hazardous Materials, and Discharges.

The prevention, reporting, and assessment of oil spills at oil fields is primarily the responsibility of the California Division of Oil, Gas, and Geothermal Resources. For all other spills, responsibility falls on the California Department of Fish and Game. In cases of spills into a body of water the US EPA, US Coast Guard, California State Lands Commission, California Department of Fish and Game, and the state's Regional Water Quality Control Boards exercise their responsibility to control the spills and enact countermeasures.

In the case of hazardous materials (see below), the California Department of Toxic Substances Control, the California Office of Emergency Services, and the US EPA hold primary responsibility. Response to release reports, cleanup, and remedial actions and are in the main guided by three federal laws: the Comprehensive Environmental Response Act, the Compensation and Liability Act, and the Resource Conservation and Recovery Act.

Finally, regarding petroleum discharges, the California Division of Oil, Gas, and Geothermal Resources (in conjunction with the Bureau of Land Management) issues drilling operations permits that include safety and discharge prevention and containment provisions.

Other agencies involved at a peripheral level include the California Highway Patrol and US Department of Transportation, including local fire, health, and emergency planning departments (see Agencies and Policies Summary: Table 6.1.3).

Land Access, Permitting, and Endangered Species: Local county governments issue land use permits and act as lead agencies in the application of the California Environmental Quality Act, which requires potential development projects to first conduct an EIRto assess potential environmental impacts. When a development is proposed for the coast, the California Coastal Commission is lead permitting agency, and local agencies often also require building permits.

The petroleum industry must also comply with federal and California state Endangered Species Acts, administered respectively by the US Fish and Wildlife Service and California's Department of Fish and Game (see Table 6.1.4).

Air Quality: California air emissions laws date from 1948. Currently half of the state's air emissions come from mobile sources, which are regulated by California's Air Resource Board (CARB). The other half, emitted from stationary sources, are regulated by 34 different and semiautonomous Air Pollution Control Districts (APCD).

Federal air quality standards are enforced by the US EPA, but these standards are implemented by CARB and APCD. In many cases the standards imposed by the California Clean Air Act actually exceed those laid out in federal standards.

The oil industry's air emmissions have been heavily regulated since the late 1970s, with special attention focused on sulfur dioxide and ozone emissions (over the last two decades these have been significantly reduced) (see Table 6.1.5).

Toxic Air Contaminants: Toxic air contaminants differ from air pollutants such as smog in that they may contain potential carcinogens and pose other health risks. The federal Clean Air Act (1967) sets national emission standards for hazardous air pollutants, identifies 190 such substances, and imposes control technology to limit their emission.

The State of California has enacted two laws to regulate Toxic Air Contaminants: the Toxic Air Contaminants Identification and Control Act and the Air Toxics Hot Spots Act. Nearly 400 substances are identified as high risk. Of these, oil and gas production typically involve 40.

The Air Toxics Program is similar to Proposition 65[1] in that it calls on regulators to release public warnings if cancer causing agents are emitted into the air (see Table 6.1.6).

Hazardous Materials: In addition to the approximately 140,000 tons of hazardous waste oil and gas producers must transport and dispose of, the industry also uses a significant volume of hazardous of materials in their production processes. The US Department of Transportation, California Office of Emergency Services, and the California Highway Patrol regulate the transport of these materials and hold oversight responsibility in the event of accidental release.

The State and Regional Water Quality Control Boards regulate both under and above-ground storage tanks for hazardous materials. All such facilities must also meet federal and state Occupation Health and Safety Standards. California in particular is unique in its warning requirements. Under Proposition 65 and other right-to-know laws, facilities must make publicly available—or face legal action—information about the safety of stored materials, the use of chemicals on site, and the release of any hazardous materials used (see Table 6.1.7).

Transportation and Storage: As many as ten governmental agencies oversee this portion of the petroleum industry. The US Department of Transportation and State Fire Marshal oversee pipeline safety, the State Lands Commission oversees marine terminals, and city and county planning departments apply regional standards and accompanying permits to their areas (see Section 6.2: Local Oversite).

Transportation of hazardous materials falls at the federal level under the jurisdiction of the US Department of Transportation and at the state level under the Office of Emergency Services. Transportation of used oil and hazardous waste may also involve regulations enforced by the California Highway Patrol, the CaliforniaDepartment of Toxic Substances, and the California Integrated Waste Management Board. Local fire and emergency planning departments may also be involved in preventing and responding to emergency spills (see Table 6.1.8).

Oil Spill Prevention and Response: California's Oil Spill Prevention and Response Act (OSPR)of 1991 was to a great degree a response to the Exxon Valdez tanker spill. The act established an oil spill prevention and response wing within the California Department of Fish and Game and funds it by taxing oil transported into California. The act also requires all coastal facilities to have an emergency spill response protocol in case of marine release. In addition to OSPRA, the California Division of Oil, Gas, and Geothermal

Resources requires a spill contingency plan for most operations. These regulations require that tanks have control methods for spilled fluids, special safety devices for offshore and critical wells, and that operators maintain a database of spill incidents in order to stop spills from happening and improve spill response if and when they occur.

In the event of a spill, a report must be made to the California Office of Emergency Services, which then notifies the appropriate agencies. If a spill affects state waters, the Water Quality Control Boards are called. If the marine environment is affected the US Coast Guard is the lead agency. If a spill involves potentially hazardous materials, on land the state department of Toxic Substances is brought in. Several other agencies are involved in the case of a well blowout or discharge prevention, with Division of Oil, Gas, and Geothermal Resources being the lead in most instances (see Table 6.1.9).

Federal Regulatory Agencies

Department of the Interior, Minerals Management Service: The MMS is responsible for regulating oil and gas exploration and development operations on the federal outer continental shelf (OCS), which off the California coast, are those submerged lands located more than three miles offshore.

Occupational Safety and Health Administration: The mission of the Occupational Safety and Health Administration (OSHA) is to save lives, prevent injuries and protect the health of America's workers. To accomplish this, federal and state governments work in partnership with the more than 100 million working men and women and their six and a half million employers who are covered by the Occupational Safety and Health Act of 1970.

OSHA and its state partners have approximately 2,100 inspectors, plus complaint discrimination investigators, engineers, physicians, educators, standards writers, and other technical and support personnel spread over more than 200 offices throughout the country. This staff establishes protective standards, enforces those standards, and reaches out to employers and employees through technical assistance and consultation programs.

National Marine Fisheries Service: The Protected Species Management Division (PSMD) of the NMFS is responsible for the management of protected marine species (such as marine mammals, sea turtles, and Chinook salmon) under the provisions as set out by the Endangered Species Act and the Marine Mammals Protection Act. The PSMD reviews National

Environmental Protection Act and California Environmental Quality Act environmental documents prepared for projects that could affect protected marine species.

US Army Corps of Engineers : The US Army Corps of Engineers (ACOE) has regulated certain activities in the nation's waterways since 1899. The regulatory jurisdiction of ACOE includes all ocean and coastal waters within the zone three nautical miles seaward of territorial seas. Wider zones are recognized in the navigable waters of the US.

US Coast Guard: As the primary overseer of US navigable waters, the Coast Guard is involved with a number of issues which overlap oil industry activity. First of these is the delineation of navigable waters. The Coast Guard requires aids to navigation on artificial reefs and other fixed structures such as offshore platforms.

Furthermore, the Coast Guard is involved in the control of pollution by oil and other hazardous substances, as well as in the removal of such discharge(s). The CG is notified and takes a lead role in the advent of marine release. More recently, the Oil Pollution and Prevention Act of 1990 has further specified the Coast Guard's role in the prevention, response, and cleanup, giving the Coast Guard a greater responsibility to direct emergency reactions to oil spill events.[2]

US Department of Transportation: Under its Office of Pipeline Safety, the Department of Transportation has oversight of and regulatory power over pipeline safety—operation, maintenance, and abandonment protocols.

US Environmental Protection Agency: The primary concern of the EPA with regard to on and offshore oil development (and currently its decommissioning) is through the Clean Water Act. Through the National Pollution Discharge Elimination System Permit Program, the EPA regulates the discharge (from runoff to systems "flushing") of effluent from industry infrastructure—pipelines, platforms and onshore facilities.

US Fish and Wildlife Service: The primary concern of the FWS is the protection of public fish and wildlife resources and their habitats. FWS mandates require that it provide comments on any public notice issued for a federal permit or license affecting the nation's waterways, in particular, COE permits pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. Additionally, the FWS administers certain amendments of the Endangered Species Act of 1973.

Clean Air Act (CAA) of 1967: Originally providing for research and training in air pollution control techniques and assessment, amendments to the act in 1967, 1970, and 1977 gave the Act "teeth." In 1967, the federal government set ambient standards for air pollutants in addition to sponsoring state initiatives to assure federal standards were met. Ten years later saw the federal government substantially increased its enforcement role and set stricter guidelines for (primarily vehicular) combustion emission standards. In the most ambitious 1977 amendment, the federal government required states to adopt plans for full compliance with federal standards by 1982.

Endangered Species Act (ESA) of 1969: Section 9, in particular, prohibits the "take" of any listed specie, which means to harass, harm, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. A notable component of this act is the inclusive defintion of "harm" which it operationalizes. Harm includes significant habitat modification or degradation, scenarios that significantly impair essential behavioral patterns, including breeding, feeding, or sheltering. Anyone or organization that harms (that is "takes") listed wildlife (and by extension their habitats) would be subject to prosecution under Section 9 or Section 10, as mandated in the ESA.

Other sections within the ESA specify that all federal agencies use their authorities in the furtherance of the purposes as laid out by the ESA by carrying out programs for the conservation of endangered species and threatened species. Furthermore, the federal government is mandated by the act to review proposed activities which may affect listed species.

Federal Coastal Zone Management Act (FCZMA) of 1972: The Coastal Zone Management Act of 1972 stipulates that federal agencies, in carrying out their functions and responsibilities with regard to coastal resources consult, cooperate, and coordinate their activities with public, state, and regional authorities in the development of coastal management plans. After approval of a state's coastal management program, applicants for federal licenses or permits to conduct an activity affecting land or water uses in the coastal zone are required to provide certification that the proposed activity complies with that state's approved coastal program, and that the proposed activity will be conducted in a manner consistent with that program.

After the management program of any coastal state has been approved by the Secretary, the act also calls on applicants to furnish to the state or other designated agency a copy of that certification, with all necessary information and data included. Any person who submits a plan for the exploration or development of, or production from, any area which as been leased under the Outer Continental Shelf Lands Act (43 USC 1331 et seq.) is required to attach to certification that each activity complies with that state's approved management program and will be carried out in a manner consistent with such program. No federal official or agency shall grant such person any license or permit for any activity until that state or its designated agency receives a copy of such certification and plan, together with any other necessary data and information.

Federal Water Pollution Control Act (FWPCA) 1948: Created to establish water quality standards for coastal waters, the legislation also set procedures for the removal and cleanup of discharged oil and other water-born effluents. It also provides guidelines for the cost reimbursement of clean up (liability) of hazardous materials discharge. Under the FWPCA, the Coast Guard is the lead agency in marine environmental response, port environmental safety, and (marine) waterway management.

The Amendment P.L. 92-500 to the FWPCA: Prohibits the unauthorized discharge of dredged or fill material into United States waters. The selection and use of dredged disposal sites will be in accordance with the guidelines developed by the Environmental Protection Agency (EPA). The EPA can deny, prohibit, restrict, or withdraw the use of any defined area as a disposal site whenever (if it is determined, after notice and opportunity for public hearing and after consultation with other relevant agencies) that discharge of such materials into such areas will have an unacceptable adverse effect on municipal water supplies, fishery areas, wildlife, or recreational areas. This act is administered in conjunction with the US Army Corps of Engineers.

National Environmental Protection Act (NEPA) 1969: NEPA was enacted in January of 1970 and requires all administrative agencies of the Federal Government to consider the environmental impacts of their actions in the process of project development and decision making. NEPA also allows other officials, Congress, and the public to independently evaluate the environmental consequences of government actions.

Through section 102 NEPA also requires that environmental impact statements be produced for all federal actions that could affect the environment. These statements must address: 1) the environmental impact of the proposed action(s); 2) any adverse environmental affects which cannot be avoided, should the proposal be implemented; 3) alternatives to the proposal; 4) the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity; and 5) any irreversible and irretrievable commitments of resources involved in the proposal. The primary purpose of the EIS process is to ensure that the policies and goals of the NEPA are carried out. Thus, federal agencies are to make their decisions based on information found in the EIS and other materials.

Whether an EIS is carried out or not depends on if it is required, which in turn is based on whether the proposal under consideration constitutes a major federal action that will significantly affect the environment. Federal action means not only those the federal government undertakes, but also those it permits or approves. The standard "significantly affecting the quality of the human environment," means having an important or meaningful affect upon a broad range of aspects of the human environment.

The basic rules for determining whether a EIS is adequate are 1) whether the agency in good faith has taken an objective look at the environmental consequences of the proposed action and alternatives; 2) whether the EIS provides detail sufficient to allow those who did not participate in its preparation to understand and consider the pertinent environmental influences involved; 3) whether the EIS explanation of alternatives is sufficient to permit a reasoned choice among different courses of action.

National Marine Fisheries Enhancement Act (NMFEA) of 1972: See agency manifesto above.

Oil Pollution Act (OPA) of 1990: OPA introduces new provisions for oil pollution liability, prevention, preparedness, and clean up pertaining to vessels, offshore oil and gas facilities, onshore terminals, and other petroleum industries. Major provisions of the law include 1) oil pollution liability and compensation; 2) prevention and removal of oil pollution; 3) oil pollution research and development program; and 4) amendments to the oil spill liability trust fund. The US Coast Guard has been given (by this act) greater responsibility over directing emergency response to marine oil spills.

Relevant federal non-environmental acts or environmental acts which have had historical impact on oil and gas production in the tri-counties:

Antiquities Act 1906
Taylor Grazing Act 1934
Outer Continental Shelf Act 1953
Classification and Multiple Use Act 1964
Wilderness Act 1964
Land and Water Conservation Fund Act 1965
National Historic Preservation Act 1966

Wild and Scenic Rivers Act 1968
National Trail Systems Act 1968
Archeological and Historic Data Conservation Act 1974
Resource Conservation and Recovery Act 1974
Federal Land Policy and Management Act 1977
Federal Mine Safety and Health Act 1977
Surface Mining and Reclamation Act 1977
Endangered American Wilderness Act 1978

Federal Assessment Strategies

Natural Resources Damage Assessment (NRDA): This act guides personnel involved in emergency response to oil spills and hazardous substance releases. Under the National Oil and Hazardous Substances Pollution Contingency Plan the NRDA process provides a protocol template. Federal on-scene coordinators and other (federal and state; see below) natural resource trustees are called on to work with one another on projects which cross jurisdictions as is the rule with oil spills. NCP directs on-scene coordinators to work with trustees in specific preparedness and response activities, to help ensure that natural resources are protected when they are at risk from an actual or potential oil spill or hazardous substance release.

In particular the NRDA process involves the coordination of assessment activities between response operations in order to assure that data from the multiple activities that take place in such response scenarios can more effectively support those (referred to as a on-scene coordinator) in assessing the damages incurred at the site of the spill. Trustees are federal officials designated by the president; state officials designated by the governor; Indian officials designated by the governing body of any Indian tribe; and or foreign officials designated by the head of any foreign government; each acts on behalf of the public (of the nation, the state, the tribe, or the foreign country). The purpose of a NRDA assessment is to: avoid or minimize injury to natural resources; assess damages or injury to, destruction of, or loss of natural resources; obtain compensation from the responsible party for any damages done through negotiation or litigation; and develop and implement plans for restoration of damages or injured resources.

Environmental Impact Statement (EIS): (See NEPA Act above)

California State Regulatory Agencies

California Air Resources Board (CARB): The Air Resources Board's (CARB) mission is to promote and protect public health, welfare and ecological resources through the effective and efficient reduction of air pollutants in recognition and consideration of the effects on the economy of the state. (see "Regional Regulators and Policies," below, for county Air Pollution Control Districts)

California Coastal Commission (CCC): The California Coastal Act of 1976, the foundation for the federally approved California Coastal Management Plan (CCMP), was enacted by the State Legislature to provide for the conservation and development of the state's 1,100 mile Coastline. Under the Coastal Act and CCMP, the commission must consider the impacts of proposed projects within the coastal zone.

California Department of Fish and Game: The primary responsibility of California Fish and Game in regard to oil and oil related developments is to review NEPA and CEQA documents with respect to fish and wildlife resources and habitat impacts resulting from project implementation. California's Oil Spill Prevention and Response Act (OSPR) of 1991 was a direct response to the threat posed by a Exxon Valdez type tanker spill off the California Coast. The act established an **Oil Spill Prevention and Response (OSPR)** wing, within the California Department of Fish and Game and funds it by taxing oil transported into California.

California Division of Oil and Gas and Geothermal Resources (DOGGR): A subdivision of the California Department of Conservation, DOGGR is responsible for supervising the drilling, operation, maintenance, and abandonment of wells throughout the state, including those wells within territorial seas. Division inspectors conduct on site inspections to ensure compliance with DOGGR regulations.

California Environmental Protection Agency (Cal-EPA): The mission of Cal/EPA is to improve environmental quality in order to protect public health, the welfare of the state's citizens, and California's natural resources. Many agencies fall under the 'umbrella' provided by Cal/EPA. Each hold jurisdictions that overlap portions of the oil production process. The agencies include: the Air Resources Board, Department of Toxic Substances Control, Integrated Waste Management Board, Office of Environmental Health Hazard Assessment, State Water Resources Control Board.

California Highway Patrol (CHP): The California Highway Patrol regulates the transport of hazardous materials, such as petroleum products, on California interstate highways and thoroughfares. They also hold oversight responsibility in the event of accidental release.

California Integrated Waste Management Board (CIWMB): The mission of the integrated waste management board (IWMB) is to protect public health and safety and the environment through waste prevention, waste diversion, processing, and disposal. The CIWMB is responsible for solid waste management and is charged with implementing the **Integrated Waste Management Act of 1989** (see below). The board also administers programs intended to encourage the recycling of used motor oil.

California Occupational Safety and Health Services (OSHS): The division is charged with supervision in California over workplaces that are not under federal jurisdiction. The division enforces laws and regulations governing the protection of the life, safety, and health of every employee in California.

California State Fire Marshal, Pipeline Safety Division (SFM): The division, certified by the Federal Department of Transportation (which through the Hazardous Liquid Pipeline Safety Act of 1979 was charged with hazardous pipeline jurisdiction) has jurisdiction over intra- and inter-state hazardous liquid or carbon dioxide pipelines.

California State Lands Commission (SLC): The SLC is responsible for the management of extractive development of mineral resources located on State lands. Oil and gas development has primarily been concentrated on sovereign tide and submerged state lands adjacent to the coast and out three nautical miles offshore of Southern California.

California State Office of Emergency Services (OES): Under the authority of the Emergency Services Act, the California Office of Emergency Services (OES) mitigates, responds to, and aids in recovery from the effects of emergencies that threaten lives, property, and the environment. The state provides a pivotal link in disaster management by assisting local governments with response and recovery. OES oversees the California Mutual Aid system, is responsible for the Operational Area Satellite Information System, leads in the Standardized Emergency Management System, and is the proponent agency for other technical programs, particularly in the radiological and hazardous materials areas. During disaster response, OES coordinates the activities of state agencies. When necessary, OES recommends that the governor proclaim a disaster and, if warranted, prepares the petition the governor uses to request a Federal Declaration. OES also implements the state's Natural Disaster Assistance Act, which provides recovery funding for local governments suffering disaster losses. Additionally, OES coordinates all federal disaster activities in the state, ranging from hazard mitigation to response and recovery

California Department of Toxic Substances Control (DTSC): The mission of DTSC is protection of public health and the environment through effective and efficient regulation of hazardous waste management and site mitigation activities and through promoting the development and use of pollution prevention and waste minimization technologies. In accomplishing this mission, the DTSC is committed to carrying out all program activities in a manner that is responsive to the public and to industry needs. DTSC has primary authority over disposal of hazardous waste and toxic wastes. DTSC administers both the Subtitle "C" of the federal Resource Conservation and Recovery Act and other applicable California Toxic Substance laws.

California Office of Environmental Health Hazards Assessment (OEHHA): The mission of OEHHA is to protect and enhance public health and the environment by objective scientific evaluation of risks posed by hazardous substances. This is the lead agency for the laws established by the state's Proposition 65, which prohibit the release into drinking water of suspected carcinogens and reproductive toxins. Some by-products of petroleum production process, such as benzene, toluene, xylene, are listed as suspected carcinogens.

California Water Resources Control Board (also see "Regional Water Quality Control Board," below): Created by the Legislature in 1967, the state Water Resources Control Board's mission is to preserve and enhance the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations. Additionally, the state board ensures the highest reasonable quality of waters of the state, while allocating those waters to achieve the optimum balance of beneficial uses. The joint authority of water allocation and water quality protection enables the state board to provide comprehensive protection for California's waters.

The Board's responsibility is over designated non-hazardous and inert wastes that may enter state waters. Drilling muds, tank bottom wastes, and oil-contaminated water may become designated waste subject to state water quality regulations.

California State Environmental Policies

Air Toxics "Hot Spots Act": This program regulates 720 substances through a "hot spots" agenda that require facilities to inventory emissions, asses health risks from those emission, identify "hot spots," advise nearby populations of them, and reduce significant associated risks. Local air districts implement this program, usually by applying a ten parts per million criteria risk standard.

California Coastal Act (CCA) of 1976: The Coastal Act created a unique partnership between the State (acting through the California Coastal Commission) and local government (15 coastal counties and 58 cities) to manage the conservation and development of coastal resources through a comprehensive planning and regulatory program. The 1976 Act made permanent the coastal protection program launched on a temporary basis by a citizens' initiative that California voters approved in November 1972 (Proposition 20, the "Coastal Conservation Initiative"). The Act's coastal resources management policies and governance structure are based on recommendations contained in the California Coastal Plan called for by Proposition 20 and adopted by the Coastal Commission in 1975 after three years of planning and hundreds of public hearings held throughout the State. The CCA, the foundation for the federally approved California Coastal Management Plan (CCMP), was enacted by the state legislature to provide for the conservation and development of the State's 1,100 mile coastline. Under the CCA and CCMP, the Coastal Commission (see above) must consider the impacts of development in all its forms including the inverse—removal and abandonment procedures.

California Environmental Quality Act (CEQA): Enacted in 1970 CEQA was a response to growing concern over environmental protection and has four basic purposes: to inform the public and governmental decision makers of potential environmental effects of proposed activities; to identify ways to reduce or avoid environmental damage; to prevent damage by requiring changes in projects through alternative projects of mitigation measures; and to make the public aware if an approved project will have significant environmental effects.

CEQA applies to any activity proposed, funded, or permitted by a state or local agency that has the potential for resulting in physical change in the environment. Only projects statutorily or categorically exempt from CEQA review are exempt. Otherwise, projects which fall within these parameters must prepare either a Negative Declaration (ND) or Environmental Impact Report to assess potential impacts to the environment. Generally, an EIR is required when a project has the potential for significant environmental impact; ND is prepared when there is considerable evidence that a project will cause no substantial effect on the environment.

CEQA calls for not only permitting but the continued monitoring of permitted projects. An agency must adopt a reporting and monitoring program whenever it makes a finding relevant to the mitigation or avoidance of significant environmental effect of a project.

The CEQA process, as it is referred to, normally consists of three parts or phases. The first phase consists of a preliminary review of a project to determine whether it is subject to CEQA. The second involves preparation of an initial study to determine whether the project may have a significant environmental effect (if not, a negative declaration). The third phase is the preparation of an EIR if the project is determined to have significant effects.

Integrated Waste Management Act of 1989: This law governs handling and disposal of solid waste, whichg includes reducing the amount of waste in solid waste land fills. Local jurisdictions are required to develop integrated waste management plans showing how they will meet the waste reduction mandates outlined in this law.

The Toxic Air Contaminants Identification and Control Act: This law requires the California Air Resources Board to identify toxic air contaminants, assess risks, and then, if necessary, to develop methods to eliminate the contaminations or reduce the health risk. Local APCDs implement the control measures.

Relevant state non-environmental acts or environmental acts which have had historical impact on oil and gas production in the tri-counties:

Case and Plugging Act 1903
Natural Gas Conservation Act 1911
Minerals Leasing Act 1920
California Mineral Reservation Act 1921
Gas/Oil Ratio Act 1929
Hazard Prevention Act 1931
Well Spacing Act 1931
State Lands Act 1938
Crude Oil Maximum Efficiency Rate of Production Act MER 1955
Compulsory Polling 1947
Compulsory Unitization (primary production) 1971
Compulsory Unitization (secondary recovery) 1971
Compulsory Unitization (well spacing) 1973

Environmental Impact Report (EIR) see CEQA (above).

Regional Environmental Regulators

County of San Luis Obispo, Air Pollution Control District (SLO-APCD): The San Luis Obispo Air Pollution Control District (APCD) monitors and enforces air pollution standards. The support and cooperation of the public and business community are crucial to the success of their efforts. Besides being vital to public health, clean air is critical to two of the county's most important industries: agriculture and tourism.

The San Luis Obispo APCD was formed in 1970 and is a state district created by state law. Tweny people comprise the district's staff including engineers, inspectors, planners, technicians, and administrative personnel. It is the basic policy of the Air Pollution Control Board and the APCD to control emissions of air contaminants within district boundaries, so as to achieve and maintain state and federal ambient air quality standards. This, in turn, promotes and protects public health, public welfare and the productive capacity of the citizens of San Luis Obispo.

The APCD has the primary responsibility for controlling emissions from mobile and stationary sources of air pollution. Sources vary, from power plants and refineries, corner gas stations and dry cleaners, to personal autos and commercial cargo service. The APCD planning staff is also responsible for evaluating emission control measures that may be needed to protect and improve local air quality. Planners review new residential, commercial and industrial projects and develop strategies to minimize their air quality impacts. APCD engineers evaluate plans and issue permits for any new project that involves installing, altering, or operating equipment that either causes air pollution or is used to control it. Engineers work with permit applicants to minimize emissions of air contaminants and to ensure compliance with all federal, state, and local rules and regulations. Once a new facility is completed and begins operation, APCD inspectors conduct periodic inspections to ensure compliance with permit requirements. Along with evaluation and permiting the APCD can also takes enforcement action to bring businesses into compliance.

County of Santa Barbara Air Pollution Control District (SB-APCD): (see above, County of San Luis Obispo Air Pollution Control District)

County of Ventura, Air Pollution Control District (Ventura-APCD): (see above, County of San Luis Obispo Air Pollution Control District)

Regional Water Quality Control Boards (RWQCB): (see above, "State Water Resources Control Board"): As regional representative of the State Water Resources Control Board, the mission of the regional board is to ensure the highest reasonable quality of waters of their regions, while allocating those waters to achieve the optimum balance of beneficial uses.

County of San Luis Obispo, Department of Planning and Building, Energy and Natural Resources Division: The Energy and Natural Resources Division of the Department of Planning & Building is responsible for the planning and project review of all proposed energy and mining development within San Luis Obispo County. This includes the processing of all land use permit applications for onshore energy and surface mining projects; the monitoring and evaluation of all offshore oil development studies; the development of proposals for submittal to the state and federal governments for protection of waters off the county coast; and the coordination and development of an ongoing inspection program for all surface mining operations. This includes special attention to environmental review. The division also assists elected and appointed county officials and the public in evaluating potential impacts of land use projects, both private and county, on environmental resources as required by the California Public Resources Code.

County of Santa Barbara Planning and Development Department, Energy Division: The Energy Division works to influence federal and state energy policy in the interests of the citizens of Santa Barbara County. Important tasks which the Energy Division pays particular attention include: development of local energy plans; promulgation of policies and ordinances to best meet adopted federal, state and local goals; participation in joint federal, state and local review panels for the environmental review and permitting of major oil and gas development projects; and review of oil and gas projects and with the permit conditions imposed by the County decision makers.

County of Ventura, Resource Management Agency, Planning Division: Oil regulation at the local level is carried out in Ventura County by the staff of the Resource Management Agency, Planning Division. The equivalent of two full time staff positions are dedicated to oil related planning and enforcement, including issuing permits, investigating and correcting permit violations, and regulating some aspects of offshore oil's onshore support facilities.

Assessment Strategies

Environmental Impact Reports: Done in conjunction with state of California; see above:

Local Coastal Plans (LCP): See both Federal and California Coastal Acts above.

Notes

1. Proposition 65, better known as the "right to know act," holds industrial polluters legally accountable for not reporting effluent release into the environment to surrounding and potentially affected communities.

2. The Oil Pollution Act of 1990 dictates that in the advent of an emergency release of potentially hazardous substances into the marine environment, the US Coast Guard, in conjunction with other relevant agencies, initiates an incident command structure that delineates the lead agencies involved who coordinate emergency response. This emergency response supersedes other permit and regulatory jurisdictions until and at which time the emergency is over.

Table 6.1.1: Produced water management regulations

Law/regulation	Requirement	Responsible Agencies
Federal Safe Drinking Water Act	Injection well permits and controls	California Division of Oil, Gas, and Geothermal (DOGGR), Federal BLM, US EPA
California Public Resources Code & California Code of Regulations Title 14 & Title 23, California Toxic Pits Control Act, Fish and Game Code	Surface impoundment controls	DOGGR, State Water Resource Control Board, US EPA, Regional Water Quality Control Boards, California Department of Fish and Game
California Public Resources Code & California Code of Regulations Title 14 & Title 23, California Toxic Pits Control Act, Fish and Game Code	Surface Water Discharge Permit process: (1) NPDES permit and discharge waster requirements, (2) NPDES and hazardous substance reporting, (3) Liability financial assurance	California Division of Oil, Gas, and Geothermal (DOGGR), Federal BLM, US EPA, USCG, Office of Emergency Services
California Health and Safety, Porter Cologne Water Pollution Control Act, California Code of Regulations, Title 23	Controls all permits for water treatment facilities that may generate hazardous waste	California Office of Toxic Substances Control
Proposition 65	Warning of public on discharge required; prohibits discharge into drinking water	California Division of Oil, Gas, and Geothermal (DOGGR), Federal BLM, US EPA, USCG, Office of Emergency Services

Source: State of California. Department of Conservation. Division of Oil & Gas. 1986. *A Profile of California's Oil and Gas Industry.* Sacramento: California Division of Oil & Gas.

Table 6.1.2: Waste management regulations

Law/regulation	Requirement	Responsible Agencies
Resource Conservation and Recovery Act, California Hazardous Waste Control Act, California Code of Regulation, Title 22	Solid waste management controls, Hazardous waste management controls: (1)H/W treatment, storage and disposal facility permits and controls, (2) Cleanup and remedial actions, (3) H/W transport controls, (4) H/W sources reduction plans, (5) Biennial report	California Department of Toxic Substances Control, US EPA, California Integrated Waste Management Board
California Integrated Waste Management	Solid waste management controls: (1) Disposal permits	California Integrated Waste Management Board: Local enforcement agencies
Federal Comprehensive Environmental Response, Comprehensive Liability Act	(1) Clean-up and Remedial Actions (2) Liability Assurances	US EPA, California Department of Toxic Substance Control
Toxic Substances Control Act	(1) PCB waste controls, (2) Asbestos waste controls	US EPA, California Department of Toxic Substance Control
California Hazardous Waste Control Act	Used oil recycling	California Department of Toxic Substance Control, California Integrated Waste Management Board
Clean Water Act dredge and fill regulations	Permits for dredging and fill disposal in US waters	US Army Corps of Engineers, Regional Water Quality Control Boards
County Sanitation and Public Works Department Regulations	Industrial waste disposal permits and controls	County Sanitation and Public Works Departments
Local land use permits	Land use permits	Cities/Counties

Source: State of California. Department of Conservation. Division of Oil & Gas. 1986. *A Profile of California's Oil and Gas Industry*. Sacramento: California Division of Oil & Gas.

Table 6.1.3: Emergency preparedness regulations

Law/regulation	Requirement	Responsible Agencies
Federal Comprehensive Environmental Response, Comprehensive and Liability Act	(1) Hazardous substances release reporting, (2) Clean up and remedial actions, (3) Liability assurance	US EPA, California Toxic Substances Control , California Office of Emergency Services
Emergency Planning and Community Right to Know Act	(1) Updating of material safety data sheet, (2) Inventory reporting, (3) Release Reporting	US EPA, Local Emergency Planning Committee, Local Fire and Health Agencies
California Public Resources Code, California Government Code	(1) Spill prevention and response, (2) Spill reporting, accident, and hazards assessment	California Division of Oil, Gas, and Geothermal Resources, Office of Emergency Services
California Public Resources Code and California Code of Regulation, Title 14	Spill prevention and response, accident and hazards assessment	California Division of Oil, Gas, and Geothermal Resources, State Land Commission, Office of Emergency Services
Clean Water Act, Porter Cologne Water Pollution Control Act	(1) Spill prevention, control, and countermeasure plan, (2) Spill reporting	US EPA, US Coast Guard, State Water Resources Board, Regional Water Quality Boards, California Office of Emergency Services
US Code, 49 CFR 394, Vehicle Code	(1) Hazardous materials transport, (2) Accidental spills of waste and hazardous substances	Federal Department of Transportation, California Office of Emergency Services
Federal Pipeline Safety Act, California Pipeline Safety Act	Accidental spills from pipelines, reporting	State Fire Marshal, California Office of Emergency Services
Resource Conservation and Recovery Act, California Hazardous Waste Control Act	Hazardous waste emergency response and reporting plan	California Department of Toxic Substances Control, US EPA
California Health and Safety Code (AB 2185/2187)	(1) Hazardous material business and emergency response plan, (2) Emergency response plan	California Office of Emergency Services, Local implementing agency
California Health and Safety Code	(1) Risk management business and emergency response plan, (2) H/S inventory, (3) Emergency response plans	California Department of Toxic Substances Control, Local Implementing Agency - County Health/Fire Departments
Code of Federal Regulation 40 CFR 3160.4, California Public Resources Code and California Code of Regulations	Drilling operations permit includes: safety, blowout, discharge prevention, containment and well abandonment	Bureau of Land Management, California Division of Oil, Gas, and Geothermal Resources
US Hazardous Materials Regulations, California Vehicle Code	Hazardous materials transport emergency response, procedure, and reporting	US Department of Transportation, California Highway Patrol
California Code of Regulations, Title 19	(1) Emergency response regulations, (2) Spill reporting	California Office of Emergency Services
California Underground Storage Tank Act	Emergency response, regulation, and reporting for releases underground storage tanks	California Regional Water Quality Control Board and/or local agency

Source: State of California. Department of Conservation. Division of Oil & Gas. 1986. *A Profile of California's Oil and Gas Industry*. Sacramento: California Division of Oil & Gas.

Table 6.1.4: Land access/use permits regulations

Law/regulation	Requirement	Responsible Agencies
NEPA, Public Resources Code, California Environmental Quality Act	(1) State environmental quality regulations including the use of environmental impact reports to asses and mitigate environmental impacts, (2) NEPA and its EIS process on federal lands	Lead agency is designated, usually a city or county planning agency. All other agencies are involved through EIR/EIS process. On federal land, BLM or DOE is lead.
Endangered Species Act	Land-use permit for any activity on public land that could affect listed specie	US Fish and Wildlife, California Department of Fish and Game
Federal Land Policy and Management Act	Right-of-way permits for projects on public lands; Construction, operations and rehabilitation plans	BLM
Public Resources Code, Coastal Management Act	Coastal development permits for facilities in the sate coastal zone	California Coastal Commission
Local planning, zoning, land use, and building ordinances	Local land-use and building permits	City and County planning departments/agencies

Source: State of California. Department of Conservation. Division of Oil & Gas. 1986. *A Profile of California's Oil and Gas Industry*. Sacramento: California Division of Oil & Gas.

Table 6.1.5: Air quality regulations

Law/regulation	Requirement	Responsible Agencies
Federal Clean Air Act	(1) Air pollution control including air quality standards, (2) emissions controls and reporting, (3) permitting, (4) new source review, (5) prevention of significant deterioration	US EPA, California Air Resources Board, Regional Air Pollution Control Districts
California Health and Safety Code, California Clean Air Act	Air emissions reductions mandates, controls on air districts SIPs	US EPA, California Air Resources Board, Regional Air Pollution Control Districts
South Coast AQMD rules	New and modified source review, permit to construct, new source performance standards, stack monitoring, source sampling and testing, SO controls, NO controls, solvent and RVP controls, storage and transfer of gasoline controls, petroleum storage controls	South Coast AQMD
Santa Barbara County APCD	New and modified source review, permit to construct, new source performance standards, stack monitoring, source sampling and testing, so controls, no controls, solvent and rvp controls, storage and transfer of gasoline controls, petroleum storage controls	Santa Barbara County APCD
Ventura County APCD	New and modified source review, permit to construct, new source performance standards, stack monitoring, source sampling and testing, so controls, no controls, solvent and rvp controls, storage and transfer of gasoline controls, petroleum storage controls	Ventura County APCD
San Luis Obispo County APCD	New and modified source review, permit to construct, new source performance standards, stack monitoring, source sampling and testing, so controls, no controls, solvent and rvp controls, storage and transfer of gasoline controls, petroleum storage controls	San Luis Obispo County APCD

Source: State of California. Department of Conservation. Division of Oil & Gas. 1986. *A Profile of California's Oil and Gas Industry*. Sacramento: California Division of Oil & Gas.

Table 6.1.6: Toxic air contaminants regulations

Law/regulation	Requirement	Responsible Agencies
Federal Clean Air Act	(1) National emissions standards for hazardous pollutants, (2) Maximum achievable control technology for federally defined hazardous air pollutants	US EPA, South Coast AQMB: County APCDs
Health and Safety Code - Toxic Air Containment	Controls on California "List of Toxic Air Contaminants"	California Air Resources Board, South Coast AQMB, County APCDs, Office of Environmental Health Hazards Assessment
Health and Safety Code - Air Toxics "Hot Spots"	Air toxics emissions inventory, risk assessment, and public notice	California Air Resources Board, South Coast AQMB, County APCD's, Office of Environmental Health Hazards Assessment
South Coast AQMB Rule 1401	New source review carcinogenic pollutants	South Coast AQMB
South Coast AQMB Rule 1410	Hydrogen fluoride controls	South Coast AQMB
Ventura County APCD	Chromium cooling tower controls	Ventura County APCD

Source: State of California. Department of Conservation. Division of Oil & Gas. 1986. *A Profile of California's Oil and Gas Industry*. Sacramento: California Division of Oil & Gas.

Table 6.1.7: Hazardous material handling and storage regulations

Law/regulation	Requirement	Responsible Agencies
Emergency Planning and Community Right-to-Know	Submittal of material safety data sheet, chemical inventory reporting, release reporting	US EPA, Local Emergency Planning Committee
US Code 49 CFR 394, Vehicle Code	(1) Hazardous materials transport, (2) Accidental spills of waste of hazardous materials	Federal Department of Transportation, California Department of Emergency Services, California CHP
Occupational Safety and Health Act, California Labor Code	Personnel health and safety standards including training and records keeping	Federal and State OSHA
Hazardous Substances Storage Act	Regulations controlling the storage of hazardous substances including petroleum in above ground storage tanks	California State Water Resource Control Board, Regional Water Quality Control Board
Federal Resource Conservation and Recovery Act, California Underground Storage Tank Act	Regulations controlling the storage of hazardous substances including petroleum in underground storage tanks	US EPA, California State Water Resources Control Board, Regional Water Quality Control Boards, local agencies
California Health and Safety Code, Proposition 65	Regulations controlling the handling of hazardous materials including inventory reporting, and hazardous materials training	California OSHA, California Office of Emergency Services, California State Water Resources Board, Department of Toxic Substances Control, Office of Environmental Health Hazards Assessment

Source: State of California. Department of Conservation. Division of Oil & Gas. 1986. *A Profile of California's Oil and Gas Industry*. Sacramento: California Division of Oil & Gas.

Table 6.1.8: Transport and pipeline regulations

Law/regulation	Requirement	Responsible Agencies
US Code 49 CFR 394 Vehicle Code	(1) Hazardous material transport, (2) Accidental spills of waste or hazardous substance	Federal Department of Transportation, California Office of Emergency Services
Federal and State Pipeline Safety Act	Pipeline safety regulations control the operations and maintenance of pipelines, hydrostatic testing, and records keeping	US Department of Transportation, State Fire Marshal
Health and Safety Code, Hazardous Waste Control Act	Regulations that control the transportation of hazardous materials as well as the transport of oil	California Department of Toxic Substance Control, California Integrated Waste Management Board
California Public Resource Code: California Government Code	Marine terminal and facility controls, accidents and hazardous waste assessment	State Lands Commission
Local land use and zoning regulations	Local land use permits	City and county planning departments

Source: State of California. Department of Conservation. Division of Oil & Gas. 1986. *A Profile of California's Oil and Gas Industry*. Sacramento: California Division of Oil & Gas.

Table 6.1.9: Oil spill prevention and response regulations

Law/regulation	Requirement	Responsible Agencies
Federal Water Pollution Control Act, Federal Oil Spill Act	Oil spill pollution prevention, preparedness, and response	US EPA, US Coast Guard, Bureau of Land Management
Clean Water Act, Porter Cologne Water Pollution Control Act, California Code of Regulations, Titles 22 and 23	(1) Spill prevention, control, and counter measure plan, (2) Spill reporting	US EPA, US Coast Guard, State Division of Oil, gas, and Geothermal Resources, State Lands Commission, California Department of Fish and Game
Code of Federal Regulations 40 CFR 3160, California Public Resources Code, California Government Code, California Code of Regulations, Title 14	(1) Oil spill and response, (2) Reporting	Division of Oil and Gas, State Lands Commission
California Code of Regulations Title 19	Emergency response regulations, spill reporting	California Office of Emergency Services
California Public Resources Code, California Government Code	(1) Marine terminal and facility oil spill prevention and response, (2) Spill reporting, accidental and hazards assessment	California Department of Fish and Game, State Lands Commission

Source: State of California. Department of Conservation. Division of Oil & Gas. 1986. *A Profile of California's Oil and Gas Industry*. Sacramento: California Division of Oil & Gas.

Section 6.2
Local Oversight

Oil and gas development does not produce just material goods and economic development. In this section, we examine how privately directed oil and gas development have affected the political and administrative capacities of county and local governments. In turn, these consequences have changed the way the industry does business in Santa Barbara County.

1950-1968

Where public sentiment expresses concern for economic and environmental impacts, government may legislate and enforce laws that intervene in oil activities by standardizing procedures for mineral and property rights claims, industrial siting, fiscal remuneration, and environmental safety. Historically, the oil industry's advocacy or resistance to governmental intervention has depended on the intentions of such intervention. Where the goal has been to rationalize oil and gas production, the industry (or at least its non-independent sectors) has often endorsed legislation that regulates the activities of oil developers vis-à-vis conflicting governmental claims or one another.[1] By contrast, where redistributing or constraining profit is seen as the outcome, the oil industry has traditionally urged the government to stay out of the private market of energy development. Both traditions have been observed in Santa Barbara County.

As the 1950s began, the county government's interventions into oil and gas activity were influenced by a long-standing legacy of onshore and coastal development.[2] Since the turn of the century, expansive drilling in the North County and southern coastline had generated major tax revenues for county and local governments that in turn funded city-building, exemplified most notably by the county's Spanish Mission style courthouse. Expertise on energy development was gradually developed in county departments that would serve the board of supervisors throughout this period: a Planning Department familiar with facility siting issues, a district attorney and county counsel well-versed in legal aspects of coastal drilling, and an Oil Well Inspection Department (later, the Petroleum Department) to enforce oil field unitization and ensure a modicum of environmental safety.

The historical record describes no industry-wide antagonisms against county government in the period before 1969. Without its modern environmental connotations, "regulation" in this period generally meant enforcing oil field conservation and wellhead spacing, adjudicating the conflicting drilling claims of operators, and enforcing certain industrial safety standards. These interactions helped form a client-like rapport between county government and the oil industry that facilitated expanded onshore development in unincorporated county land. For example, in 1956 Richfield Oil's Cuyama Valley leases (on 150,000 acres of federal and private land in the county's unincorporated northeast corner) resulted in $1.6 million in property taxes—the largest single tax bill that year, and 13 percent of the entire county property tax base (*Santa Barbara News-Press*, December 3, 1956). Without a direct channel to the county's property tax revenues, the handful of city governments had more fiscal autonomy from oil development, but most made no efforts to exercise legislative power over onshore drilling in this era. Only the city of Santa Barbara created restrictive zoning to push drilling out of certain residential areas.

Seldom opposed, the industry's capacity to operate was further enhanced following landmark offshore energy legislation in the 1950s. The federal Submerged Lands Act and Outer Continental Shelf Lands Act divided state and federal jurisdiction over offshore development at the three mile limit from the coast, leaving the county no taxing or zoning authority over offshore oil and gas drilling. Responding to the momentum for state-owned tidelands development, South Coast opponents of offshore drilling successfully lobbied the state legislature in 1955 to pass the Shell-Cunningham Tidelands Act, which among other things created a drilling-free Santa Barbara Oil Sanctuary in state waters adjacent to the South Coast's urban limits (extending from Coal Oil Point to Summerland Bay).[3] Additionally, the county moved to exercise control over the onshore components of offshore energy development.

Despite county oversight efforts and the longstanding public protest which supported them (see Section 4.1: Local Support and Opposition), at this time the oil industry did not encounter much bureaucratic inertia over permitting oil development. Generally, the county followed the administrative pronouncements of the state government (which vocally favored offshore development) and articulated local preferences upon which an applicant could reasonably expect to have its onshore project approved. Addressing South Coast concerns, the county created ordinances to prohibit oil drilling piers, regulate movement of hazardous materials resulting from offshore drilling, and annex tidelands areas to adjacent school districts (in large part to levy additional school district taxes on oil properties).[4]

These zoning ordinances only constituted general onshore policy regarding then-pending offshore development. When the first offshore platform (Hazel, in the Summerland oil field) was installed in 1958, the first concrete county response to offshore energy development came with the proposal for the needed onshore processing plant site. The project's approval demonstrated a pattern of bureaucratic facilitation and public opposition characteristic of oil development in the period before 1969. County planners worked closely with the applicant (Standard Oil) to select a site from four alternatives (including consolidation with existing facilities) that would be amenable both to the company and the county. Planners endorsed the applicant's choice, a new site in rural Carpinteria, to the county board of supervisors, who in turn approved it over vocal public opposition.

As more applications for onshore facilities were submitted, the county began establishing general site criteria (promoting, for example, rural locations and the use of existing facilities) that would expedite site selection while mollifying public concerns. However, project by project, offshore developers could not provide sufficient information about onshore site preferences that would let the county standardize its onshore site policy, resulting in two trends which foreshadowed future bureaucratic impacts. First, county planners and supervisors could never fully routinize site selection and remove themselves from the permitting process, no matter how sympathetic they were to an applicant's proposal. Consequently, onshore facility applications had to be heard case by case in sometimes contentious public hearings, with no guarantee of their ultimate approval. Most notably, in 1968 the county board of supervisors approved another Carpinteria onshore facility proposal (by Humble Oil), only to have their decision overturned by public referendum (described further in Section 4.2: Campaign Contributions).

Second, county planners would begin to push for a coherent onshore facility siting policy that combined facility consolidation and compatibility with local geographic, land use and aesthetic criteria. Initially approved in 1967, this industrial consolidation policy would continue to be the subject of political controversy into the present era: In 1985, voters narrowly rejected an initiative restricting all onshore processing facilities into one site (thus paving the way for Chevron's Gaviota facility), while in 1996 voters approved an initiative confining all South Coast slant-drilling into one of two facility sites (Las Flores Canyon and Gaviota).

1969-1986

In the "Environmental Era" of 1969-85, the bureaucratic context was fraught with new issues of environmental safety in the Channel, industrial siting of onshore facilities, and renumeration for county oil planning. Offshore energy development in the Santa Barbara Channel sputtered for several years after the 1969 oil spill and the various OCS and tidelands drilling moratoria imposed in its wake (see also Section 4.1: Local Support and Opposition). Already in the permitting process before the spill, Sun Oil's Platform Hillhouse was installed in late 1968 and (after questions over pipeline transportation were resolved) became operative two years later, but otherwise new offshore drilling would not occur until Exxon installed its Platform Hondo in 1976.

In the interim, new national and state legislation altered the ways offshore energy development would proceed. First, in 1970 the National Environmental Policy Act and the California Environmental Quality Act gave county governments a role in identifying, analyzing, and mitigating environmental impacts. New procedural steps, such as preparing environmental impact reports (EIRs), soliciting public comment, and proposing mitigation measures for individual impacts, added months or even years to the period between a project's permit application and subsequent production. Second, the 1972 Coastal Zone Management Act and the 1976 California Coastal Act imposed on all California counties special coastal zoning and land use plans that would be legislated and adjudicated by the California Coastal Commission (CCC), a new state government agency with regulatory jurisdiction over the onshore components of offshore energy development. Third, the 1978 Outer Continental Shelf Lands Act Amendments gave counties additional opportunities for input in the federal OCS energy development process.

Despite the stricter coastal zoning and increased governmental oversight that resulted, counties in California varied widely in the degrees to which they seized new opportunities for input and enforced the letters of these laws. With its political environment of local outcry, Santa Barbara County chose to exercise an unprecedented degree of local regulatory oversight and political autonomy. The county was one of the first in the state to apply for and be granted post-Coastal Act permitting authority over coastal land use zoning, subject to review by the CCC. This required county planners to enhance their already considerable expertise and capacity, so that they could in effect implement state policy (Lima, 1995).

To this end, a new county agency was established in 1973 to manage the new sets of applications and information required of project applicants by the state and federal legislation. Spun off from the Planning Department, the Department of Environmental Quality (DEQ) prepared intra-county EIRs, responded to federal and state EIRs (related, for example, to OCS leasing), and reviewed permit applications for all projects (not just those related to oil and gas development) which pose potential environmental impacts. At the end of this section, Figure 6.2.1 shows the expenditures and personnel commanded by the DEQ. Recognized nationally as a pioneer local agency in the post-NEPA era, the DEQ commanded not only these budgetary and staff resources but also an additional 95-member citizen advisory board (Reynolds, 1974). A new bureaucratic chain of command was thus established over oil and gas development planning, whereby the DEQ would review applications and EIRs, and the planning commission would oversee this review and forward its recommendations to the county board of supervisors.

As a result, the oil industry faced a considerably changed bureaucratic environment in Santa Barbara County. Most immediately, the era of expedient county permitting came to an end, even as the mid-1970s energy crunch increased federal pressures for expanded OCS drilling. Setting a pattern that continues to the present, the county planning commission would rarely reject or approve projects all at once, instead subjecting their approval to any number of further conditions. Project applicants might appeal to the Board of Supervisors or the CCC or litigate these decisions with some success, but by the second half of the 1970s, the county demonstrated an unprecedented administrative capacity to implement local concerns about offshore drilling.

Arco's 1975 proposal to expand drilling at Platform Holly provided the first visible example of this local authority when the county mandated Arco produce a second EIR for onshore facility modifications (at Ellwood), a ruling which Arco unsuccessfully appealed (Graves and Simon, 1980; Johnson and Nye, 1979). This and other exercises of expanded bureaucratic capacity occurred in a context of unrelenting public demand, chiefly based in the South Coast, to halt all offshore energy development. This, too, prolonged the permitting process. Notably, Exxon's 1975 application for an onshore gas treatment facility (in Las Flores Canyon) received a favorable county re-zoning decision but was subsequently met with litigation by environmental organizations and a narrowly defeated public referendum to repeal the county's approval (see Section 4.2: Campaign Contributions).

While it might appear to some that county bureaucracy and public mobilization comprised a "one-two punch" against the oil industry, the county also explored new forms of cooperation with the oil industry in this period. As a perhaps unintended result, the county sometimes took actions that made local oil opponents as wary as oil companies traditionally were. In their expressed commitment to "environmental problem-solving," county staff often sought to engage and collaborate with oil companies proactively, in order to establish energy-related policy before any individual projects would demonstrate the need for such policy. Long-standing local concerns about pipelines and onshore facility consolidation presented an early opportunity of this kind. In 1976, the county enlisted industry representatives from Arco, Chevron, Exxon, Burmah, and other companies (much to the consternation of some local environmentalists) to form a joint industry/government pipeline working group (Graves and Simon, 1980). Such collaborative efforts demonstrated county planners' independence from pressure by pro- and anti-oil advocates, as well as their aptitude for organizational and policy innovation in order to resolve offshore energy problems constructively. The county's efforts at cooperative oil development planning were not always reciprocated. Some oil industry informants suggest that at this early stage of expanded OCS development, oil companies were more likely to resist county entreaties and litigate instead, for fear of setting a binding precedent otherwise.

By the 1980s, federal efforts to accelerate OCS development had ushered in a new era in Santa Barbara County. Area-wide OCS lease sales, new Channel oil field discoveries, and a growing number of offshore development projects triggered an unprecedented increase in permitting activity for a variety of arrangements, ranging from the significant (for example, oil and gas processing facility siting) to the more routine (reorganization of operator stakes). At the onset of this period, only a handful of planners in the county's traditional Planning Department reviewed oil-related permitting applications, channeling them through the same administrative process it used for shopping centers and suburban subdivisions. Having dissolved its Department of Environmental Quality,[5] and unable to review each oil-related permit application with the requisite attention, the county had concerns its existing administrative capacities were insufficient to monitor oil development in the Santa Barbara Channel. Consequently, it moved to establish a separate planning unit just to manage offshore energy development and its onshore components. In 1983, the county parlayed a California Coastal Commission grant (designated to fund a single county offshore energy planner) into a new oil-only planning unit: the Energy Division, a stand-alone division of the Planning Department through its Resource Management Department (Lima, 1995). With this new planning unit, the oil industry again encountered an altered bureaucratic chain of command, the impact of which became most visible in the 1987-1996 period.

1987-1996

Throughout the most recent historical period, the oil industry concentrated its activities offshore. Onshore support components faced unprecedented oversight by local government, particularly through the county's Energy Division. As a separate planning unit to manage offshore energy development and its onshore components, the Energy Division hosts a large staff to oversee the many onshore permitting and regulatory processes involved in offshore development. To this day, the Energy Division reviews permit applications, analyzes environmental impacts, monitors regulatory compliance, and develops offshore energy-related land use policy. It submits recommendations for individual projects (such as permitting applications) to the Planning Commission for approval. In turn, the Planning Commission's decisions can be appealed to the county board of supervisors, as indeed almost all substantial offshore energy decisions have (Lima, 1994).

Given both the local controversy surrounding oil and gas development and the property tax ceilings imposed by state initiatives, the county does not use general fund revenues to fund the new planning unit (Lima, 1995). Instead, it has established the Energy Division as a fee offset program, whereby to develop offshore oil in the Santa Barbara Channel, project operators must fund *in advance* the estimated costs of planning work. Due to the vast scale of offshore energy development in the Santa Barbara Channel, this financing arrangement means the Energy Division has always generated revenues that cover (and sometimes exceed) its actual expenditures. This high level of funding contrasts remarkably with the budget shortcomings that local planning units traditionally face.

With funding for local energy development planning secure, the size of the Energy Division's budget would reflect the pace of offshore development. At the end of this section, Figure 6.2.2 demonstrates how the Energy Division's expenditures rise and fall with the levels of permitting activity each year. While expenditures exceeded $1.6 million in the Division's first year (twice as large as that year's initially estimated budget), two years later its expenditures would peak at $3.5 million. In 1987—the year this historical section begins—Division funding began to drop somewhat, although hardly at a level commensurate with the drop in barrel prices, since by then prominent oil and gas facility projects (for example, Chevron's Gaviota processing facility) were far down the permitting "pipeline". Division budgets have gradually decreased in the 1990s. In fiscal year 1996, its budget had fallen to $1.7 million.

As Figure 6.2.2 also indicates, the Energy Division's staffing likewise varies on the pace of offshore energy development. As the planning unit's (now former) deputy director recently told us, "If [oil operators] don't want more permits, we have a lot less work to do." From 12 initial staff positions (at full time equivalents, or FTEs), the Energy Division hired up to 30 employees at its 1987 peak, before gradually decreasing to 18 staff members in 1996. As a note of comparison, in recent years San Luis Obispo County has designated four employees for offshore energy planning, while Ventura County has two.

The elaborate planning regime which oil companies face in Santa Barbara County is suggested by a review of the Energy Division's responsibilities. The Energy Division organizes its duties in three primary tasks. Under *permitting*, the planning unit reviews the project operator's application (for new projects, facility modifications, connecting companies' projects, etc.), produces an environmental impact statement, solicits public input, and makes recommendations to the decision-makers at the Planning Commission. After a permit is issued for a project, the Energy Division monitors for the operator's *compliance* to the permit conditions imposed by the county. Finally, the Energy Division makes *policy* for both long-range planning and immediate policy issues; policy work not related to specific projects is funded by grants and county funds. Individual onshore oil facilities and components are assigned to a single planner who interacts with the operators across the lifespan of each project, from initial permitting to ultimate abandonment.

The trends in the Energy Division's permitting workload reflect the maturity of oil development in Santa Barbara County. As mentioned earlier, the planning unit was initially formed to permit the new offshore projects proposed for the recently discovered extensions of the Santa Barbara Channel's reserves. The new projects in turn required that operators obtain permits for oil transportation and onshore processing facilities, two major concerns of the late 1980s. By the 1990s, as operators focused on consolidating and concluding development in current projects, permitting for expansion and abandonment of existing facilities moved to the fore. By 1996, project abandonment, soil remediation, and site abandonment had become major tasks for the Energy Division, making up about half of the planning unit's entire permitting workload and boosting the proportion of total permitting work from ten years previously (see the sub-section entitled "Abandonment," below).

The Energy Division's *decreasing* permitting compliance workload also reflects local offshore energy development's maturity. Procedurally, compliance requirements for individual projects decrease over their lifespans, since most conditions can be satisfied before production begins or in a few subsequent stages, thereby reducing inspection work as a matter of course.[6] Additionally, the county places the burden of responsibility on operators to specify how they will comply to individual permit conditions by submitting individual plans for each condition that the Energy Division reviews and often sends back for further specification. After more than a decade of these compliance procedures, some county planners have observed that the oil industry has increasingly seen the benefits of such "detail work" as specifying in advance future compliance requirements for expanded projects, and companies have improved at reducing the numbers of plans they submit. The aggregate effect is less compliance work for the Energy Division. Its (former) deputy director estimates that permit compliance work has dropped roughly 30 percent from ten years ago, currently constituting 50 percent of all Energy Division work.

Perhaps the most unique aspect of the county's regulatory focus is its policy efforts to mitigate the social and environmental impacts of offshore energy development, as exemplified by the Energy Division's policy work. While some of this work simply clarifies minor ambiguities concerning oil development,[7] the Division's policy efforts typically enact long-term protocols for managing issues like oil transportation (pipelines vs. tankers), systems safety/hazardous facilities siting (both immediate safety issues and long-term future siting questions), and onshore facilities abandonment. Some county oil policies have taken unprecedented forms, such as the Coastal Resources Enhancement Fund (CREF), which institutionalizes funding for coastal mitigation of oil development.

Initiated in 1987, CREF is funded by a special fee levied on coastal and offshore oil projects. Each year, the county (via the Energy Division) allocates the resulting pool of funds to local agencies, city governments, and local non-profits that focus on broadly defined mitigation projects (for example, parkland expansion, habitat preservation, environmental education, and fisheries mitigation). As Table 6.2.1 (at the end of this section) illustrates CREF generates a significant sum of money which varies depending on the level of development activity in each year. In 1998, for example, 19 grants were awarded out of CREF funds. The largest ($325,000) went to the Las Positas Park Foundation to expand this Santa Barbara park—one of six habitat acquisition awards in this year. Other 1998 awards went to build trails and scenic overlooks, support the construction of maritime museums and a Santa Barbara aquarium, fund the Wildlife Care Network (an animal hospital that treats oiled wildlife), prepare a video about snowy plover birds, and fund Earth Day events in Santa Maria.

In the past, Santa Barbara parkland expansion projects have received the largest single CREF awards: two $1 million awards to acquire the Santa Barbara Shores property (in 1988) and the Wilcox Property (in 1994, since re-named the Douglas Family Preserve). Overall, since CREF's inception, more than $10 million has been awarded to Santa Barbara County agencies and organizations. By comparison, this amount is larger or perhaps roughly equal to oil company philanthropy in the entire tri-county region (for explanations of how we estimate the value of oil philanthropy, see Section 2.4: Philanthropy).

Another major regulatory policy which distributed fees from major coastal and offshore oil projects to local agencies for ten years was the tri-county Socioeconomic Monitoring and Mitigation Program (SEMP). SEMP generated funds to mitigate the effects of oil-related population growth, by distributing payments to tri-county cities, school districts, and service districts where oil workers and their families located (for more discussion of SEMP, see Molotch and Freudenburg, 1996).[8] Until its cessation in 1995, SEMP represented another unique cost of doing business in the tri-county region. At the end of this section, Table 6.2.2 lists the cumulative annual SEMP payments in Santa Barbara and Ventura Counties. Two final mitigation funds are the Fisheries Enhancement Fund and Fishermen's Contingency Fund, which fund mitigation of long-term and accidental impacts, respectively, on the local fishing industry and its infrastructure. The size of these annual funds is far less than the average pool of award money generated by CREF or SEMP.

Increasingly, the county looks to non-industry funding sources to address policy issues that exceed the domain of oil development. For example, the Energy Division received an extramural grant in the early 1990s to fund the creation of an "energy element," a county planning document dealing with general energy use in the county including oil development, innovative building review, sustainable development, and electric vehicles.[9]

Other oil-related county agencies

Oil operators have to contend with a host of other county agencies (and state and federal as well) besides the Energy Division. Also under the Planning Department are two smaller oil related units. The Petroleum Department, a two-person operation in 1997, oversees onshore oil development (predominantly in the North County). Compared to the Energy Division, this department's workload is consistently insubstantial, as its expenditures and personnel indicate (see Figure 6.2.3, below). A similarly small Oil and Gas Section of the Planning Department reviews building code compliance (for example, to electrical permit conditions) for onshore facilities. It contracts about half of its field inspections to other experts.

The county's Fire Department has two units that deal with oil and gas: Its Office of Emergency Services coordinates with state and federal levels to deal with emergency management issues like fires and explosions, while the Protective Services Division handles contamination from chronic or acute oil spills. The county's Environmental Health Services unit deals with health and safety issues resulting from oil emergencies, such as contamination of potable water sources. Most significantly, the Air Pollution Control District (APCD) reviews emission standards and monitors pollution by oil operators (as well as other industries). Although the APCD is strictly speaking a state agency, the county nevertheless provides much of its administration and funding.

Abandonment

While the oil industry looks to Santa Barbara County for renewed production, it operates in a local bureaucratic context where perhaps the most important issue concerning oil and gas development is its cessation, that is, abandonment of oil and gas wells, infrastructure, and facilities. Abandonment is a relatively new concern. Prior to 1960, most development permits did not set requirements for the termination of operations. Since that time, public concern has grown over highly contaminated lands and scenic eyesores left by abandoned facilities and infrastructure, which have proliferated due to the forced closure of some 1,900 onshore wells (due to economic viability) since 1993. In the 1990s, a number of older offshore platforms (Chevron platforms Hazel, Hilda, Heidi and Hope), onshore wells (for example, wells at Arco's Ellwood and Unocal's Santa Maria Unit sites), and processing facilities (Chevron's Gaviota Gas Plant, Unocal's Battles Gas Plant, Arco's Dos Pueblos Oil and Gas Production Facility and Bishop Tank Farm, and CalResources' Guadalupe Production Island "D" site) have been either been abandoned or are scheduled for abandonment. Thus, whether set into motion through mandatory deadlines set forth in permit conditions or by operator reevaluations of productive viability, operators undertake abandonment procedures that have come to comprise much or even most of their local activities in a region where oil and gas prospects have declined.

For the county's Energy Division, abandonment requires that producers remove the industrial foundation,[10] clean up the environmental residues, and revegetate the site of an oil and gas project so that it may be rezoned for future use. Legally, abandonment is considered a "development" that requires permit approval and compliance to state environmental laws, much like new construction proposal. Since at least the past several years, each operator has been required to specify its project's abandonment procedures before commencing to decommission the project. Generally, the operator must submit an "abandonment and restoration plan," detailing specific procedures for removal and restoration, which the Energy Division reviews and amends if needed. In some instances, permitting also requires operators post an abandonment bond.[11] If the operator has an existing permit that deals with the operation of the project but also requires them to abandon their facility, then the existing permit is amended to deal with the specifics of abandonment.

After it receives an abandonment permit, the operator has some leeway as to when it carries out the required procedures. Given this discretion, conflicts have emerged between the county, operators, and other involved governmental units over the timeliness of abandonment. The county prefers to see abandonment projects carried out promptly, rather than let deactiviated facilities stand idle and possibly decay. By contrast, for operators abandonment may entail allocating significant expenditures (generally $2-3 million) that could be used for existing development instead. Forced to allocate a budget for either an abandonment project that is all expenses or a development project that may produce several millions of dollars in income, operators may give priority to the latter. In other cases, simply getting all partner operators and governmental units involved to approve abandonment plans delays their speedy implementation. As the former chief of the Energy Division told us, "Trying to get prompt abandonment of offshore activities, nearshore and onshore pipelines, and old processing plants has taken *much* more effort than we ever thought it would take."

Another issue is the future land uses proposed for abandonment projects. When operators halt development entirely, they face the problem of restoring a site so that it may be rezoned for future use. In recent years, operators have come up with innovative and controversial future land use proposals. Onshore, residential and commercial uses have been proposed for abandoned well sites. Among more notable examples, Arco has proposed a golf course for 208 coastal acres previously used as oil well sites for over 50 years.[12] Such land-use proposals typically require new land use permits and even policies from the county and (for coastal sites) the state as well. Offshore, oil and gas operators advocate the "rigs to reefs" concept familiar from the Gulf of Mexico, whereby offshore platforms in the Santa Barbara Channel would be removed down to their submerged support structures, which would be left intact as artifical reefs to support marine life.

The vast number of oil and gas facilities reaching the limits of their productivity and public concerns for their environmental impacts have motivated the county to formulate an abandonment policy. This would set forth consistent protocols for a number of abandonment issues, such as proper abandonment for different types of wells, streamlining overlapping regulatory jurisdiction with the state, pre-application assistance, status reports, financial responsibility, transfer of ownership, and abandonment assessment funds. To date, abandonment policy is still in the drafting stage, due in large part to the vast number of governmental agencies and environmental regulations acting on the process.

The political controversy surrounding oil and gas development in the county has promoted government oversight and bureaucratic investment in the speedy abandonment of declining wells and infrastructure. On the other hand, many oil operators (and state and federal agencies as well) give abandonment lower priority or differ with what the county considers "proper" abandonment. Clearly, abandonment will move to the forefront of oil and gas issues in Santa Barbara County, if not becoming the premiere future issue.

Conclusion

Santa Barbara County's Energy Division perhaps best epitomizes the county's bureaucratic-regulatory regime concerning oil activity. The policy expertise, administrative scale, and institutional stability (based on its) has enabled the Energy Division, alongside other county agencies, to present a sustained and largely coordinated local response to oil operators offshore and in Santa Barbara County. The planning unit's existence, however, is not assured. While the decline of oil development will not dramatically reduce the Energy Division's capacities, due to its fee-based funding triggered by abandonment permits, political sentiments may have this effect. In recent years, pro-oil county supervisors from the North County have urged the downsizing of the Energy Division as well as the APCD, despite the continuing liability of oil operators as future oil activities increasingly shift toward abandonment. While these political calls have faced strong opposition on the South Coast, to date the outcomes of such demands are unresolved.

Notes

1. Statewide, large segments of the oil industry successfully lobbied the California legislature twice to promote industry regulation in the 1950s. In 1955, the Shell-Cunningham Tidelands Act granted tidelands authority to California's State Lands Commission, thereby resolving confusion over permitting for tidelands oil activity. By the end of the decade, a set of oil field unitization bills established protocols for onshore well-spacing and pool conservation.

2. Much of this section comes from James Lima's research on the politics of offshore energy development in Santa Barbara County (Lima, 1994; 1995).

3. The 1955 Shell-Cunningham Tidelands Act also granted tidelands authority to California's State Lands Commission and authorized Channel development outside the Santa Barbara Oil Sanctuary with a 200-day waiting period between application for drilling rights and granting of rights (Lima, 1994; Johnson and Nye, 1979: 194).

4. Following the first permit for Channel tidelands leasing (near Summerland) in 1956, the city of Santa Barbara also looked, albeit unsuccessfully, to zoning authority as a mechanism to enforce local control by annexing the Sanctuary. Four years later, facing objections by the county board of supervisors and a state lawsuit, the city agreed to give up its claim to zoning authority over submerged lands.

5. In 1981, the Department of Environmental Quality was dissolved in the face of political controversy stemming from several urban development projects (see Graves and Simon, 1980).

6. The All-American Pipeline (connecting the Las Flores Canyon facility to Texas) exemplifies how operators face less compliance requirements over the lifespan of a project. During the pipeline's initial permitting, the county imposed a vast number of conditions, most of which have since been met and no longer apply. Currently the pipeline's operator must satisfy the county's requirements for the final stages of revegetation, after which all of its conditions will have been met until the pipeline is abandoned (requiring a final stage of permitting and permit compliance).

7. A good deal of the Energy Division's "policy" work elaborates upon zoning or legislative issues raised by specific projects. In a recent example, Chevron requested a lot-line adjustment on its Gaviota plant that necessitated planners adjudicate an earlier zoning violation at a neighboring rancher's property. As the planning unit's deputy director told us, this issue began as an "obvious" Energy Division job (since it dealt with Chevron), but through haggling with this rancher over stream and vegetation restoration, "it doesn't look much like an oil and gas project anymore."

8. SEMP's jurisdiction exceeded Santa Barbara County to span the tri-county region, although San Luis Obispo County declined to participate in the program. In Santa Barbara County, the Santa Barbara County Association of Governments oversaw the distribution of SEMP payments until the program's end in 1995.

9. The growth of funding from extramural grants and county coffers illustrates the increasing priority given to policy-making; from about 95 percent in the early years, now about 80 percent of the Energy Division's costs are paid for by the industry.

10. Per county ordinance, well abandonment entails removing production equipment, squeeze cementing any non-removable downhole production equipment, cutting and removing the casings, and placing a series of cement plugs with mud fluid between them (to prevent cement from interfacing with ocean-sediment).

11. This parallels the state's Idle Well Abatement Program, which requires well operators to acquire an indemnity or cash bond of $5,000 for each well, a $1,000,000 blanket bond, or an annual fee of $100 for each idle well.

12. In 1998, Arco's "Dos Pueblos Golf Links" proposal received Coastal Commission approval and consequently survived a lawsuit by environmental organizations (claiming state and county policies protecting coastal agricultural resources and public access were violated) to overturn that decision. As of this writing, Arco was negotiating sale of the property to hotel developers and commencing the last stage of abandonment.

Table 6.2.1: Cumulative mitigation fees paid through Coastal Resource Enhancement Fund, 1988-1998

Year	Amount
1988	$2,820,519
1990	$884,944
1991	$1,126,705
1992	$211,320
1993	$461,750
1994	$1,509,270
1995	$850,728
1996	$911,575
1997	$855,908
1998	$950,415
TOTAL	$ 10,583,134

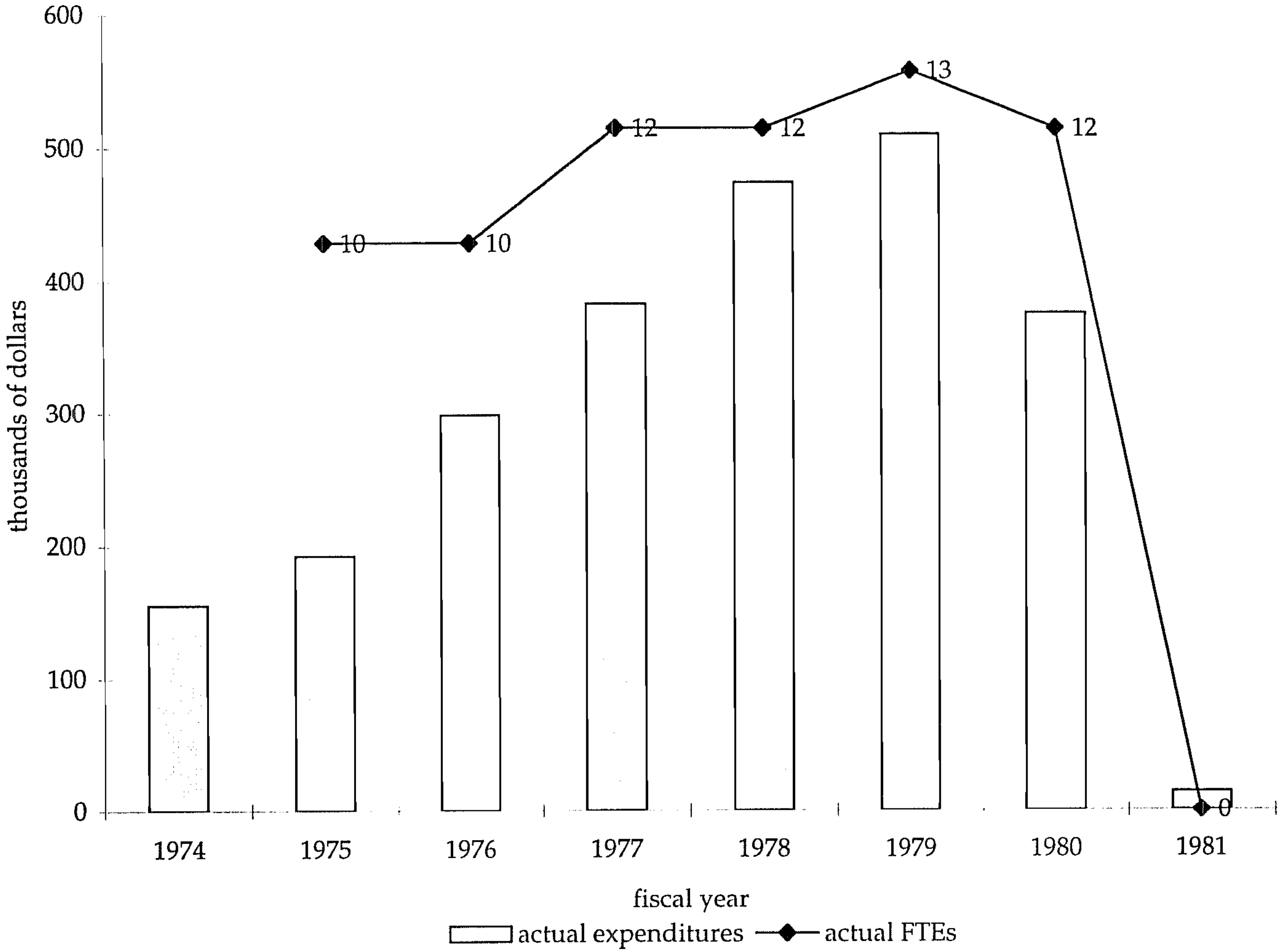
Source: Santa Barbara County Energy Division.

Table 6.2.2: Cumulative mitigation fees paid through Socioeconomic Monitoring and Mitigation Program, 1985-1995

Year	Santa Barbara County	Ventura County
1985	N/A	$23,170
1986	$568,224	$412,021
1987	$491,814	$456,480
1988	$439,534	$251,568
1989	$521,367	$148,816
1990	$501,730	$106,448
1991	$1,806,368	$363,924
1992	$1,990,357	$213,142
1993	$855,006	$496,671
1994	$250,020	$503,807
1995	N/A	$455,238
TOTAL	$7,424,420	$3,431,285

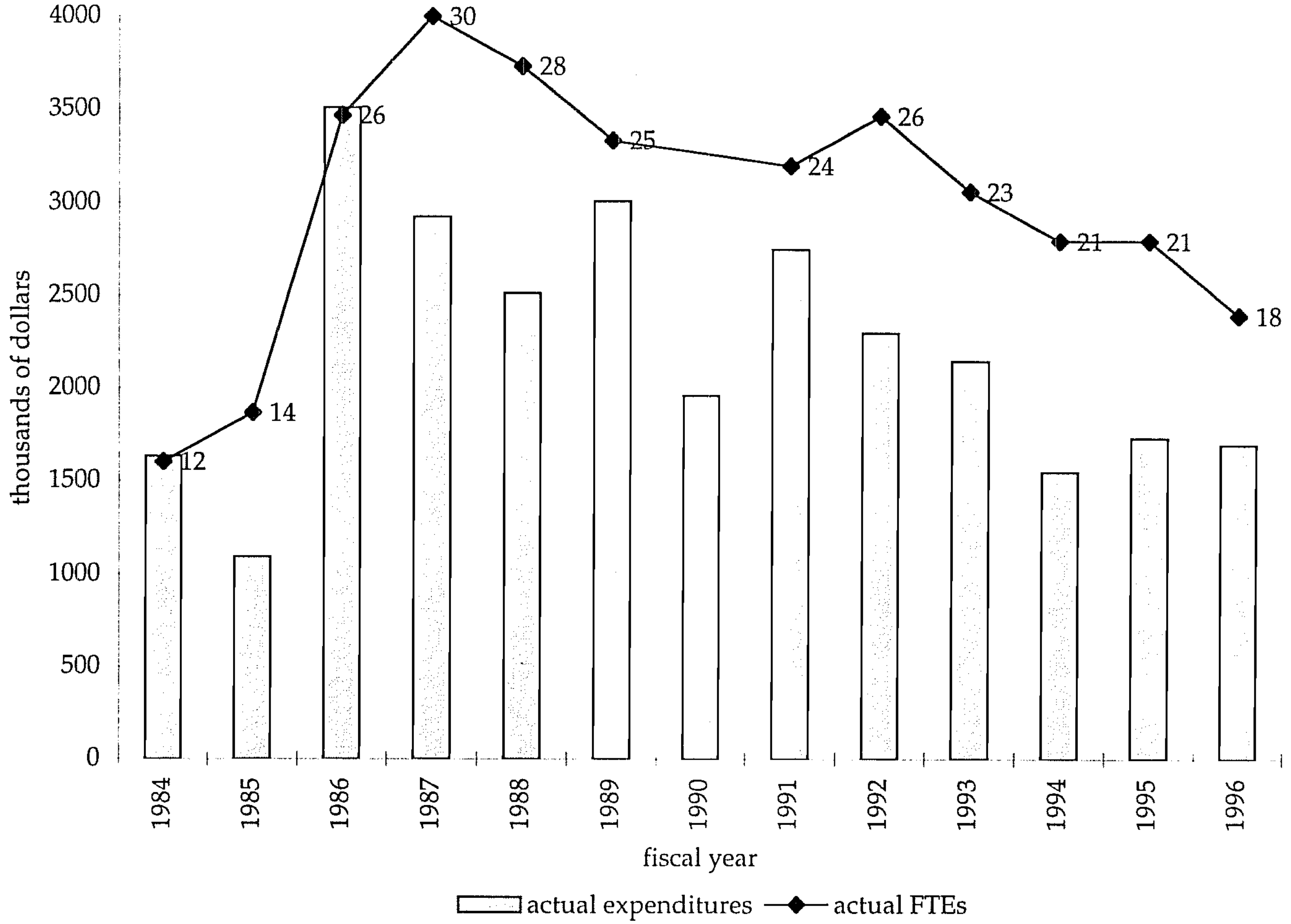
Source: Santa Barbara County Association of Governments.

Figure 6.2.1: Santa Barbara County Department of Environmental Quality expenditures and staff, 1974-1981



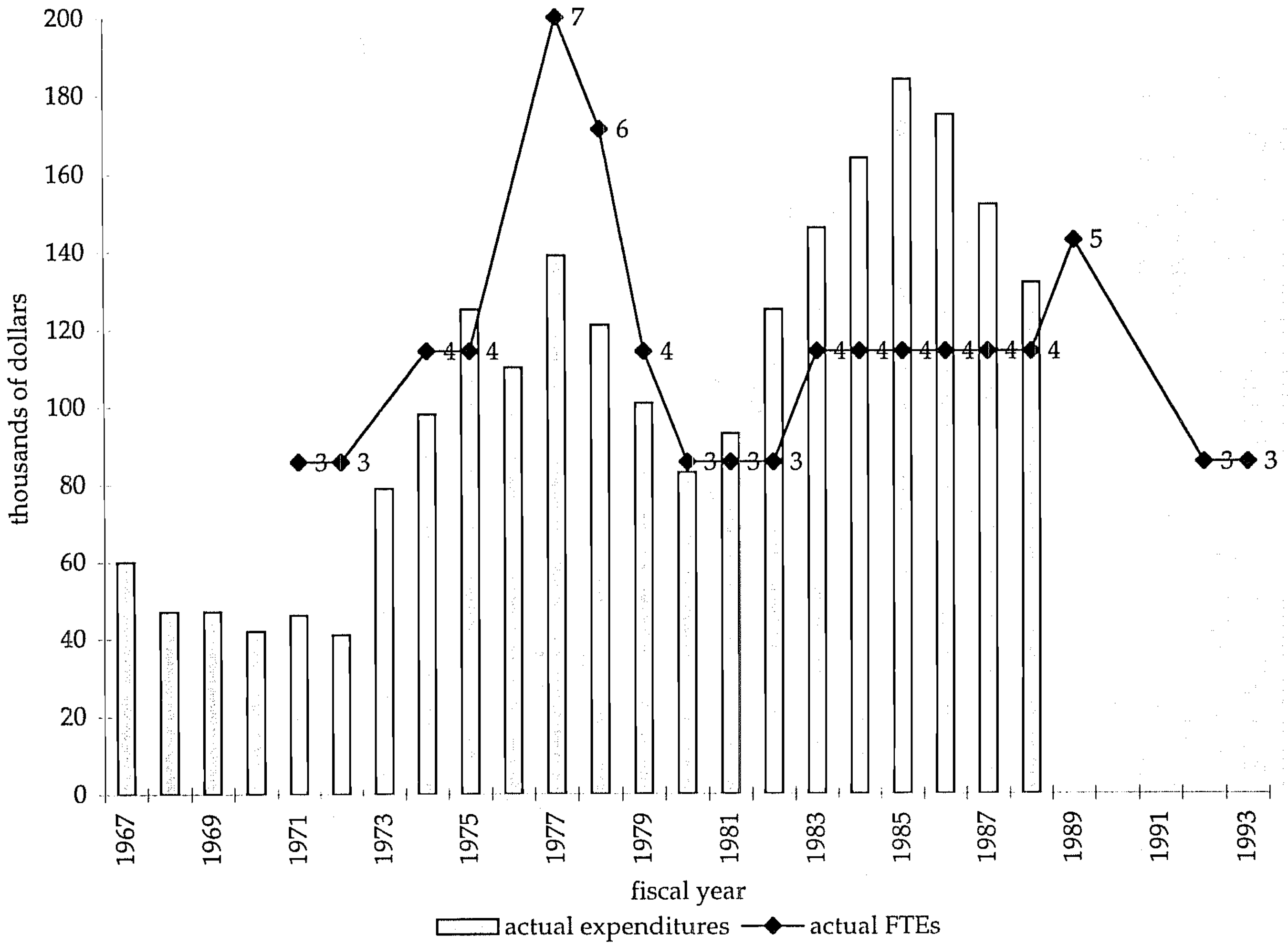
Note: 1974 FTE data is missing.
Source: Santa Barbara County Board of Supervisors, Final Budget.

Figure 6.2.2: Santa Barbara County Energy Division expenditures and staff, 1984-1996



Note: 1990 FTE data is missing.
Source: Santa Barbara County Board of Supervisors Final Budget; 1991 and 1994-1996, Energy Division Deputy Director's personal reports.

Figure 6.2.3: Santa Barbara County Petroleum Department expenditures and staff, 1967-1993



Note: FTE data is missing for 1967-1970, 1973, 1976, and 1990-91. Expenditure data is missing for 1989-1993.
Source: Santa Barbara County Board of Supervisors, Final Budget.

Section 6.3
Agenda Impacts

In this section we briefly touch on how Santa Barbara County government has been affected by federal Outer Continental Shelf (OCS) development. Woolley and Lima (1996) found that California offshore oil production impacts the local decision-making processes of the county board of supervisors. Most oil production in the Santa Barbara Channel falls under state and federal jurisdiction. Local county governments have little influence in these "offshore matters." However, the exception to this passive role occurs when a producer proposes onshore support facilities for their offshore investments. In these cases, the county board of supervisors has decision-making powers based in permit control. These local decisions to approve or deny permit variance for coastal petroleum development often prove time intensive, adding to the average number of items on each meeting's agenda. "Oil occupied more agendas and more agenda space," a phenomenon also referred to as *agenda control* (Woolley and Lima, 1996: 15). In other words, if the issue being brought before the board is politically controversial, agenda space can be impacted which may create a backlog of agenda items. According to Woolley and Lima (1996), this describes the situation for the Santa Barbara County Board of Supervisors during the active period of federal offshore activity in the Santa Barbara Channel and post 1969 oil spill.

In contrast to Santa Barbara County, Ventura County and San Luis Obispo County experience less "agenda control" by the oil industry In the case of Ventura County, supervisors' unanimous pro-oil sentiments have meant little controversy and thus little time spent on oil issues. On the other hand, San Luis Obispo County with its anti-oil consensus has also spent little time on an OCS agenda items. Interestingly in Santa Barbara County OCS oil development has political salience in the community. Counties which hold a consensus—pro- or anti-oil—spend less time on oil issues than Santa Barbara County, where the issue remainsn "undecided" and thus contentious.

Section 7
Technological Innovation

Unlike many of the other oil producing regions in the US, California in general and the tri-counties in particular have been the scene of a rather unique struggle between would-be oil producers and a citizenry that does not unconditionally support industry desires. Residents of the central coast of California have a strong connection with their natural environment, especially ocean and coastal resources (see Molotch et al., 1996; Freudenburg and Gramling, 1994). This cultural disposition has sensitized the public to the prospect of industrial development; oil has the unenviable status of being a primary target of their concern. With the push to develop offshore tracts in the late 1950s through the 1960s, the visibility of oil production became more pronounced; platforms, processing plants and a handful of accidents[1] led to an already extant local opposition an urgency which spawned organized protest. Events such as lease sales, proposed platform installations, and the construction of onshore facilities became points for resistance as locals vied for control over the development direction the region.

This local opposition has caused the oil industry a good deal of difficulty; according to industry advocates it has retarded the continued development of the region's petroleum industry by making large scale oil production unprofitable (See Section 6.1: Regulations). For the industry, resistance to oil-related development has often translated into: the denial of and long delays in permitting and installation of needed facilities, increased operation costs, and development of costly technological innovations to meet federal, state, and local requirements. Echoed throughout industry references to the tri-countys region are allusions to the distinct set of parameters they must contend with when producing oil. As early as 1958, Richfield Oil Corporation had to address such concerns when constructing their Rincon Island drill platform located approximately 10 miles south of the city of Santa Barbara and 20 miles north of Ventura. Because state law forbade what werereferred to as "Texas style oil towers," Richfield was forced to construct their drill platform as an island.[2] Furthermore, to appease a handful of ocean view hotels and homes along the coast the man made island was landscaped with palm trees (*Ventura Star Free Press Magazine*, February 13, 1965).

In more recent times, in response to the 1969 Santa Barbara Channel oil spill (see Section 4.1: Local Support and Opposition) and growing concerns over air quality, the industry has had to address increasingly stringent pollution control standards, areas designated as officially off limits to oil development, and a population that is generally suspicious of oil development. Throughout industry references to the region are characterizations of a place unfriendly to oil. In the following trade journal excerpt, the constraints posed by the area on oil development areacknowledged, with the author adding in uncertain terms that "some sort of buffer zone" will be enforced to preserve the area's scenic beauty:

> Industry reports that more than 700,000 acres, and perhaps as much as 1,000,000 acres, have been nominated for the October (lease) sale. (The) Only area sure to be excluded from the sale is some sort of buffer zone just beyond the no-drilling sanctuary immediately in front of the city of Santa Barbara. Here the state banned drilling to preserve the beauty of the coastline, prohibiting offshore oil operations between Goleta point, west of Santa Barbara and Summerland to the east (*Offshore Magazine*, June 20, 1967: 73).

The industry has had to confront an increasing number of pollution abatement measures across the nation, but it is in California and the tri-counties/Santa Barbara Channel in particular that these measures and community concerns have effected change in the ways the petroleum industry operates and presents itself.[3] While the push to reduce pollution has gained a national audience with powerful lobbies, it is in areas such as the tri-counties that the "frontier" of pollution control has been pushed the farthest. Hand-in-glove with such pollution controls, operators have also had to aesthetically modify their plans by developing ways to visually hide their operations from a tri-county population that can be sensitive to them.

Santa Barbara County has been especially effective in this regard, using their permit control over proposed onshore support and refining facilities to influence proposed developments, even those out of their jurisdiction in federal waters. In order to appease local fears, petroleum operators have gone so far as to paint their platforms to match the environments within which they have been installed, promised to camouflage land-based facilities with extensive landscaping and paint, and in some cases have located facilities out of plain view. Another petroleum trade journal excerpt provides an account of platform Hogan's installation (offshore in the Santa Barbara Channel). Herein, an industry spokesperson notes the new equipment which defines the platform as distinct from similar ones installed or in use at that time. Under the title, "First Development of Channel Acreage Begins: Painted a Hazy Blue, Phillips' Hogan, Designed To Drill 66 Wells, Fight Pollution," the article recounts industry awareness of the special requirements they confront when producing in the Channel:

> (The) First development of a federal lease in Santa Barbara Channel Calif., is underway from Philips Petroleum Co. Platform Hogan, situated in 151 ft Of water some 4 miles offshore. . .

> A hazy blue. . . Both aesthetic and anti-pollution considerations play a large role in the operation. Both platform and the two rigs on it are painted a "blue haze" color to blend with sky and sea. The platform has been designed to eliminate all possible sources of water pollution during drilling and producing operations. . . Beautification does not stop with the platform. At the processing plant, trees, shrubs, and ground cover will be utilized to screen the facility. Also all vessels and tanks are painted a natural green to blend with surroundings. . .
>
> Air kept pure. . . Settling tanks, wash tanks, and storage tanks are equipped with vapor recovery units to prevent air pollution. Under normal operating conditions no gas will be flared. Produced gas and vapors will be processed to remove water vapor and heavy hydrocarbons . . . Produced water will be processed through a skimmer and flotation unit to remove any oil. Water then will be filtered to remove solids and minute traces of oil prior to disposal in the ocean (*Offshore Magazine*, 1968, July: 32).

As one may surmise, painting a rig hazy blue or planting shrubbery around a refinery to spruce it up was something that was relatively new for an industry that usually got its way, on its own terms. In the Gulf of Mexico, where much of the offshore technology was first developed, these kinds of innovations were unnecessary, due to geophysical and topographic differences as well as cultural ones (Freudenburg and Gramling, 1994). When offshore discoveries in the Channel began, a new set of criteria had to be addressed if the industry was going to do business in the region. Even before the 1970s, the era conventionally identified as the beginning of modern "environmentalism" (Colella, 1981; Enloe, 1975; Pratt, 1978, 1981; Pratt et al., 1997) these aesthetic and pollution concerns held salience for local residents and were a source of tension between industry and community relations (See Molotch et al., 1996). During the 1980s and '90s these concerns amplified with the general growth in environmental consciousness, further forcing the industry to elaborate on existing technologies, and to create new lower-impact extraction methodologies, and/or mitigate their potentiall negative affects.

The novelty that such aesthetic and pollution control concessions represent is apparent when the industry's historical resistance to such demands is recounted. Their attitude toward these demands has historically been one characterized by recalcitrance; open resistance to regulation and regulatory compliance in general, especially those regulations that are superfluous to production, has been the norm (Pratt, 1978, 1980). According to historian Joseph Pratt the industry enjoyed unchallenged dominance in government-business relations until the 1970s, a dominance it has exhibited by historically flouting local, regional, and national authorities' attempts to stem what had become, at least in the Gulf of Mexico, pervasive petroleum based degradation. According to Pratt:

> Through an ideological lens of "free competition," oil executives in the spindeltop era viewed government suspiciously, as a potential usurper of corporate power and a threat to corporate autonomy. Politicians were usually seen as meddlers who were both opportunistic and incompetent. . . The resulting distrust of government did not disappear. Of course, such attitudes did not prevent business from cooperating with government measures that were beneficial to it. But when government attempted to assert power in areas previously controlled solely by the corporation, cooperation became most difficult. Pollution control was one of the most volatile issues (Pratt, 1978: 7).

In California, much the same mentality has dominated industry priorities until the more recent era of stringent state and federal environmental regulation and enforcement. Take for example regulations governing platform stability in California's earthquake prone waters. The industry has not only complied with the regulations, but preemptively designed its platforms to withstand earthquakes of eight or more on the Richter Scale (*Offshore Magazine*, July 1976: 51-55; Pratt et al., 1997). In fact, the industry has addressed both platform strength and ductility in seismic proofing of their investments. The *strength* level of a platform is an assurance that the platform is designed to maintain all nominal stresses without buckling in earthquakes, for the life of the rig. The ductility of a platform, on the other hand, refers to a platform's ability to withstand earthquakes beyond its designed strength capacities. *Ductility* entails ensuring that there is enough structural resilience to absorb significant stresses beyond those anticipated in a worst case scenario (Pratt et al., 1997).

While attending to seismic concerns in California may have had a direct payoff for the industry—\$50 to \$150 million dollar platforms and production facilities are big investments—pollution abatement presented no such incentive. The "payoff" of pollution control equipment and procedures are much less tangible in that they are long term, dispersed, and not directly tied to oil investments. The petroleum industry's externalization of "environmental costs" is a trait it has shared with other heavy industry, but the sheer size and importance of the petroleum corporations have given them a good deal of immunity for much of their history. More recently, regulatory compliance has achieved a status which even large petroleum corporations must address. Through regulation the cost of ignoring compliance has become burdensome giving it a priority status it once lacked (see Section 6.1: Regulations).

However, aesthetic and pollution control considerations have not been the only motivations to drive industry innovations in the region. The Santa Barbara Channel in particular has also posed a number of new problems for those that seek to develop offshore oil tracts. Geophysically, the Channel presented producers through the mid-1970s with water depths they had not yet confronted, and as mentioned earlier an earthquake-prone environment. Environmental conditions in the Channel also presented operators with consistently high wave velocities as well as wind speeds at times in excess of 100 miles per hour. In a 1958 article fittingly titled, "Drilling in California will be Tough" an industry trade journal noted that the conditions that characterize California's offshore environment were vastly different than those confronted in the Gulf of Mexico where offshore operators had learned their business. The same article continued to note, "California offshore locations encounter higher everyday waves, greater water depths, fewer adequate harbors and onshore facilities" (*Oil and Gas Journal*, 1958: 68-70). These conditions in conjunction with the region's regulatory climate sponsored a number of industry "firsts": in the development of drilling techniques for water depths over 1000 feet, in developing production platforms able to stand in 600 and more feet of water, in transferring seals and sulfur dioxide reduction systems which would meet California and Santa Barbara Air Pollution Control District specifications, and many others.

In the following pages we touch on a number of these innovations and the contexts that have sponsored them, including: innovations that have been the outcome of regulatory requirements, advancements that address the region's distinct geophysical and environmental features, and how these innovations have promoted technologies which have set new standards for the industry and have subsequently been applied outside the region. Innovation trends have been typified by different barriers to the industry's production at different periods of time. From the late 1950s and the industry's drive to produce in ever deeper water, to current dilemmas based in abandonment (This process is also referred to as "decommissioning" in some technical and policy circles) and remediation, the story of "innovation" is a varied one based in available technologies, economic cycles, and the ingenuity of the industry itself. Taken together, aesthetic/regulatory, geophysical/environmental, and economic constraints have presented the industry with both the social and material motivations to innovate. Based on these *innovation motivators,* as we refer to them, the region has provided the impetus for new production techniques and an accompanying array of technologies.

In Figure 7.2 we graphically outline the motivators the tri-counties have presented the industry with and the advances that have been made to over come them. Each of these factors as both impediments to, and sponsors of, new exploration and production technologies has affected change in the industry at different periods. In the following we recount this history of regionally sponsored technological innovation.

1950-1968

Deep Water and Deep Pockets: Depth is Not a Limit

From the 1950s into the mid-1960s, innovation in offshore oil production centered on the development of technologies to deal with an increasing number of deep water finds. From the mid-1960s through the '70s, the offshore industry grew worldwide at a phenomenal rate, and the Santa Barbara Channel was no exception. Engineers and research and development people knew that new technologies were a must if they were to tap oil reserves beyond the conventional 300 feet pile-driven platform limits (*Offshore Magazine*, November, 1982: 45).

Economic considerations during this period were not an overriding concern for engineers, who were able with virtually open budgets to overcome barriers to production. Tens of billions of dollars were spent on solutions, some of which while appearing workable later had to be scrapped. Economic projections of $40-$50 dollars a barrel (which turned out incorrect) appeared at the time to justify such investments. According to petroleum engineer Stuart Hall, "the offshore industry had a kind of myopic view of the real world back then . . . We were blinded by the challenges of a particular number, in this case 1000 feet (of water)" (*Offshore Magazine*, November, 1982: 46).

The Santa Barbara Channel's steep continental shelf and depths dropping well over 1000 feet provided a testing ground for such deep water technologies, especially with lease sales P-1 (1963), P-3 (1966) and P-4 (1968) in federal waters three and more miles offshore Santa Barbara County. Producers who had not until this time drilled in waters over 600 feet found it necessary to develop both exploratory and production technologies to cope with this new deep water environment.

The period's big producers, with "limitless" resources at their disposal, coupled with their high hopes for Channel finds, financed such independent mobile drill ships as Wodeco IV and Blue Water 2 to push deep water drill records routinely past the 600 feet mark.[4] The first record was set in 1965 by Exxon crews drilling in 632 feet of water off the coast of Santa Barbara (see Figure 7.2: Drill records). In setting such records and hence new standards, the industry also learned valuable lessons that were later applied off the coasts of southeast Asia, Africa, and the North Sea.

Other innovations included technologies to address platform installation in the Channel's deep waters and extremely steep ocean floor. The depth coupled with a 600 feet contour (a precipitous sloping of the ocean floor) ranging from only two to fifteen miles offshore made platform installation a very tricky proposition (Pratt et al., 1997).[5] Complicating platform placement and stability beyond the depth and abrupt drops of the Channel floor were constant westerly winds, accompanying extreme wave conditions, and few adequate harbors or onshore facilities to fabricate, install, or service offshore platforms. Waves for instance, driven by persistent winds can reach heights of 26 feet for 12-36 hours at a time (Pratt et al., 1997). Such waves not only taxed the platform styles of the day, but also the techniques that producers used for installing them. An initial innovation the industry developed to meet these demands was the *gravity structure design*.[6] The gravity structure concept entailed floating the platform jacket out to the point of intended installation and then securing the platform by gravity alone. This was accomplished by filling its caissons (or legs) with sand and cement instead of anchorage with steel piles driven into sea floor as done in the Gulf of Mexico. One of the first applications of this advanced design technique was with the installation of platforms Hope, Heidi, Hilda, and Hazel (beginning in 1958 with platform Hazel). The design strategy allowed the industry to pre-construct larger and more secure platforms on land in other regions (primarily the Gulf where their operations were already in place), float them to the intended destinations, and install them relatively quickly, even in rough seas. This method, having proven effective in the Channel, has been used extensively in Cook Inlet (Alaska) and in the North Sea off Norway.

1969-1986

Deep Water and Pollution Control as Innovation Incentives

Through the 1970s, deep water coupled with good economic returns for local oil producers continued to prompt technical innovation. Exxon's operations in the Channel would continue, until 1974, to hold world records for open water drill depth and platform placement (see Figure 7.2: Drill records). By the early 1980s the Santa Barbara Channel's role as a deep water testing ground gave way as the majors began to apply what they had learned to drilling and production in other regions in water depths that on occasion exceeded 3,000 feet[7]

In addition to deep water, environmental legislation following the 1969 spill acted as a spur for a new round of advances, as oil firms were forced to devise pollution control equipment to meet new regulatory demands (see Section 6.1: Regulations). Innovation continued to occur and was spurred on by the constant threat of earthquake, consistently rough wave action, and high winds characteristic of the Channel. In this period, new innovations to meet these environmental conditions included platform jacket jointing, development and use of flexible materials (for instance new steel alloys), and caisson support systems that could withstand these stresses; these technologies were employed on increasingly large and expensive offshore platforms.[8] Through the 1980s regulatory and pollution control issues would also continue to push producers and define for them the character of the tri-counties region. The strict regulatory climate that began to develop in California, coupled with a new array of federal controls, forced operators to address environmental impacts through innovative pollution abatement technologies.

The heavy restrictions placed on air-and-water-borne discharge from platforms and land-based facilities, for instance, forced producers to develop *advanced effluent recovery units* to assure low level waste emissions (both air and water), to use of alternative fuels to power generators, and to mitigate unavoidable impacts. Specifically, innovations developed to address these and other pollution concerns included: platforms that ran on electricity as opposed to diesel; facility installations, extraction processes, transport systems, and refining processes that developed new or applied the most advanced pollution control devices; the modification of onshore technologies for 'first time use' in offshore applications (ability to accommodate multiple liquid effluents such as oil, gas, water; and muds from extraction wells and refining processes); and all other potentially detrimental effluent whose origins are the platforms (for instance, human wastes).

1987-1996 and into the Future:

Economic Downturn, Abandonment, and Post-Industrial Clean-up

Market prices for oil precipitously declined in the 1980s and with them the tri-county region began to see the majors sell off or pull out their "unproductive" (that is, less profitable) operations. A handful of platforms were among the operations slated for removal, and these challenged the technical knowledge of the industry. Unlike the Gulf of Mexico, where such abandonments have become rather routine,[9] the decommissioning of these platforms became a hot issue and led to a (currently) continuing debate over whether platforms should be left in place, partially, or completely removed.

This first round of abandonment was in relatively shallow waters. Platforms Helen, Herman, Hope, Heidi, Hilda, and Hazel, all in state waters, were at 100 feet depths, but the size of the Channel platforms changed the nature of removal as it had been accomplished up to this time. The Gulf of Mexico provides the largest base of experience and information for platform abandonment with over 1,100 platforms removed to date. However, because Channel platforms tend to dwarf the average size of those removed in the Gulf, and the environmental conditions that characterize the Channel are less hospitable, extraction of these platforms is more problematic. The platforms off the Santa Barbara coast are typically in the 8,000 to 16,000 ton rage, while those in the Gulf typically weigh 3000 tons and less. Furthermore, with only 38 of those Gulf platforms in depths over 200 feet their removal protocols differ markedly from those producers had to develop for the Channel.

A number of technologies had to be developed in order to meet new abandonment challenges that entail heavier total loads and stricter regulatory restrictions than those found in the Gulf.[10] Examples of such technologies include: hydraulic grippers adapted to special buoyant lift rigging which could handle 500 ton lifts or more, the development of "A" frames which could also handle such enormous weights, as well as barges, cranes, lazer cutting devices, and other tools able to deal with unprecedented torques, corroded and overgrown sub-sea infrastructures, and metals designed specifically to withstand tremendous force. Complicating extraction beyond the technologies involved is the plain fact that all these enormous tools and their removal strategies have to be coordinated from the top side of a floating work station.

The dilemmas these removals present do not end with the platforms, the water depths, or their difficult removal. They also present an environmental double-bind which has proven difficult if not impossible for the industry to overcome. Even if equipment of the right size and horsepower is developed and used, the pollution emitted would violate California and tri-county air quality standards, making removal virtually impossible.[11]

Still, in the near future the abandonment of the Channels offshore rigs looms as the viability of a number of the OCS petroleum reservoirs are depleted. All the remaining 24 platforms in the Channel, with the exception of platform Holly (in state waters), are in federal waters. The extreme water depths in which these platforms stand, coupled with thier immensity, pushes the limits of existing knowledge and technology, providing the impetus for a new round of innovation. It is important to stress that the removal process is one that is derivative of and embedded in a social context. The region continues to be concerned with issues of pollution abatement and environmental impact. Experts believe the Channel will be the first location to have structures of this size, in these depths, and in such a heavily regulated environment to be removed. From the industry's perspective, the conditions that surround the removal of these platforms makes their extraction not only arduous, but expensive (requiring expenditures that can rival those of the initial installations). Yet a strategy will have to be devised, because state and federal law as it is currently written calls for the complete removal of those platforms when production has been discontinued.

In addition to offshore innovation, a number of onshore fields, of which the abandoned Guadalupe oil field is the most significant, provide another incentive for a new array of remedial technologies (see Beamish, 1999). In Guadalupe's case, a petroleum thinner called diluent (pronounced dil-'ú-ent)—or K-9 thinner as it is referred to by the oil industry—was spilled, accumulating under the sands of the Nipomo-Guadalupe Dunes reserve that surrounds the oil field. Estimates put the spilled product between 8.5 and 30+ million gallons. Much like kerosene or diesel fuel, diluent is a relatively clear petroleum by-product that is used to thin the heavy crude characteristic of the Central and South Coast of California. As a thinning agent, diluent was an early regional innovation that made possible the pipeline transport of the areas thick crude from extraction wells to local refining and storage facilities (*Oil and Gas Journal*, August 13, 1956: 127-128).

Because the spill is hard to access, as it is primarily underground on the water table and in the middle of California's last intact dunes and marsh system, new remediation techniques are being implemented that promise lower impacts than those associated with traditionally conceived excavation techniques. Bioremediation technologies include an array of largely untested strategies for the clean up of petroleum contaminated sites. New clean up strategies and technologies include: installation of high integrity physical barriers to impede hydrocarbon drift (technically referred to as bentonite walls), vacuum enhanced drop tube technologies (use of high vacuum drop tube techniques to pull hydrocarbons out and push oxygen in which "enhances" the growth of petroleum eating microbes), and biosparging (which entails forcing air and microbes underground into contaminated areas, promoting the growth of introduced biogenetically engineered micro-organisms which live on such hydrocarbons). These are being developed and used for the first time, at least at this kind of scale, and will be used in other areas as similar sites are found in the tri-counties and elsewhere.

In the preceding pages we have looked at how the tri-counties and the Santa Barbara Channel in particular have motivated innovations in the petroleum industry. These have been the outcome of regionally based regulatory requirements, advancements made that address the region's distinct geophysical features, and environmental conditions that put new stresses on what were time were inadequate technologies. Furthermore, we have also touched on how these innovations have promoted technologies that have set new standards for the industry and have subsequently been applied outside the region. Taken together, aesthetic/regulatory, geophysical/environmental, and economic constraints have presented the industry with both the social and material motivations to innovate. Based on what we refer to as *innovation motivators,* the region has sponsored new production techniques and an accompanying array of technologies that have changed how the industry produces oil and presents itself. Those changes have not only had ramifications for local production, but have at times had applications outside the region.

Notes

1. The 1969 Santa Barbara oil spill was the most notorious.

2. In the 1950s state law required that all aspects of such island structures had to be built from natural materials such as sand and stone. Other islands similar to the Richfield's at Rincon also went in off the coast of Long Beach, California and were also decorated with palm trees, facades, and camouflage for their drill rigs (see *Offshore Magazine*, 1958; pp. 68-69; Pratt, 1997)

3. Enforcement largely began in the late 1960s (see Section 6.1: Regulations; Pratt 1978 and 1980).

4. Working under contract for Exxon and Esso, respectively.

5. This is in contradistinction in the Gulf of Mexico (the standard) where the ocean floor's gradient is incredibly gradual. Platforms can be many miles offshore and still encounter relatively shallow depths and a flat ocean floor.

6. Source: *Decommissioning and Removal of Oil and Gas Facilities Offshore California: Recent Experience and Future Deep Water Challenges.* September 23-25, 1997. Ventura California. Sponsored by the Minerals Management Service and the California State Land Commission.

7. Open water drill depths for exploratory purposes exceeded the 2,500 ft. mark, but a drop in oil prices which was soon to occured; production at these depths becuase unprofitable and was never carried through.

8. Between 1978 and 1979 the price of a platforms more than doubled. The deep water record breaking platform Hondo cost $67 million to construct and install in 1978; such investments were worth the added technological protection gained through extensive research and development (*Offshore Magazine*, April 1979, p. 43).

9. In the Gulf of Mexico, the average number of platform abandonments for a year is about 100. The Santa Barbara Channel at its high point had only 31 platforms. Currently, 24 remain.

10. Source: *Decommissioning and Removal of Oil and Gas Facilities Offshore California: Recent Experience and Future Deep Water Challenges.* September 23-25, 1997. Ventura California. Sponsored by the Minerals Management Service and the California State Land Commission.

11. Diesel is high particulate air pollutant which is heavily regulated.

Table 7.1: Santa Barbara Channel offshore platform installation and removal chronology†

1958
1. Platform Hazel installed *
2. Construction of Rincon Island*

1960
1. Platform Hilda installed *
2. Platform Helen installed *

1961
1. Platform Harry installed *

1963
1. May, Lease Sale P-1
2. Platform Herman installed *

1966
1. December, Lease Sale P-3
2. Platform Holly installed *
3. Platform Heidi installed *
4. Platform Hope installed *

1967
1. Platform Hogan installed **

1968
1. February, Lease Sale P-4
2. Platform Houchin ** installed
3. Platform 'A' installed **
4. Platform 'B' installed **

1969
1. Platform Hillhouse** installed
2. January, blowout, Platform 'A'

1974
1. Platform Harry removed

1976
1. Platform Hondo installed ** (self contained deep water platform for combined drilling and production activities.

1977
1. Platform 'C' installed **

1979
1. June, Lease Sale 48
2. Platform Grace installed **
3. Platform Henry installed **

1980
1. Platform Gilda installed **
2. Platform Gina installed **
3. SALM Technology installed by Exxon to process crude from Hondo avoid environmental restrictions.**

1981
1. May, Lease Sale 53
2. Platform Habitat installed **

1982
1. June, Lease Sale 68
2. Arco's natural gas recovery project commences (pyramid gas trap over natural gas seep receives pollution credits

1983
1 November, Lease Sale 73

1984
1 October, Lease Sale 80

1985
1. Platform Hermosa installed **
2. Platform Harvest installed **
3. Platform Irene installed **

1986
1. Platform Hidalgo installed **

1987
1. Platform Gail installed **

1986
1. Platform Helen removed
2. Platform Herman removed

1989
1. Platform Heritage installed **
2. Platform Harmony installed **

1996
1. Platform Hazel removed
2. Platform Hilda removed
3. Platform Hope removed
4. Platform Heidi removed

† To date 31 platforms installed, 7 removed, 24 remain.
* State lands.
** Outer continental shelf, federal waters.

Figure 7.1: Tri-county innovation motivators

Aesthetic/ Regulatory

Aesthetic
- ✓ Beautification
- ✓ Camouflage
- ✓ Concealment
- ✓ Removal

Regulatory
Pollution abatement technologies:
- ✓ Vapor locks
- ✓ Separators
- ✓ Filters
- ✓ Exhaust suppressers
- ✓ Remediation
- ✓ Abandonment/ removal specifications

Geophysical/ Environmental

Extreme Depths
- ✓ Drilling
- ✓ Platform installation
- ✓ Abandonment

Geology
- ✓ Steep continental shelf, shallow oil sands under Channel
- ✓ Deep deposits under deep water in Channel
- ✓ Thick oil
- ✓ Seismic considerations

Innovation, Wave and Wind Action
- ✓ 40 ft. waves
- ✓ Winds up to 100 miles an hour

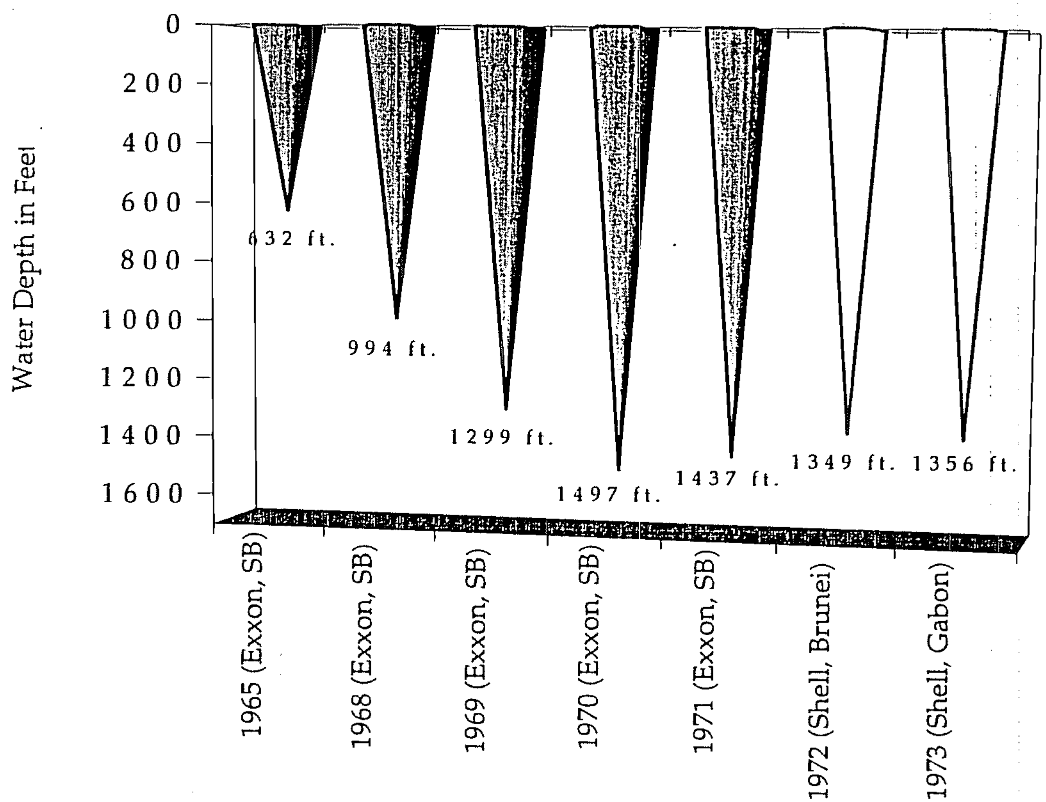
Economic Cycles

Economic Cycles
- ✓ Oil, and natural gas prices
- ✓ Costs of aesthetic/ regulatory and geophysical/ environmental Innovations
- ✓ Quality of crude

Examples of Local Commercial Innovations (see also Section 3.3: Adaptation and Diversification)

- Regional development of thinners to enhance petroleum extraction and piping of thick regional crude (diluent(s)).
- *Vetco Marine Inc.* develops deep-water drill technology.
- *California Divers Inc.* develops rotary hull cleaning device and closed circuit TV system for maintenance and repair offshore oil machinery (ships, supply boats, platforms, etc.).
- *Diver Systems International* develops fiberglass helmets for offshore work that set international standard.

Figure 7.2: Santa Barbara Channel drill records



Source: Simmons, J.D. 1976. "Exxon Discloses its Experience in Deepwater Drilling Worldwide." *Offshore Magazine*. Vol. 36, May: 200-209.

Section 8
Future Scenarios

In this section, we extend our historical analysis of the oil industry to hypothesize the local impacts of future oil development in Santa Barbara County. We extrapolate the influence of local community- and industry-based factors on three specific future scenarios: (1) no new projects, (2) one new slant drilling project, and (3) two new slant drilling projects. Below, we review these community and industry factors, then suggest how these will shape local impacts from future oil activity according to the three scenarios.

Of course, such local factors do not alone determine future oil and gas development in Santa Barbara County. External variables include geological, technological, and political conditions for future oil activity. In the first case, there must exist oil and gas reserves sufficiently valuable for development. On this geological matter, oil industry representatives are fairly positive about the possibility of renewed production offshore and (at a much smaller scale) onshore through at least the first two decades of the 21st century. Second, there must exist the extraction and processing technology to recover future resources. Here, industry-wide technological advances appear to make ever more feasible recovery of local oil and gas resources, particularly with the advent of directional drilling innovations which could conceivably replace offshore platforms altogether. Third, political conditions which hinder future oil activity include the federal and state moratoria that restrict OCS and tidelands oil and gas development off the California coast. In 1998, President Clinton extended the federal offshore drilling moratorium for all unleased tracts offshore California until 2012. However, the moratorium does not prohibit drilling on 40 currently leased yet undeveloped OCS tracts in the Santa Barbara Channel and Santa Maria Basin, so it will not completely postpone new offshore development in the near future. These enabling geographical, technological, and political factors are distinct from local factors of a social nature, to which we now turn.

Community factors

As most oil and gas operators are well aware, many legal and political factors of local origin will greatly influence future oil and gas development in and off the coast of Santa Barbara County. In some cases, it is not enough that oil operators individually assuage local demands; the legacy of *other* operators' compliance (or failure to comply) may work against operators pursuing new oil activities. Below we discuss the main issues of local concern that constitute factors in future oil development.

To be permitted in Santa Barbara County, all significant oil and gas projects will need to meet a large set of conditions for mitigating potential environmental impacts. In their breadth of concerns and degree of required effort, the mitigations that constitute the "teeth" of the county's regulatory regime may no longer be unique to this region. Some producers have told us that they comply with similar environmental demands in overseas locales. What will perhaps remain locally distinct is the *procedural complexity* of oil and gas permitting and regulation, both within Santa Barbara County and vis-à-vis state and federal jurisdictions. Operators must address not only local concerns regarding biological and ecosystem impacts of oil activity but also zoning impacts (for example, through project consolidation laws) and socioeconomic costs (addressed, for example, by the Fisheries Enhancement Fund). Additionally, they must coordinate the often contradictory rulings of overlapping local, state, and federal agencies with authority over offshore development and coastal land-use. The highly bureaucratic process which precedes development has lengthened the time in which all local oil and gas project proposals become reality, and this is not likely to change in the future. It is telling that some of our informants identified "greater community affinity" as a hallmark of the new independent producers that increasingly succeed in obtaining local oil activity permits. Oil companies and entrepreneurs who are used to dealing with more "flexible" local decision-makers will likely be frustrated in Santa Barbara County.

In large part, future oil and gas development will be shaped by a public concerned about its cessation, that is, *abandonment* of oil and gas wells, infrastructure, and facilities. This relatively new concern in the oil industry has come to predominate much or even most of producers' local activities in a region where oil and gas prospects have generally declined. Future abandonment will likely need to comply to standardized abandonment policies which the county is now formulating. Complying to abandonment conditions requires costly investments in environmental consultants, status reports, and abandonment assessment funds. Producers more concerned about funding exploration and development may delay the abandonment process and therefore engender further controversy. Clearly, abandonment will move to the forefront of oil and gas issues in Santa Barbara County, if not becoming the premiere issue. If abandonment activities provoke local controversy, then other operators seeking exploration and development permits may face a contentious local environment.

Besides abandonment, other issues are perennial concerns for county residents and government and pose potential problems for future oil operators. *Tankering* is a thorny issue which divides the county from oil companies and federal government agencies. Since the 1969 oil spill, county residents have long held strong opinions about the hazards posed by tanker ships transporting local crude out of the Santa Barbara Channel. Their fears in part stem from the county's inability to set forth consistent protocols on Channel tankering, since OCS activity falls out of county and state jurisdiction. The federal government has generally compelled operators to pipeline oil and gas onshore instead of tankering, yet at times companies have successfully made "emergency" requests and otherwise lobbied government to exempt them from pipeline rules. Frequently, the result is litigation; oil companies have sued Santa Barbara County (as, for example, Chevron did in 1991), and in turn local organizations have sued the federal government (such as a 1997 suit by the Sierra Club, Citizens Planning Association, and the Environmental Defense Center, later dismissed) to overturn exemptions from the pipeline guidelines. In the future, Santa Barbara County government will likely continue to insist on pipeline transport conditions that some operators may find unacceptable.[1]

Air quality regulations will likely become the chief environmental constraint that producers face in the permitting process. Since air quality was first regulated in 1977, Santa Barbara County and its component regions have remained in non-attainment status according to federal standards on pollution; large-scale industrial activity, such as massive oil projects, regularly threaten the county's air quality attainment. Consequently, in the county's regulatory environment, air quality standards have historically posed major obstacles around which oil-related permit approval must negotiate. Producers are regularly compelled to provide emissions offsets, most recently in 1996, when Molino Oil agreed to mitigate its natural gas slant-drilling facility down to zero. Even in abandonment, producers are sometimes sued to offset emissions, as six companies collaborating on submerged well abandonment discovered in 1996.[2] As the local economy flourishes along with Southern California, increasing urbanization and economic growth may well narrow the margin by which the county achieves air quality attainment, thereby assuring that air quality offsets remain a hallmark of future oil activity permitting.

Finally, the recent decline in oil and gas prospects has by no means corresponded to slackening interest in the *local participation* in the study and oversight of future oil development. Instead, Santa Barbara County government and community organizations maintain their characteristic demand to be included on various bodies with influence over the pace of future development, such as the current California Offshore Oil and Gas Energy Reserves Study and the "unified command" of governmental agencies responsible for oil spill response. This Santa Barbara trait is unlikely to fade as oil and gas development declines in the region.[3]

Industry factors

In addition to these political and local factors, future oil and gas development will occur in the context of a transformed industry. The tri-county *oil industry structure* will be limited in the extent to which it is capable of expanding in response to favorable demand and supply conditions. Due to declining production gains, major firms have greatly reduced their local activities since at least the mid-1980s. It is highly unlikely that any foreseeable supply and demand trends will induce them to return to their historical levels. Importantly, as major firms leave, so may important processing facilities that other producers use, like Chevron's Estero Bay terminal (currently slated for abandonment) and possibly its Gaviota processing facility. Additionally, many oil supply service have folded in the last decade, while others have branched and/or diversified into fields and regions that take them outside the Santa Barbara Channel. The only real growth segment of the oil industry may well be the environmental consultant firms that are contracted at several stages of abandonment and remediation (see Section 3.4: Environmental Consultants).

Local *labor* that performs work for the oil industry is also adapting to continued downsizing. The supply of oil workers in Santa Barbara County has been mostly of non-local origin, but current trends suggest those who learned skills in the Santa Barbara Channel are moving elsewhere. Workers with especially technical skills (like offshore platform electricians) are sought after by offshore producers around the world. Some have even begun learning foreign languages to stay competitive and find work elsewhere. There is some evidence that workers find similarly skilled jobs in non-oil workplaces. For example, biotechnology companies like Amgen of Ventura have hired former offshore platform employees to work in boiler rooms and other places where they operate similarly sophisticated heavy machinery.

Given the global spread of oil and gas development, the oil industry has grown more footloose in recent years, and the local industry transformations just described by no means preclude the industry's return to the Santa Barbara County region. However, the oil industry will have a less permanent presence in the future and (as Section 2.1: Econometric Analysis suggests) an even more negligible local economic impact. As operators and local support firms grow leaner, oil workers will increasingly be contracted out of oil centers like Bakersfield and the Gulf of Mexico. Industry flexibility is not absolute, however. Without important processing infrastructure, oil and gas may need to be processed in offshore facilities and/or transported by tanker, both of which are likely to engender local controversy. With fewer local employees, the economic benefits of oil and gas activity may increasingly be directed out of the county. Finally, in future cases of local oil controversy, industry downsizing and outsourcing ensures a smaller base of community support in historical "oil towns" like Santa Maria.

The social consequences of industry transformations described above are already apparent to many oil companies active in Santa Barbara County. Consequently, some have adopted a political approach to oil activities that contrasts with the adversarial past. Benton Oil, an independent producer involved in the Molino Gas Project, is one example of the new oil producer who may well find more political success in contentious areas such as Santa Barbara County. While CEO Alex Benton acknowledges that the county's permitting process presents many hurdles to be cleared, he does not feel their regulatory demands are unreasonable, and he expressed to us the importance of not taking an adversarial approach with local government. Benton discussed with us the need for oil companies to recognize the needs of people who live in the areas where oil is extracted—to "see communities as people" rather than obstacles to development. Along these lines, the company has donated generously to community organizations in Carpinteria, where it is headquartered. It is likely that producers who adopt this kind of non-adversarial, "taking the extra step" approach will be more successful in getting their projects approved.

Future scenarios

In conclusion, we now assess three possible future scenarios and their impacts for Santa Barbara County.

No new projects: The first scenario suggests an extension of the current status quo into the future. There may be continued development from existing leases, but eventually oil and gas recovery would reach its geological limits, and over time oil activities would shift into a wholesale abandonment stage. This would entail contracting workers and environmental consultants who would briefly increase oil payrolls. However, our econometric analysis suggests that this would produce no net gains on the local economy. Considering that infrastructure and other "improvements" properties constituted over $1.1 million or 94 percent of total oil and gas county tax revenues in 1996, abandonment of industrial infrastructure would lower gross oil and gas tax revenues significantly; the net impact on county revenues, however, may be weak since the county is currently diversifying industrially into higher value sectors (see Section 2.1: Econometric Analysis). The phasing out of local oil and gas projects would reduce and eventually halt funding for various governmental bodies and programs like the Energy Division and the Coastal Resources Enhancement Fund, but as these are currently fee-based, their disappearance would produce no net change in county revenues.

As Unocal has discovered at Guadalupe and San Luis Obispo County, some former oil properties may be so contaminated that complete remediation is quite difficult. Consequently, there may be some areas which oil producers are *unable* to abandon, due to the specter of future liability, and which will be removed from almost all economic uses for the foreseeable future. This may produce a boon for the remedial industry of environmental consultants, even as it forestalls urban and economic development in the affected communities. Otherwise, former sites of oil industry like the North County will continue their diversification into new industries to the extent allowed by external factors (for example, the commercial space launch industry) and the legacy of oil imposed aesthetic impacts particularly along the coast allow.

One new slant drilling project: The second scenario presumes that development and later abandonment of existing leases proceeds elsewhere in the county as described above in the first scenario. Additionally, we assume the new slant drilling project will be located along the South Coast. In this case, the Molino Gas Project offers a reliable predictor of how one new slant drilling project would be received locally.

The county will impose conditions in the permitting stage, and permit approval will depend on operators' willingness to comply with these conditions. Most importantly, the project will need to operate from one of two approved sites in the South Coast for slant drilling, Gaviota and Las Flores, in order to avoid triggering the county referendum process created by 1996's "Measure A" referendum; otherwise, voters may not approve oil activities at the new site. If triggered, a referendum would be highly contentious, and electoral success would ultimately be costly, as Mobil Oil's Clearview proposal and the Measure A campaign demonstrated (see Section 4.2: Campaign Contributions). Depending on the economics of the slant drilling project, the costs of the ensuing political campaign might prove to be too great for some operators to bear. With or without the referendum process, the project will still be greeted with opposition by some organizations and citizens.

As a new and fairly intensive economic use, the new slant drilling project will generate new county revenues, in the form of higher tax payments (from the increased assessment value of the consolidated facility, assuming that adjoining slant drilling activities and supporting local infrastructure like processing facilities and pipelines remain constant). Additionally, a new stream of operator fees will sustain CREF, other mitigation funds, and the county's Energy Division planning unit (should it still be operative).

Otherwise, the economic impacts of the project will be negligible. As our econometric analysis suggests, even the brief upswing in employment and payroll that accompanies the construction of a new oil project has no detectable economic impact. To the extent that "consolidation" uses existing slant drilling infrastructure, the new project may not even produce these short-term and undetectable economic impacts. Once activated, the new slant drilling project will use the existing facilities and labor supplies that service current oil and gas activity: Very few new employees will be hired, some services will be contracted (most from outside the county), and existing pipelines (such as POPCO) will transport the resources out of the county. All told, the consolidation of the new slant drilling project's activities within existing industry infrastructure will in some senses make the project locally "invisible," insofar as a single project must participate in the county's mitigation programs and will not likely create significant socioeconomic impacts anyway.

Finally (and somewhat obviously), a new slant drilling project also postpones the decline of the oil industry. If oil activities persist in Santa Barbara County, so will the governmental and community institutions which regulate and oppose it.

Two new slant drilling projects: For the purposes of this third scenario, we assume the conditions of the second scenario described above. That is, one new slant drilling project will occur at an approved South Coast consolidation site, while eventual abandonment of other oil and gas activities proceeds apace. Additionally, we assume that a second new slant drilling project will be proposed for an area outside one of the consolidated sites, say, on the North County coastline to tap the offshore reserves of the Santa Maria Basin.[4] Were the second new slant drilling project to lay within one of the South Coast consolidated sites, we believe its incremental impact would not significantly exceed those described in the second scenario.

A North County slant drilling project would not trigger the voter referendum process created by 1996's "Measure A" referendum, which pertains only to South Coast projects. However, the project would likely produce opposition from South Coast and San Luis Obispo County residents. Depending on the nature and success of their demands, opponents could prolong the permitting process and, if it is ultimately approved, make the final project costlier than expected.

Once the project is approved, construction would likely create a brief boost in oil employment and payrolls. As the North County coastline has no oil-related industrialization onshore, the project would require additional infrastructure for pipeline transport and possibly even local processing of oil and gas, depending on the industrial and political logistics of the site. The nearest active processing facilities are the Lompoc HS&P facility and the Torch refinery in Nipomo, which pose major geographical and (especially for the Nipomo refinery, given San Luis Obispo County's traditional anti-oil stance) political obstacles to the expedient processing of oil and gas produced by a North County slant drilling project. Conversely, the new project's infrastructural requirement would likely create new activity for pipeline companies and other oil service firms. The new project could also conceivably boost the North County's declining oil industry, although most work will probably be contracted out of Bakersfield and other regional industry centers.

The spate of secondary activity which a new North County slant drilling project requires means the county would oversee a new round of permitting, and therefore public mobilization, on a far greater level than even the scenario for one new project suggests. Funding and staffing for the Energy Division and mitigation funds would increase, environmental consultants would again be contracted, local attention to oil and gas activities would be heightened, and oil opponents from the South Coast and San Luis Obispo County would mobilize public participation at many stages. Each new permittee would receive a variety of permit conditions that would all need compliance, lest the proposed scope of the second slant drilling facility be impaired. All told, these developments would likely mean a lengthy permitting process would add to the total costs of the North County slant drilling facility and accompanying infrastructure and delay the start of actual drilling.

While this third scenario suggests a qualitatively greater level of activity, there is little evidence to suggest two new slant drilling facilities—one at a South Coast consolidated site, the other in the North County—would produce a detectable impact on the county's economy. While the first few years of construction would produce the largest economic stimulus, we cannot be certain that over time these projects would substantially trickle down or revive the county's oil support industry. Given the modest employment, non-local industry support, and on-going abandonment that currently characterize tri-county oil activities, two new slant drilling facilities would likely create more local political impacts than socioeconomic benefits.

Notes

1. Indeed, the abandonment of some tri-county marine terminals that usually receive oil by pipeline may only increase the urgency of operators to ship oil by non-pipeline means. Most recently, the anticipated closing of Chevron's Estero Bay oil-loading tanker terminal in San Luis Obispo County prompted Mobil Oil to ship its modest oil volumes by rail tanker cars instead, thereby provoking local concerns about derailment accidents (*Santa Barbara News-Press*, June 3, 1998).

2. In this case, the six companies had received prior air quality exemptions on unrelated projects which the State Lands Commission later decided could satisfy air pollution offset requirements. Local opponents sued the companies to force compliance with requirements from which they were previously exempted.

3. For county government, the insistence on decision-making input, coupled with the willingness to innovate new forms of regulatory compliance, has prompted interest from other county and even state governments to inquire, "How do you guys do it?" To follow the path set by Santa Barbara County (the former Energy Division chief told us) means "they have to not be afraid of being preempted... it takes a little chutzpah on the part of local government leaders to put themselves in the fray."

4. The possibility of a slant-drilling facility in the North County is raised in a Santa Barbara County Energy Division document, "North County Oil and Gas Facility Siting and Planning Analysis," the first draft of which was released in July 1998.

Section 9

Chronology of Oil Industry Events in Santa Barbara County*

- 1776: Spanish missionaries notice natural oil seeps in the Santa Barbara area (Johnson and Nye, 1979: 188).
- 1865: Santa Barbara County's first oil boom is brought on by the pronouncements of Yale University chemist Benjamin Silliman. The boom results in modest land-grab but is otherwise short-lived (Johnson and Nye, 1979: 188).
- 1886: Natural and crude gas are discovered in Summerland in the same year as the community is established by H.L. Williams (on 1,050 acres originally part of pueblo lands of Santa Barbara). The next year, the first oil well in Summerland is drilled (Fuller and Olson, 1980: 76).
- 1890: *Union Oil Company incorporates in California with a capitalization of $5 million (Johnson and Nye, 1979: 188).*
- 1895: The Montecito Oil and Land Company is incorporated to explore for oil on 3,200 acres in back of Summerland (Myrick, 1987: 67).
- 1900: The Associated Oil Company lays the 4" Associated Line, the first oil pipeline in the county, from the Tar Sands field (in San Luis Obispo County) down to Gaviota (Darwin Sainz interview, August 17, 1994).
- 1901: Santa Maria-based Western Union Oil Company brings in the first successful well in the Santa Maria Valley with its "Western Union" No. 3 (Simon, 1990: 21).
- 1902: Santa Maria-based Pinal Oil Company begins drilling north of Graciosa Ridge (two miles from "Western Union" No. 3) and finds oil by 11/02; in 5/03, their Well No. 3 gushes over and extends the proven oil field over the Graciosa Ridge (Simon, 1990: 22; Carlson, 1959: 130, 137).
- 1902: Seven days before W.W. Orcutt and Union Oil must forfeit lease in Purisima Hills, its well "Hill" No. 1 strikes a 2900 barrel oil well at roughly 3000 foot depth (Franks and Lambert, 1985: 21-22).
- 1903: Other small oil companies form to prospect the Orcutt hills (a.k.a. Solomon Hills): Santa Maria Oil and Gas Company, California Coast Oil Company, New Pennsylvania Oil Company, Rice Ranch Oil Company, Graciosa Oil Company, Brookshire Oil Company. Larger firms like Standard Oil, Associated Oil, and Southern Pacific also arrive (Simon, 1990: 22).
- 1903: Frank Hill, Union Oil drilling superintendent, performs the first deep-hole cementing jobs in the oil industry at a Lompoc well. Later oil development innovations from the Santa Maria field: the continuous distillation method of refining oil, and the first gasoline extraction plant in California (Franks and Lambert, 1985: 22, 36).
- 1903: *California becomes the nation's largest oil-producing state, with more than 3,000 producing wells (Johnson and Nye, 1979: 188).*

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* Italics indicate a non-local event impacting the local oil industry.

- 1903: *State regulations established for casing and plugging wells (Johnson and Nye, 1979: 190).*
- 1903: Construction of "Orcutt siding" is complete. W.W. Orcutt arranges with E.W. Clark, manager of Pacific Coast Railway (and later executive vice-president of Union Oil) for siding, oil and gas pipelines, storage tanks and equipment for loading oil at railroad sidings, to be built in order to transport oil to Port Harford. Union Oil plant is then built, including office buildings, warehouses, boarding houses, dormitories, and family cottages. Pacific Coast Railway also builds storage tanks at Port Harford (Simon, 1990: 22; Krieger, 1990).
- 1904: Union Oil geologist W.W. Orcutt lays out the town of Orcutt as a service and trading center for the north county oil industry. He installs private water and sewer system and sells gas to residents (Orcutt has no public utilities until 1920s) (Nelson, 1987: 17, 25-26; Simon, 1990: 22-23, 82).
- 1904: Union Oil's "Old Maud" well ("Hartnell" No. 1, in the Orcutt hills) blows out, produces one million barrels in its first 100 days, and attracts national attention (Simon, 1990: 80; Johnson and Nye, 1979: 191; Carlson, 1957: 129).
- 1906: Union Oil completes 6" pipeline from Santa Maria fields to 1/4-million barrel tank facility at Port Hartford (now Port San Luis) (Krieger, 1990).
- 1906: *Western Oil and Gas Association (WOGA) is created as the industry's trade organization (Johnson and Nye, 1979: 188).*
- 1907: The Santa Maria Gas and Power Company lays gas pipeline from the Brookshire Oil Company's lease to Santa Maria and other districts. J.F. Goodwin, stockholder and Pinal Oil Company director, "acquired the necessary franchise from the county permitting this construction;" from 1913-1928 he is president of the Santa Maria Gas Company (renamed in 1911) (Carlson, 1957: 137-138).
- 1908: Santa Barbara Chamber of Commerce, fearing oil pollution, officially opposes construction of an oil pipeline on Stearns Wharf (Johnson and Nye, 1979: 190).
- 1908: West Cat Canyon oil field is discovered near Los Alamos by the Palmer Union Oil Company with its "Palmer" No. 1 well, which "all but surpassed Old Maud's production" at 6,000-10,000 barrels daily (Nelson, 1987: 19; Frank and Lambert, 1985: 24).
- 1911: *Union Oil drills "Lakeview" No. 1 in Miracopa, California, which comes in for 30,000 barrels a day.*
- 1915: The Palmer Union Oil Company finds the first substantial strike in the East Cat Canyon field. Although even more companies become active there (United Consolidated, Union Oil, Henderson, Stone-Goodwin and Santa Maria), most of the 21 wells in this field are controlled by Palmer Union and Brooks (Franks and Lambert, 1985: 25).
- 1915: *State Oil and Gas Supervisor created to administer regulations (Johnson and Nye, 1979: 190).*
- 1917: Casmalia oil field (between Point Sal and San Antonio Creek) is discovered by the Doheny Petroleum Company. Initially developed by Doheny, Pacific, and Associated oil companies, Union Oil later starts drilling on the eastern edge of the field (Frank and Lambert, 1985: 24).
- 1920: After rising throughout WWI, oil production in the Orcutt hills reaches a peak of 3,742,249 barrels (Nelson, 1987: 20; Simon, 1990: 38).

- 1921: *California Mineral Leasing Act reserved to the state all mineral rights to state lands and offshore tidelands, required permits and leases for development, and established regulations for offshore development (Johnson and Nye, 1979: 190).*
- 1922: Union Oil begins decreasing production in Orcutt due to oil well-spacing. As production declines, workers and their families moved south to work in oil fields in the Los Angeles area (Simon, 1990: 39).
- 1922: A wildcatter well by the Puritan Oil Company touches off controversial 10-year frenzy of oil drilling in Santa Barbara's residential Mesa neighborhood (Tompkins, 1989: 44).
- 1923: *Amendment to California Leasing Act allows California Surveyor General to deny offshore permit applications under certain conditions (Lima, 1994).*
- 1924: *State Legislature passes Oil Pollution Act, prohibiting discharge of oil into sea and navigable waters* (Johnson and Nye, 1979: 191).
- 1926: El Capitan oil field discovery prompts a "rush" of permit applications, many of which are denied by the Surveyor General prompting a lawsuit by oil men (Johnson and Nye, 1979: 190).
- 1927-30: The peak of the oil boom in Santa Barbara's Mesa neighborhood. The most profitable well, the Olympic Refining Company's "Lomas" No. 1, comes in at a Palisades tract on May 20, 1929, only to be abandoned a year later after producing 29,000 barrels of poor quality crude. The Mesa oil field is virtually depleted by WWII, although the last operating well is capped in 1971. The field, recalls a Santa Barbara historian, "was never more than a public nuisance" (Tompkins, 1989: 44-45).
- 1927-37: *Boone v. Kingsbury opens oil fields to development after State Supreme Court holds Surveyor General's permit denials to be unconstitutional (Lima, 1994; Johnson and Nye, 1979: 190).*
- 1927: Ellwood oil field is discovered 15 miles west of Santa Barbara (Johnson and Nye, 1979: 190).
- 1929: Responding to anti-oil protest regarding drilling in the Mesa neighborhood, the Santa Barbara City Council opposes oil drilling within city limits (Johnson and Nye, 1979: 190).
- 1929: Oil is discovered within Santa Barbara City limits, in the More Residential Tracts. Anti-oil protest decries the blight oil development brought to the local landscape. The Chamber of Commerce opposes oil drilling within city limits (Johnson and Nye, 1979: 190).
- 1929: *State Legislature enacts moratorium on offshore exploration and leasing (Lima, 1994).*
- 1930: The O.C. Field Gasoline Corporation reopens 10 wells in the Casmalia field (where most early wells had been shut down by 1926) to supply its refinery in Casmalia (Franks and Lambert, 1985: 24).
- 1932: *Ballot measures upheld ban on offshore development (Lima, 1994).*
- 1934: Oil production expands into the "Santa Maria Valley" field (as distinguished from the nearby Orcutt field) (Uhl, 1987; Simon, 1990: 22).
- 1934: *Federal attention is brought to ownership of offshore oil leases after Joseph Chamberlain is denied an offshore lease claim and appeals to Congress (Johnson and Nye, 1979: 192).*
- 1936: From its turn of the century beginnings as an Orcutt field lease area, the Rice Ranch Oil Company refines and markets its own gasoline at "Rancho" filling stations across the Central

Coast before selling its stations and refining exclusively for Union Oil in 1936 (Nelson, 1987: 20).

- 1937: The Santa Maria Valley's "Adams" No. 1 well comes in, producing about 3,000 barrels a day. The heyday of onshore oil and gas production in the Santa Maria Valley begins (Uhl, 1987).
- 1937: Union Oil opens its Battles Absorption Plant to clean and separate natural gas from Union Oil production sites in the Santa Maria Valley (Uhl, 1987).
- 1938: *California State Lands Act allows offshore oil development with restrictions (Lima, 1994).*
- 1938: *Legislation asserting federal ownership of offshore lands dies in House Judiciary Subcommittee (Lima, 1994).*
- 1939: *Federal legislation to establish offshore oil as a naval petroleum reserve died in committee (Lima, 1994).*
- 1943: Oil production in the Santa Maria Valley reaches unprecedented heights during W.W.II, bringing new capital investment and creating labor shortages. Most of Union Oil's oil (which had supplied the Navy since the 1920s) is shipped to the US Navy's Pacific Fleet from Port San Luis. Wartime production also brings new capital investment (e.g., steel structures, electric pumping units) to old rigs and makes it feasible to resurrect shut-in wells like Union Oil's Old Maud, inoperative since 1918. Demand for labor in oil fields exceeds supplies, and transients, schoolboys, and off-duty soldiers are hired (Uhl, 1987; Nelson, 1987: 17, 94).
- 1945: *President Truman asserted federal claim to offshore lands and their resources in Proclamation Number 2667. United Sates v. California filed in the US Supreme Court on October 9, 1945. US Attorney General argued that the federal government needed to control offshore lands for national defense (Lima, 1994; Johnson and Nye, 1979: 192).*
- 1946: *Congressional quitclaim legislation to return lands to the state vetoed by President Truman, House does not override (Lima, 1994).*
- 1946: Shell Oil builds a small, completely automatic gasoline plant in Santa Maria to process gas from old Shell properties in the Santa Maria field (Beaton, 1957: 647).
- 1947: *US Supreme Court rules in favor of the federal ownership of offshore lands in US v. California. Consequently, California's offshore lease system is thrown into disarray, helping to delay further development (Lima, 1994; Johnson and Nye, 1979: 192).*
- 1947: Interim Agreement of the State Lands Commission allows California to continue administering offshore lands within a three mile limit, with the approval of the Secretary of Interior (Johnson and Nye, 1979: 192).
- 1947: Santa Barbara voters defeat referendum to amend City of Santa Barbara's charter so that permitting of oil drilling or prospecting is subject to public vote. The *Santa Barbara News-Press* opposed the amendment (*Santa Barbara News-Press*, May 5, 1947
- 1948: Norris Oil Company's well "Cuyama" No. 2 discovers oil in the Cuyama valley (*Ventura County Star-Free Press*, October 19, 1949). Richfield soon acquires over 150,000 acres of land and 87 percent of potential production in the Russell Ranch area.
- 1948: Three large seismic exploration explosions in the Santa Barbara Channel sensitize local citizens to offshore development's threats to marine life. After hearing local

fishermen's complaints, Governor Earl Warren halts seismic exploration, then reauthorizes it with stricter regulations (Johnson and Nye, 1979: 192-3).

- 1948: The completion of Continental's well "LeRoy" No. 2 marks the discovery of Guadalupe field (Division of Oil & Gas, 1965).
- 1948: *Federal quitclaim legislation dies in Senate committee (Lima, 1994).*
- 1949: The completion of Richfield's well "Homan A" No. 81-35 marks the discovery of South Cuyama field, located about three miles southeast of Russell Ranch field (Division of Oil & Gas, 1950).
- 1949: *US House and Senate quitclaim bills die in committee (Lima, 1994).*
- 1949: The completion of Richfield's well "Russell" No. 1 discovers the Russell Ranch field. By the end of 1949, Richfield has 109 producing wells in the field (*Ventura County Star-Free Press*, October 19, 1949; Division of Oil & Gas, Index of Well Records).
- 1950: *Revenues from offshore development are placed in a federal trust fund instead of accruing to the State of California (Johnson and Nye, 1979: 192).*
- 1950: *Federal interim management legislation dies in Congress (Lima, 1994).*
- 1950: Norris Oil subleases its Russell Ranch drilling operations to Richfield (50), Hancock (8), and F.C. Griggs Associates (3).
- 1950: The first revolving drilling from a floating platform is performed in the Santa Barbara Channel, using a rig built by Westrick Iron Works (*Santa Barbara News-Press*, October 11, 1957).
- 1950: Sunray absorbs Barnsdall Oil Company, with 36 producing wells in Ellwood and Cat Canyon fields at the end of 1949, in a $44 million purchase of the firm's 800,000 shares of stock (*Oil & Gas Journal*, January 24, 1955; Division of Oil & Gas, 1950).
- 1950: Russell Ranch field is unitized for control of production from the Dibblee zone. Richfield is designated the unit operator (Division of Oil & Gas, 1951).
- 1950: Richfield completes a 40-mile, 10" welded pipeline extending from its Cuyama South pipeline station to a connection with its main trunkline in Wheeler Ridge field. Costing roughly $900,000, the pipeline can carry 51,000 barrels of crude per day (Howard Kegley, "Oil Field News," *Santa Barbara News-Press*, March 24, 1950).
- 1950: Sunray's refinery southwest of Santa Maria explodes and catches fire, causing two deaths (*Santa Barbara News-Press*, July 12, 1950).
- 1950: The American Petroleum Institute reports that daily production in all of Cuyama Valley totals 43,700 barrels (Howard Kegley, "Oil Field News," *Santa Barbara News-Press*, July 13, 1950).
- 1950: A $250,000 fire destroys Union's Orcutt compressor plant (*Santa Barbara News-Press*, July 12, 1950).
- 1950: Hancock Oil Company's well "Hancock-Bishop" No. 44-31 discovers oil in the Taylor Canyon area of Cuyama Valley in San Luis Obispo County. The area is designated the Taylor Canyon field effective July 1, 1956 (Division of Oil and Gas, 1951, 1957).
- 1950: Tidewater prepares to build a two-way, submerged pipeline off its marine loading station at Gaviota. The facility transports distillate to Zaca field to inject into wells. Crude

oil produced from wells is then transported to Gaviota (Howard Kegley, "Oil Field News," *Santa Barbara News-Press*, September 10, 1950).

- 1951: *Interim management and quitclaim legislation again die in Congress (Lima, 1994).*
- 1951: *The year marks a shift in California petroleum exploration from the southern and central to north central parts of the state. Firms continue to explore in marginal areas around established fields, but they are faced with the need of making Cuyama Valley-like discoveries. Leading geologists look at the area extending north from King City to the upper Sacramento Valley as highly favorable* (Howard Kegley, "Oil Field News," *Santa Barbara News-Press*, January 5, 1951).
- 1951: City of Santa Barbara referendum to authorize onshore drilling near airport is approved by near 3-1 margin.
- 1952: City of Santa Barbara adopts ordinance to ban oil drilling and exploration in the Santa Barbara Channel (Johnson and Nye, 1979: 193).
- 1952: *Interim management and quitclaim legislation vetoed by President, Congress does not override (Lima, 1994).*
- 1952: The completion of Union's well "Jesus Maria" No. 4 makes an important oil discovery six miles northwest of Lompoc files and four miles southwest of Casmalia field. The area is designated the Jesus Maria field effective July 1, 1956 (Division of Oil & Gas, 1953, 1957).
- 1953: Application for seismic oil exploration in the Santa Barbara Channel causes public concern and effort to zone offshore areas to restrict development (Lima, 1994).
- 1953: *President Eisenhower signs Submerged Lands Act and Outer Continental Shelf Lands Act, which divides authority over offshore area between state and federal government at 3 mile mark (Lima, 1994).*
- 1953: After Humble Oil applies to explore in the Santa Barbara Channel, Santa Barbarans appeals to States Land Commission to be granted authority to restrict offshore development through zoning. National AP and UPI give national news coverage of Santa Barbara testimony by Santa Barbara's mayor and the county's District Attorney and Planning Commission (*Santa Barbara News-Press*, January 2, 1953; *Santa Barbara News-Press*, January 11, 1953).
- 1953: Monterey Oil Company of Los Angeles acquires the West Texas and California oil properties of Wilshire Oil Company, active in South Cuyama field (*Oil & Gas Journal*, April 5, 1954; Division of Oil & Gas Index of Well Records).
- 1953: Union acquires Guadalupe lease, including all wells and equipment, from Thornbury Drilling Company and assumes operation of the field (Division of Oil & Gas, 1965).
- 1953: Effective July 1, 1953, the Dibblee zone of South Cuyama field is unitized. Richfield is designated the operator of the participating wells and lands. The unit includes 211 wells in addition to development wells completed after this date. All operators except for Superior (17 producing wells) join the unit agreement (Division of Oil & Gas, 1954).
- 1954: Santa Barbara city and County lobby the State Legislature to grant them a development-free offshore sanctuary and the authority to restrict offshore development through zoning (Johnson and Nye, 1979: 194; Lima, 1994).
- 1954: Union Oil buys Orcutt refinery from Sunray Oil Company and builds another facility at Santa Maria to process heavy crudes with large quantities of sulfur. The $12 million Santa Maria facility processes 20,000 barrels of crude daily, and gasoline and gas oil stocks are piped to Avila for tankering to Union Oil's Oleum refinery (Welty and Taylor, 1958: 213).

- 1954: Monterey Oil Company of Los Angeles purchases most of the assets of Fullerton Oil Company, incorporated in California on May 8, 1899, for $52 million. Fullerton at the time operates in Cat Canyon and Lompoc fields (*Oil & Gas Journal*, April 5, 1954; Division of Oil & Gas Index of Well Records).

- 1955: State legislature passes the Shell-Cunningham Tidelands Act, which clarifies state tidelands development and leasing by (1) granting tidelands authority to State Lands Commission, (2) creating the development-free Santa Barbara Oil Sanctuary (adjacent to the Santa Barbara urban/suburban area, extending from Coal Oil Point to Summerland Bay), and (3) authorizing development elsewhere on the Santa Barbara Channel with one new requirement: a 200-day waiting period between application for drilling rights and granting of rights. Protecting the Sanctuary becomes a main theme of local government policy (Lima, 1994; Johnson and Nye, 1979: 194).

- 1956: J. Paul Getty renames Pacific Western Oil Corporation Getty Oil Company. Incorporated in 1928, one of California's top oil-producing firms, and active in numerous Ventura and Santa Barbara fields, Getty had obtained control of the firm in 1931 (Lenzer: 1985; Division of Oil & Gas Index of Well Records).

- 1956: Union absorbs Los Nietos, a wholly-owned subsidiary since October 1949. Los Nietos operates at the time in the county's Casmalia, Orcutt, and Santa Maria Valley fields (*Oil & Gas Journal*, September 17, 1956; Division of Oil & Gas Index of Well Records).

- 1956: *California voters reject state initiative mandating unitization of oil fields and well spacing (Jones 1972: 276-279).*

- 1956: State Lands Commission issues the first application for an offshore lease, to be located near Summerland. The next year, exploration confirms the presence of oil off Summerland (Lima, 1994: 194-195).

- 1956: Richfield tops county taxpayers with a tax bill of $1,601,915 and is again the county's biggest taxpayer in 1956. Other large taxpayers include Union ($603,499), Superior ($103,370), Signal Oil & Gas ($90,669), Standard ($68,177), Monterey ($58,207), General Petroleum ($58,028), Hancock and General ($55,238), Pacific Western ($47,505), Shell ($44,322), Tidewater ($43,964), and Sunray ($42,395) (*Santa Barbara News-Press*, December 3, 1956).

- 1956: Santa Barbara County prepares local ordinances and other policies in anticipation of development of the Santa Barbara Channel (Lima, 1994: 192-193).

- 1957: Over the objections of the County Board of Supervisors and others, the city of Santa Barbara moves to annex the offshore Sanctuary before pending state law prohibits such action. The action is first justified to annex the (otherwise non-adjacent) airport in Goleta, then to grant the city power to zone offshore lands to prohibit development. Four years later, the city settles a state lawsuit by agreeing to annex only surface but no submerged land in the sanctuary, thereby neutralizing its anti-development effect (Lima, 1994: 204-208; Johnson and Nye, 1979: 195).

- 1957: Searching for oil reserves nearer to its markets, Union Oil uses secondary recovery at 35 sites, including the Guadalupe field where gas injection, water flooding, underground burning, or a combination triples recoverable oil prospects up from 11 million barrels; similar yields are produced at Cat Canyon and Orcutt fields, among others. Petroleum-separating innovations at Unocal's Brea Research Laboratory allows the company to develop the Union Oil-owned Sisquoc tar sands (Welty and Taylor, 1958: 229-230).

- 1957: *Amendments to Shell-Cunningham Tidelands Act create sliding royalties scale which is decried as exorbitant by many oil industry firms. State tidelands leasing is suspended for one year until amendments are approved (Welty and Taylor, 1958: 229; Lima, 1994).*

- 1957: Several of the major oil companies conduct offshore core drilling. Permission to do so is granted by the Division of State Lands so that firms could gain geological information prior to bidding on leases. As a result, for the year, of 106 notices to drill in Santa Barbara County, 85 are for offshore coreholes (Division of Oil & Gas, 1958).

- 1957: The completion of Sunray Mid-Continent's well "Sisquoc Ranch" No. 1 makes a possible new area discovery (Division of Oil & Gas, 1958).

- 1957: Harry S. Rothschild's well "Edwards" No. 1 makes a possible new field discovery in the Las Varas area of the county (Division of Oil & Gas, 1958).

- 1957: Test drilling on the first offshore lease awarded under the Shell-Cunningham Act commences after the *Pacific Driller*, a barge-on-stilts brought up from Huntington Beach, is placed into position on the 5,500 acre Standard/Humble Summerland lease that they acquired in January for 7.25 million (Howard Kegley, "Oil Field News," *Santa Barbara News-Press*, March 3, 1957).

- 1957: *Following the defeat of a state unitization initiative, the California legislature passes a conservation law affecting state-owned lands (Jones 1972: 276-279).*

- 1958: The California State Lands Commission resumes tidelands leasing with the awarding of five parcels located between Point Conception and the Ellwood field. The total bonus paid for the parcels is $55,973 million. The successful bidders include: Phillips and Edwin W. Pauley (Parcel A, $13.55 million), Humble and Standard (Parcel B, $770,837), Humble and Standard (Parcel C, $12.4 million), Texas, Monterey, and Newmont (Parcel D, $23.7 million), and Phillips and Edwin W. Pauley (Parcel E, $5.1 million).

- 1958: In preparation for development in Channel's Summerland field, the Santa Barbara County Board of Supervisors approves construction of an onshore processing plant site in Carpinteria (Lima, 1994: 201).

- 1958: Humble Oil Company (later Exxon) erects Platform Hazel, the first offshore oil platform in California, in the Summerland oil field (Johnson and Nye, 1979: 195).

- 1958: Standard Oil requests permission from local Water Pollution Control District to dump waste into the ocean off the "first offshore platform on the coast." A 1957 amendment to the Public Resources Code allows dumping (*Santa Barbara News-Press*, March 4, 1958).

- 1958: Richfield Oil Corporation begins piping natural gas from its Cuyama fields (Russell Ranch and South Cuyama) to Southern California Edison Company's Mandalay Generating Plant near Ventura. To deliver the gas to Edison, Richfield constructs a 59-mile pipeline (Jones 1972: 300-301).

- 1958: *The California legislature extends oil unitization laws to city- and county-owned lands (Jones 1972: 276-279).*

- 1959: Bankline Oil Company of Los Angeles, operator in Cat Canyon field and until 1952 a major operator in Ellwood field (incorporated in California on May 20, 1912 with a capitalization of $100,000) is acquired by Signal Oil & Gas in a stock deal worth $6 million. Bankline at the time produces 1,500 barrels of oil per day and possesses a 10,000 barrel refinery in Bakersfield. All wells are transferred to Signal as of July 10, 1959 after stockholders approve the deal. The merger of Bankline, 1958 merger with Hancock, and a mid-1959 merger with Eastern States Petroleum of Houston establishes Signal as the largest independent oil firm on the West Coast (Howard Kegley, "Oil Field News," *Santa Barbara News-Press*, February 2, 1959; Division of Oil & Gas Index of Well Records; "Gas Price Boost Seen by Mosher," *Santa Barbara News-Press*, June 7, 1959).

- 1959: The county planning commission approves by a 3-2 vote the establishment of a Standard Oil processing facility, marine terminal facilities, and storage tanks in East Carpinteria on the Bristol-Myers property over strong protests from residents of the area (*Santa Barbara News-Press*, April 23, 1959).
- 1959: The completion of Texaco's well "Texaco-Monterey PRC 2206.1" No. 2 makes a major discovery on its tideland lease PRC 2206.1 offshore from Cuarta Canyon approximately four miles west of Gaviota. Standard's well "Standard-Humble Gaviota State" No. 2A on its tideland lease PRC 2199.1 "blows a large amount of gas and some condensate during testing operations," leading to the discovery of Gaviota Offshore Gas field. Phillips gets favorable showings in the Point Conception area on its tidelands lease PRC 2207.1 approximately 11 miles from Gaviota. Standard accelerates its drilling program at its permanent platform in the Summerland offshore area (Division of Oil & Gas, 1960).
- 1959: *Western Gulf, incorporated in California in 1929 and a subsidiary of Gulf Oil, is dissolved as a separate entity and operates as of October 10, 1960 as Gulf of California (Division of Oil & Gas Index of Well Records).*
- 1960: The Naples gas field is discovered. Platforms Helen (Texaco), Harry (Phillips), and Hilda (Humble) are erected (Johnson and Nye, 1979: 195).
- 1960: Humble purchases Monterey Oil Company for $118.3 million in a deal that is approved in January 1961. The deal excludes Monterey's 25 percent interest in the Cuarta offshore tract held jointly with Texaco and Newmont Oil. At the time Monterey also operates in the county's Lompoc field. Monterey also operated in South Cuyama from 1949-1953 (*Oil & Gas Journal*, January 9, 1961; Division of Oil & Gas Index of Well Records).
- 1961: Four State tidelands parcels are offered for bid. There are no bidders for parcel 1. Texaco bids $9.5 million for parcel 2 (PRC 2207.1). A group composed of Richfield, Ohio, Socony Mobil, and Tidewater bids $1.355 million for parcel 3 in the Cuarta Offshore area. A group composed of Richfield, Signal, and Socony Mobil bids $2.1 million for parcel 4, approximately two miles west of Gaviota Offshore Gas field (Division of Oil & Gas, 1962).
- 1961: Continental acquires Douglas Oil Company of Los Angeles (incorporated in California on September 24, 1935) for $17.9 million primarily for its 270 service stations. Douglas had 16 producing wells in Cat Canyon and Santa Maria Valley fields as of December 31, 1949 and refineries in Santa Maria, Bakersfield, and Clearwater with a combined capacity of 19,300 barrels daily (*Oil & Gas Journal*, February 20, 1961; Division of Oil & Gas, 1950).
- 1961: The completion of Richfield's well "Richfield-Honolulu-Signal State 308" No. 3 in the offshore from Coal Oil Point is the first successful ocean-floor completion in the county and makes a major field discovery (Division of Oil & Gas, 1962).
- 1961: A flash fire breaks out aboard an oil barge while loading oil at Phillips's platform Harry, injuring two men and severely damaging the barge. No oil is lost (Division of Oil & Gas, 1962).
- 1962: The completion of Richfield's well "State 2793" No. 1 makes a new offshore oil discovery about four miles west of Gaviota on tideland lease PRC 2793.1 (Parcel 4). Though drilling operations are completed in March, the well is not placed on production as an offshore completion until December due to the lack of pipeline facilities. The producing zone is designated the Alegria Offshore field (Division of Oil & Gas, 1963).

- 1962: Standard and Shell discover two productive dry gas areas in the Gaviota Offshore Gas field. Standard's discovery well "SSGS 2199" No. 401A completed in November is designated Caliente Offshore Gas field. This well is placed into production in January 1963 after pipeline facilities are constructed (Division of Oil & Gas, 1963, 1964).
- 1962: The state awards five parcels between Point Conception and Ellwood, leaving only two tidelands parcels unleased. Successful bidders include: Union (Parcel 6, $3 million), Standard (Parcel 7, $1.5 million), Shell and Standard (Parcel 8A, $14 million), Phillips and Pauley Petroleum (Parcel 9A, $6.1 million), and Texaco (Parcel 10A, $107,000) (Division of Oil & Gas, 1963).
- 1963: The state awards the final two parcels between Point Conception and Ellwood. Union successfully bids for both: Parcel 11 ($267,000) and Parcel 12 (with Humble, $618,840) (Division of Oil & Gas, 1964).
- 1963: Standard's well "SSGS" No. 201 is completed and put into production. The production area of the well, discovered in 1962, is designated the Molino Offshore Gas field (Division of Oil & Gas, 1964).
- 1963: Texaco's Platform Herman is erected (Johnson and Nye, 1979: 195).
- 1963: Sohio and others purchase Producing Properties, an operator in Cat Canyon field, for $52 million in an ABC deal (*Oil & Gas Journal*, January 23, 1964).
- 1964: The state awards Parcel 19 (PRC 3133), a 5535-acre tract between Summerland Offshore field and Richfield's Rincon Island to Humble for $22 million. The state awards Parcel 21 (PRC 3150), located immediately west of Parcel 19, to Standard and Richfield for $18.67 million (Division of Oil & Gas, 1965).
- 1965: US Supreme Court ruling delimits state and federal waters in the Santa Barbara Channel. The federal government prepares to issue the first federal OCS lease (a single drainage tract) in the Channel (Lima, 1994: 232).
- 1965: 60-well Platform Hope (Standard/Richfield) is constructed on tideland lease PRC 3150 (Parcel 21) offshore from Carpinteria. By year's end two wells are being drilled from the platform (Division of Oil & Gas, 1966).
- 1965: *Congress passes Water Quality Act to replace the Federal Water Pollution Control Act of 1956. The new law sets water quality standard for coastal waters (Johnson and Nye, 1979: 196).*
- 1965: Oil in the county is now a waning asset, according to the *Santa Barbara News-Press.* The *News-Press* reports that no big onshore field remains to replace reserves now diminishing at a rate of 4-20 percent per year. Offshore finds have yet to make up for onshore depletions (*Santa Barbara News-Press*, January 15, 1965).
- 1965: Cal-L Exploration Corporation drills and completes several small producers in an area onshore from Alegria Offshore field. As a result, the limits of the offshore field are extended to include the onshore productive area (Division of Oil and Gas, 1966).
- 1965: A proposition to amend City of Santa Barbara Charter declaring oil drilling within municipal limits "unlawful" and "a public nuisance" is approved by 3-1 margin (50% voter turnout). Endorsed by the *News-Press*, the amendment's impact is limited as drilling within the city limits was already outlawed by a 1953 City Council ordinance (*Santa Barbara News-Press*, May 4-6, 1965).

- 1965: Richfield makes a significant discovery on tideland lease PRC 3242 (Parcel 24, owned jointly with Mobil) about two miles from Ellwood field with its well "3242" No. 1. Richfield constructs 20-well Platform Holly so that the firm is able to drill wells into both tideland leases PRC 3120 (Parcel 18A) and PRC 3242 (Parcel 24). Well "AMES 3242" No. 3 is the first well completed from Platform Holly. It is placed into production on January 17,1967. The production area is designated South Ellwood Offshore field (Division of Oil & Gas, 1966, 1967,1968).
- 1965: The County Board of Supervisors reject a proposal for South Ellwood onshore facilities. The Supervisors order a comprehensive facilities siting policy (Lima, 1994: 238).
- 1965: Standard spuds its first well from its Platform Hope offshore from Carpinteria on Parcel 21 (*Oil & Gas Journal*, 31 January 1966).
- 1965: Reserve Oil & Gas acquires Rice Ranch Oil Company of Los Angeles and its 29 wells in Orcutt field in a stock exchange deal worth $2.25 million (*Oil & Gas Journal*, March 14, 1966; Division of Oil & Gas Index of Well Records).
- 1966: The acquisition of Richfield Oil Corporation, a significant onshore and offshore tri-county operator, by the Atlantic Refining Company is effective as of this date. With combined assets of $1.46 billion, revenues of $1.185 billion and profits of almost $70 million, the combined Atlantic Richfield (Arco) of 1966 ranks thirteenth among US oil firms in asset and twelfth in profits (*Oil & Gas Journal*, January 3, 1966).
- 1966: The completion of Standard's well "SACS 3150" No. 1 from its Platform Hope makes a significant offshore discovery, designated Carpinteria offshore field (Division of Oil & Gas, 1967).
- 1966: Platform Heidi, a 60-well, $4.75 million drilling-production platform is set on location off Carpinteria. It is set to be activated in by April. Standard, operator for itself and Richfield, will drill a total of 120 wells from platforms Hope and Heidi on a parcel that the two companies won in 1964 with a bonus bid of $18.67 million (*Oil & Gas Journal*, 31 January 1966).
- 1966: *US Department of the Interior, US Geological Survey is charged with administering relevant portions of the Water Quality Act and the Oil Pollution Act (Johnson and Nye, 1979: 156).*
- 1966: The first federal offshore lease in the Santa Barbara Channel is awarded to Phillips Petroleum/Continental/Cities Service as joint bidders for $21,189,000. Drainage Tract OCS P-0166 is adjacent to State tideland lease 1150 (Parcel 21) in the Carpinteria Offshore field. Platform Hogan, the first offshore platform in federal OCS waters in the Santa Barbara Channel, is installed in 1967 (Lima, 1994: 244; Johnson and Nye, 1979: 197; *Oil & Gas Journal*, 26 December 1966; Division of Oil & Gas, 1967).
- 1967: *The tanker Torrey Canyon (Union Oil Company of California) runs aground in England, causing an oil spill which worries Santa Barbarans about the safety of development in the Santa Barbara Channel (Johnson and Nye, 1979: 197).*
- 1967: Santa Barbara County adopts an onshore facility siting policy which promotes facility consolidation and compatibility with local geographic, land use and aesthetic criteria (Lima, 1994).
- 1967: Getty Oil acquires Tidewater, at the time America's 15th largest oil firm. Founded in 1926 as Tidewater Associated via the merger of Tidewater Oil and Associated Oil, the San Francisco-based Tidewater had been a major tri-county presence throughout much of the

century, particularly in Ventura, Rincon, and Zaca fields. At the time of the deal J. Paul Getty had already acquired a significant portion of the firm (*Oil & Gas Journal*, June 19, 1967; July 31, 1967; Division of Oil & Gas Index of Well Records; Lenzer, 1985).

- 1967: In a compromise on the county's request (Resolution 67-156) for 16 mile OCS drilling sanctuary and one-year moratorium on OCS development in the Santa Barbara Channel, the federal government creates a Federal Ecological Preserve, a buffer zone extending two miles seaward from the Santa Barbara Oil Sanctuary. County requests delay of six months to review proposed Southern California OCS leases; the federal government grants six weeks (Johnson and Nye, 1979: 197).

- 1967: *California production hits an all-time high with an output of 1,011,535 barrels a day. The record shatters the old mark of 1,000,013 set in June 1953. The new mark marks a big turnaround in production that began in 1965 with the opening of the East Wilmington field and significant new field discoveries in the San Joaquin Valley, offshore Santa Barbara County, downtown Los Angeles, and offshore Los Angeles County (Oil & Gas Journal, 11 December 1967).*

- 1967: County Petroleum Engineer issueds his report, "Phase I: Effects of Federal Leasing, Preliminary Report," calling for a "go-slow" approach that would lease only 25% of offshore oil lands (Johnson and Nye, 1979: 198).

- 1968: US Department of the Interior opens bids on 75 tracts comprising 363,181 acres. Designated Lease Sale P-4, the sale marks the opening of the federally-owned portion of the Santa Barbara Channel for exploration of new oil and gas fields. The government accepts bids totaling $602.7 million for 71 tracts. Union, operator for itself, Gulf, Mobil, and Texaco, makes the first commercial discovery on Tract 402. Sun Oil, operator for itself, Marathon, and Superior, makes a discovery on Tract 401. Humble, operator for itself and Standard, makes a discovery on Tract 342, approximately five miles seaward from Point Conception. The first oil produced in the Channel flows from Platform Hogan, adjacent to Carpinteria Offshore field, where by the end of the year 24 wells are completed. In addition, Union Oil pays $61 million for Tract OCS-P-0241, which eventually contains Platform A (Division of Oil & Gas, 1969; Johnson and Nye, 1979: 198; Lima, 1994: 253).

- 1968: The completion of Standard's well "Lakeview Unit" No. 1-A approximately six miles southeast of Santa Maria, marks the discovery of a new productive area, designated Clark area, and extends the limits of Santa Maria Valley field (Division of Oil & Gas, 1969).

- 1968: The Dos Cuadras Field is discovered (Johnson and Nye, 1979: 198).

- 1968: *As a response to the Torrey Canyon spill, the federal government prepared the National Multi-Agency Oil and Hazardous Materials Contingency Plan (Johnson and Nye, 1979: 209).*

- 1968: Army Corps of Engineers approves Union Oil permit to construct Platform A over Santa Barbara protests concerning the lack of a public hearing. The platform is installed later that year, along with Platforms B and Houchin (Johnson and Nye, 1979: 198; Sollen, 1998).

- 1968: Sun Oil absorbs Sunray DX $840 million deal whereby Sunray's 18.5 million shares of common stock are exchanged for a new cumulative Sun preferred stock on a share-for-share basis. The merged firm possesses assets of $2.3 billion, which puts Sun in the industry's top ten. A major tri-county presence, particularly in Santa Barbara County, since its incorporation in 1929, at the time of the merger Sunray operates in Cat Canyon and Ellwood fields (*Oil & Gas Journal*, November 4, 1968; Division of Oil & Gas Index of Well Records).

- 1968: County-wide referendum overturns county supervisors' approval of onshore facility at Carpinteria (Lima, 1994: 257).
- 1968: *California adopts the Marine Chemical Spill Disaster Plan* (Johnson and Nye, 1979: 207).
- 1969: A blowout occurs at Union Oil's Platform A in Dos Cuadras oil field. Drilling is suspended in the Channel pending a review of state and federal drilling regulations (Lima, 1994: 272, 274; Johnson and Nye, 1979: 198-99).
- 1969: US Senate Subcommittee on Air and Water Pollution holds hearing in Santa Barbara. Congress subsequently fails to pass any bills banning offshore oil drilling (Easton, 1972: 121).
- 1969: President Nixon visits Santa Barbara and inspects the polluted beaches. Secretary of the Interior Hickel announces expanded federal buffer zone around state sanctuary and new and tougher drilling regulations. (Easton, 1972: 119)
- 1969: The cities of Santa Barbara and Carpinteria, Santa Barbara County, and the State of California join in a class-action lawsuit against Union and its partners responsible for the Platform A blowout. The defendants eventually settle for $9.45 million, $4.5 million of which is directed to the state (Johnson and Nye, 1979: 208).
- 1969: Environmental Quality Advisory Board created by Santa Barbara City Ordinance 3373 to halt oil pollution in the Santa Barbara Channel (Johnson and Nye, 1979: 186).
- 1969: California Legislature expands sanctuaries but fails to pass bill to ban oil drilling in state waters of Santa Barbara Channel (Lima, 1994: 285).
- 1969: Federal District Court refuses injunction against further drilling (Easton, 1972: 170).
- 1969: "Sail-in" protest off Santa Barbara to block emplacement of Platform Hillhouse (the first new platform since the oil spill) succeeds in delaying the project, but US Supreme Court ruling against legal challenges results in the platform's installation by year's end. (Easton, 1972: 178-180)
- 1969: So-called "second oil spill" blackens channel beaches at Christmas time and renews public indignation against pollution. By year's end, loss of local tourism revenue due to oil spill is estimated at $24 million (Graves and Simon, 1980: 23).
- 1969: *Nixon signs Tax Reform Bill reducing tax depletion allowance and eliminating "ABC loophole" for oil companies.*
- 1970: Federal government allows resumed drilling in the Outer Continental Shelf lands (Johnson and Nye, 1979: 217).
- 1970: *A wave of environmental legislation is enacted in the wake of the Santa Barbara Channel oil spill. The National Environmental Policy Act (NEPA) and (by November) California Environmental Quality Act (CEQA) become law, require Environmental Impact Statements and Environmental Impact Reports, respectively, prior to approval of development projects. In July, President Nixon establishes the Environmental Protection Agency and the National Oceanic and Atmospheric Administration. The Federal Water Quality Act and Clean Air Act are also enacted in the same year (Johnson and Nye, 1979: 219; Easton, 1972: 236).*
- 1970: Santa Barbara County brings criminal charges against four oil companies involved with the 1969 spill. The charges result in token fine of several hundred dollars, causing local outrage. A few months later, the Federal Appeals Court quashes two injunctive pleas by the city and county against federal development policies (Johnson and Nye, 1979: 228).

- 1970: State Lands Commission (SLC) lifts moratorium on existing development in state tidelands except for waters off Santa Barbara (Johnson and Nye, 1979: 216).
- 1970: Sun requests the Interior Department to order delivery of oil from Platform Hillhouse (to date without its own pipeline access) to shore via Union's pipeline; Interior Department offers assistance but declines to issue a full order. Sun considers constructing its own pipeline but lacks pipeline subsidiaries in California with power to condemn Union Oil's previously assigned right-of-way and pipeline. After platform partner Superior Oil threatens legal action, the US Geological Survey works out a cooperative development plan in September that satisfies the state lands commission and the relevant companies, and Platform Hillhouse oil is soon piped through Union's pipeline (Johnson 1983: 279).
- 1970: *In response to Santa Barbara criticisms regarding the lack of public hearings on offshore development, the first public hearing on federal OCS development is held in New Orleans (Easton, 1972: 234).*
- 1970: Hearings are held in Washington on the Nixon Administration's proposal to cancel 20 Channel leases and create a cross-Channel marine sanctuary (Easton, 1972: 237-238).
- 1971: The eastern portion of Ellwood field is completely abandoned and re-developed as a golf course. The wells at the end of the pier on State Lease 428 are scheduled for abandonment (Division of Oil and Gas, 1972).
- 1971: Exxon (formerly Humble Oil) submits initial plan of operation for Santa Ynez Unit development (Johnson and Nye, 1979: 184).
- 1971: US Department of the Interior conducts the first public hearing in Santa Barbara regarding new platforms for channel. Santa Barbarans protest the rapid announcement (on January 1) of the hearing (Easton, 1972: 246-247).
- 1971: The State Lands Commission lifts ban on new development in state tidelands (Johnson and Nye, 1979: 216).
- 1971: Interior Secretary Rogers Morton denies Sun and Union Oil new drilling permits, although US Geological Service had issued favorable EISs, as they would conflict with the Nixon administration's pending proposal to Congress to create an oil-free sanctuary and rescind half of 70 OCS leases in the Santa Barbara Channel. Sun sues federal government for damages caused by the application denial, but 6 years will pass before a federal courts permit Sun to install its Platform Henry (Johnson 1983: 280-1).
- 1971: President Nixon rules against additional platforms in the Dos Cuadras field (Easton, 1972: 285).
- 1972: Phillips Petroleum slates Platform Harry for removal, following the abandonment of all wells in Conception offshore field (Division of Oil & Gas, 1973).
- 1972: Draft EIS is prepared for Exxon's Santa Ynez Unit Plan of Operations, the first federal OCS project in the Santa Barbara Channel to go through the NEPA process (Johnson and Nye, 1979: 219-20; Lima, 1994: 309).
- 1972: The completion of McCulloch Oil Corporation's well "Ferrero et al" No. 1-1 discovers Los Alamos field about four one one-half miles east of Lompoc field and two and one-half miles southwest of Los Alamos (Division of Oil & Gas, 1973).
- 1972: The completion of Shell's well "Shell-Standard-Bradley Land Co." No. 3-1 discovers the Bradley area of Santa Maria Valley field (Division of Oil & Gas, 1974).

- 1972: The completion of Shell's well "Shell-Standard-Bradley Land Co." No. 3-3 discovers the Sisquoc pool of Santa Maria Valley field (Division of Oil & Gas, 1974).

- 1972: *Proposition 20, the California Coastal Zone Conservation Act, is adopted by California voters and creates the California Coastal Conservation Commission and six regional commissions. The State Coastal Commission (SCC) now enters the state tidelands offshore development issue and ends SLC-oil industry domination. The Federal Coastal Zone Management Act and Clean Water Act are also enacted in the same year (Johnson and Nye, 1979: 217-18)*

- 1973: *First Energy Crisis begins. Oil shortage due to OPEC embargo leads to a drive for greater American energy self-reliance and independence through new energy sources and conservation (Lima, 1994).*

- 1973: Nixon Administration withdraws support for Santa Barbara Channel energy reserve (Lima, 1994: 301).

- 1973: Santa Barbara County opens new Office of Environmental Quality (OEQ), which is authorized to review environmental impact reports for projects that pass through the Planning Department.

- 1973: SLC lifts ban on renewal of drilling in Santa Barbara Channel (Johnson and Nye, 1979: 216).

- 1974: Platform Harry in Conception Offshore field is removed by Phillips Petroleum. The field is abandoned by 1983 (Johnson and Nye, 1979: 195; Division of Oil & Gas, 1983).

- 1974: Interior Department announces plans for accelerated OCS leasing, to include the use of "blanket EISs," documents which could be used for future developments without subsequent individual project EISs (Johnson and Nye, 1979: 220).

- 1974: Santa Barbara City Council bans oil support activities from Stearns Wharf.

- 1974: Exxon (formerly Humble Oil) requests county re-zoning of Las Flores Canyon as site for Santa Ynez Unit (SYU) onshore facilities. County OEQ subsequently prepares EIR for rezoning, and acting Secretary of the Interior approves SYU Plan of Operations (Graves and Simon, 1980: 189; Lima, 1994: 312).

- 1974: Arco announces plans to resume drilling on Platform Holly in the Santa Barbara Channel, prompting GOO appeals at SCC and state courts. In September, draft EIR for new Arco wells at Platform Holly includes plans for expanding Ellwood onshore facility, which prompts protests by nearby residents and a subsequent SLC ruling for a separate Ellwood EIR (Graves and Simon, 1980: 222-227; Johnson and Nye, 1979: 218).

- 1975: *Under Congressional pressure to favor smaller domestically oriented oil companies, the Interior Department forbids lease bids on Southern California OCS tracts by companies with global production of 1.25 million barrels a day or more (Johnson 1983: 282).*

- 1975: Phillips Petroleum establishes a California offshore depth record of 18,434 feet with its well "OCS P-0166" No. B-32 drilled from Platform Houchin in Carpinteria Offshore field at a cost of some $6 million. The well was abandoned following three more test drills (Division of Oil & Gas, 1976).

- 1975: Interior Department releases several blanket EISs: two draft EISs for its accelerated leasing program and for OCS Lease Sale 35, and in June a draft EIS for Santa Barbara Channel leasing and a draft EIS for the Santa Barbara Channel oil and gas development (Johnson and Nye, 1979: 220).

- 1975: Santa Barbara County Board of Supervisors approves rezoning of Las Flores Canyon to allow siting of Exxon facilities. Regional Coastal Commission (RCC) also approves the project, but the decision is appealed to the SCC (Graves and Simon, 1980; Lima, 1994; Johnson and Nye, 1979: 237).
- 1975: SLC approves Arco drilling proposal. The process, which formerly took only months, and resulted in SLC staff writing a report for the Commission's approval, now takes at least one year and requires a separate Coastal Commission permit. RCC approves Arco's plans, but a GOO appeal results in SCC's denial on October 15 (Johnson and Nye, 1979: 218).
- 1975: Countywide referendum by the Stop Exxon Committee to reject Supervisors' rezoning of Las Flores Canyon is narrowly defeated by 831 votes, largely due to opposition from north county voters (Graves and Simon, 1980: 194; Johnson and Nye, 1979: 237).
- 1975: OEQ submits proposal for consolidated onshore treatment facilities so that Arco need not expand its Ellwood facility. SCC denies Arco's Platform Holly permit to prod the company toward considering consolidation; meanwhile preparation of Ellwood EIR proceeds (Graves and Simon, 1980: 231, 233).
- 1976: *State updates the California Oil Spill Disaster Contingency Plan , creating a State Operating Authority and designating the Department of Fish and Game as the lead agency on overseeing spill cleanup (Johnson and Nye, 1979: 218).*
- 1976: Exxon's Platform Hondo is installed in the Santa Ynez Unit of the Santa Barbara Channel (Sollen, 1998).
- 1976: SCC denies Exxon's Las Flores onshore facility permit, prompting the company to build an offshore storage and treatment facility (Johnson and Nye, 1979: 237).
- 1976: Court ruling overturns SCC, approves permit for Arco's expanded drilling at Platform Holly (Johnson and Nye, 1979: 218).
- 1976: At behest of county OEQ and Supervisors, Joint Industry/Government Pipeline Working Group is established to examine pipeline and onshore facility consolidation, to the consternation of local environmentalists. Industry participants include Arco, Burmah, Chevron and a noncommittal Exxon (Graves and Simon, 1980: 238).
- 1977: Union installs Platform C in Dos Cuadras Field of the Santa Barbara Channel, after an 8-year delay (Sollen, 1998).
- 1977: The California Coastal Commission selects Point Conception as the best site for a Liquid Natural Gas (LNG) port.
- 1977: Oil storage tanks leak at Coal Oil Point in January (Sollen, 1977).
- 1977: County Supervisors approve Arco's Ellwood expansion with significant air quality conditions. Exxon agrees to terms, and 4 months later RCC grants Arco its permit (Graves and Simon, 1980: 239-240).
- 1977: Chevron applies for permit to build subsea pipelines from Platform Grace (in federal waters) to operating Platform Hope (in state waters) and expand its Carpinteria operations (Graves and Simon, 1980: 319).
- 1978: Pacific Offshore Pipeline Company (POPCO), a Pacific Lighting Corporation subsidiary, takes over construction of Exxon's proposed Las Flores Canyon gas treatment plant and the pipeline to bring gas onshore from Exxon's Platform Hondo (Santa Barbara County Energy Division Status Report, June 1996).

- 1978: *Outer Continental Shelf Lands Act amendments are passed by US Congress, requiring OCS developers to meet county air emissions standards (Graves and Simon, 1980: 72).*

- 1978: US Department of Interior announces two OCS lease sales: Lease Sale 48 (with tracts in the Santa Barbara Channel), to take place in June 1979, and Lease Sale 53 (with tracts located north of Point Arguello), to take place in May 1981 (Sollen, 1978).

- 1979: Platforms Grace (Chevron) and Henry (Sun) are installed in Santa Clara Unit and Carpinteria Field, respectively, of the Santa Barbara Channel (Division of Oil & Gas, 1980).

- 1979: Chevron agrees to implement county's Carpinteria-to-Rincon pipeline proposal. County approves pipeline permit, requires Santa Clara Unit EIR to include pipeline issues (Graves and Simon, 1980: 329-330).

- 1979: In Lease Sale 48, oil companies bid $527.8 million for 55 OCS lease tracts in the Santa Barbara Channel.

- 1979: County Planning Commission approves Chevron's expanded Santa Clara Unit project, bringing a two-year EIR/permitting process to an end (Graves and Simon, 1980: 334).

- 1979: Getty acquires Reserve Oil & Gas for $631 million. At one time active in all three tri-counties, particularly in Oxnard field, at the time of the deal, Reserve's local assets include 29 wells in Orcutt field (*Oil & Gas Journal*, October 22, 1979; Division of Oil & Gas Index of Well Records).

- 1980: Congress establishes Channel Islands National Park and Santa Barbara Channel Islands Marine Sanctuary extending seaward six miles from the islands.

- 1980: The Ellwood processing plant is expanded.

- 1980: A gas processing plant is proposed for Las Flores Canyon.

- 1980: Chevron opens its pipeline to Ventura (Sollen, 1980).

- 1980: The completion of Chevron's well "Chevron-Sulpetro Sisquoc Ranch" No. 1 discovers Sisquoc Ranch field (Division of Oil & Gas, 1981).

- 1981: In Lease Sale 53, oil companies bid $2.088 billion for 81 OCS lease tracts off Santa Barbara and San Luis Obispo Counties. Fifty-four tracts are awarded, including 23 to Chevron/Phillips for $1.25 billion. A Federal Judge blocks leases on 29 tracts off San Luis Obispo County in July, in response to a suit filed by the State and GOO charging that the sales violated the Coastal Zone Management Act (Sollen, 1998; 1981b; Division of Oil & Gas, 1982).

- 1981: Texaco installs Platform Habitat in Pitas Point Offshore (gas) field some 10 miles west of Carpinteria Offshore field (Division of Oil & Gas, 1982).

- 1981: Husky Oil and Union Oil apply for permits to expand operations in the Guadalupe Dunes area.

- 1981: Exxon moors its floating processing plant in the Santa Barbara Channel (as part of its Santa Ynez Unit project) to avoid Coastal Commission restrictions on the Las Flores Canyon site. On April 1, 1981, Exxon begins producing oil from Platform Hondo. By year's end, 17 wells produce an average of 21,000 barrels per day (Division of Oil & Gas, 1982; Thermos, 1981).

- 1981: President Reagan calls for a review of the ban on Channel Islands drilling (Sollen, 1981a).

- 1982: In Lease Sale 68, oil companies bid $117.9 million for 35 OCS lease tracts from the Santa Barbara Channel to the Mexican border (Sollen, 1998).
- 1982: Arco caps oil and gas seepage area off Coal Oil Point with 2 giant steel pyramids as part of an emissions trade-off with the county's Air Resources Board and the state (1.2 parts of hydrocarbon removed for every part emitted) (Oltman, 1982).
- 1982: Chevron exploration confirms the huge size of its Point Arguello area find made in 1981 from OCS Parcel 0316 in Santa Maria Basin Offshore field. It is the largest new oil and gas discovery in the United States in more than 10 years. The field is initially developed from three platforms, two operated by Chevron (Hermosa and Hidalgo) and one by Texaco (Harvest) (*Santa Barbara News-Press*, October 21, 1982; Division of Oil & Gas, 1982, 1985).
- 1982: County Planning Commission approves Guadalupe Dunes oil program.
- 1983: Santa Barbara County creates Resource Management Department's Energy Division to deal with explosive growth of oil development.
- 1983: Las Flores Canyon gas plant is opened. In December the plant jeopardizes 50,000 North County lives when deadly hydrogen sulfide entered the gas supplied to residences (Harper and Steiger, 1983).
- 1983: Union Oil reorganizes to thwart takeover threats. The firm reincorporates in Delaware, creating Unocal as a holding company (*The Economist*, April 13, 1985).
- 1983: Unocal's dehydration facility (to separate crude and water from Platform Irene, which will produce for Unocal and 5 other companies) is sped through the county's permitting process, to be eventually located 2 miles north of Lompoc (Kronman, 1986).
- 1983: Unocal confirms its discovery of the Point Pedernales field, an offshore extension of the Santa Maria basin. Permitting process begins for Platform Irene. Arco is also active in the field (Pederson 1990: 230; Division of Oil & Gas, 1985).
- 1983: The completion of Coastal Oil & Gas Corporation's well "Hunter-Careaga" No. 1 discovers the San Antonio Creek area of Careaga Canyon field (Division of Oil & Gas, 1984).
- 1983: Getty Oil proposes a Gaviota oil facility and a Gaviota-to-Bakersfield pipeline (Sollen, 1983a).
- 1983: *Congress approves a buffer zone 20 miles along the Southern California coast, along with a one-year drilling ban (Santa Barbara News-Press,* October 21, 1983).
- 1983: After US Supreme Court Justice Rehnquist lifts the ban on Lease Sale 73, oil companies bid $16.0 million for 8 OCS lease tracts in the Santa Maria Basin (Sollen, 1998).
- 1984: EIR is released for Exxon's expansion project (which includes construction of an onshore processing facility and storage tanks). County is projected to lose $1.5 million at peak of Exxon operations. One-third of Santa Barbara residents are found to rely in whole or in part on the tourism industry for their livelihood (Sollen, 1984).
- 1984: *The National Fishing Enhancement Act sets the guidelines for states to establish well-developed, well-organized artificial rigs-to-reef programs, encourages the development of artificial reefs, and defends against related liabilities at different stages of abandonment.*
- 1984: County board of supervisors unanimously approve county policies requiring offshore operators to transport oil by pipeline (*Santa Barbara News-Press*, April 17, 1984).

- 1984: *Chevron acquires Gulf Corporation for $13.2 billion. To date both firms remain major firms, in the state and in the tri-counties, operating in many fields in Santa Barbara, Ventura, and San Luis Obispo Counties (Oil & Gas Journal, November 12, 1984).*
- 1984: *Texaco acquires Getty Oil for $10.1 billion (Oil & Gas Journal, July 16, 1984; November 12, 1984).*
- 1984: In Lease Sale 80, oil companies bid $62.1 million for 25 OCS lease tracts in the Santa Barbara Channel (Sollen, 1998).
- 1984: The completion of Unocal's well "Jesus Maria" No. A83-19 discovers the Northwest area of Lompoc field (Division of Oil & Gas, 1985).
- 1985: Three offshore platforms are installed in Santa Maria Basin: Harvest (Texaco) and Hermosa (Chevron) in the Point Arguello field and Irene (Unocal) in the Point Pedernales field. Texaco begins development drilling from Platform Harvest in November 1986. Unocal begins development drilling from Platform Irene in April 1986 (Division of Oil & Gas, 1985, 1987).
- 1985: *Interior Department announces plans to slow leasing of OCS tracts (Santa Barbara News-Press,* March 21, 1985).
- 1985: County Planners approve Chevron's (formerly Getty's) Gaviota onshore processing facility (*Santa Barbara News and Review*, August 1, 1985).
- 1985: Sierra Club sues Chevron in Santa Barbara Superior Court to block Gaviota oil and gas plant (*Santa Barbara News-Press*, August 11, 1985).
- 1985: County voters reject Measure A (which would subject all new onshore industrialization to public vote) but approve a second advisory measure which mandates that the County Board of Supervisors consolidate all onshore industrialization to two sites: the Las Flores Canyon processing facility and Chevron's proposed Gaviota processing facility.
- 1986: County board of supervisors approve Exxon Gaviota offshore project.
- 1986: SCC approves Chevron's proposed Platform Gail.
- 1986: *California's Well Conservation Program is established, allowing the state's Division of Oil, Gas, and Geothermal Resources to order the reabandonment of any previously abandoned well when any future construction near or over the proximity of the well could be hazardous; the owners of the property on which the well is placed is responsible for reabandonment costs.*
- 1986: County board of supervisors approves Unocal's Point Pedernales Oil and Gas Development Project (Santa Barbara County Energy Division Status Report, August 1996).
- 1986: Construction begins on Unocal's dehydration facility 2 miles north of Lompoc. Facing air emission hurdles during county permitting process, Unocal agrees to offset air emissions in OCS waters in return (Kronman, 1986).
- 1986: The spot price of oil plummets in eight months from $22 a barrel to $6, resulting in massive oil well closings in Santa Maria Valley. Employment declines hurt small businesses and local independent producers the most. Unocal shuts down production of 200 heavy crude wells in Santa Maria Valley and Cat Canyon, including its "insect" pump next to Santa Maria K-Mart. Texaco shuts down 100 wells; Dominion Oil Company shuts down 30 (Mann, 1987).

- 1987: Chevron installs Platform Hidalgo in the Point Arguello Offshore field. In the same field Chevron begins development drilling from Platform Hermosa in January (Division of Oil & Gas, 1987).
- 1987: Celeron completes pipeline connecting Las Flores Canyon facility to Texas refineries (Cartiere, 1987).
- 1987: Price of heavy crude oil surges again, spurring Unocal to reactivate 60 of its 200 wells and Texaco to reactivate 30 of its 100 wells in the Santa Maria Valley and Cat Canyon. The smaller Dominion Oil Company only reactivates a "fraction" of its approximately 30 wells (Mann, 1987).
- 1987: The California legislature issues Santa Barbara County a block grant of $5 million from revenue generated by Section 8(g) of the federal Outer Continental Shelf Lands Act (Santa Barbara County Energy Division Status Report, September 1996).
- 1987: Santa Barbara and Ventura Counties sue SCC over approval of Platform Julius in March (Dalton, 1987a).
- 1987: Shell Oil Company, a huge tri-county presence for much of the century, including 998 wells in Ventura field alone, reorganizes its California operations under Shell Western Exploration & Production (SWEPI) (Division of Oil & Gas Index of Well Records).
- 1987: The State Lands Commission rejects Arco's Coal Oil Point project (Dalton, 1987b).
- 1987: County and Exxon reach accord over the Santa Ynez Unit project after Exxon compromises on its air pollution stance (Dalton, 1987c).
- 1987: PacBaroness wreck spills oil off Point Conception, the biggest spill since 1969 (Hauser, 1987).
- 1988: SLC approves Exxon Gaviota project after a seven-year delay (Dalton, 1988).
- 1988: *Federal one-year OCS moratorium announced (Mecoy, 1988).*
- 1989: Exxon begins to installs Platform Heritage in Pescado OCS field and Platform Harmony in Hondo OCS field. Platform Harmony stands in 1,200 feet of water, a West Coast record (Division of Oil & Gas, 1990, 1991).
- 1989: OCS Lease Sale 95 of 5 million acres is opposed by several Santa Barbara organizations but is held up by a task force investigation (*Santa Barbara Independent*, July 6, 1989).
- 1989: Unocal joins with other oil companies in routing tankers outside the Santa Barbara Channel (Cannon, 1989).
- 1989: SCC denies Chevron's tankering plan (Weyermann, 1989).
- 1989: SLC declares oil sanctuary from Newport Beach to northern Santa Barbara County, barring development of all unleased tidelands (Joseph, 1989).
- 1990: County Board of Supervisors establishes Shoreline Inventory Program to inventory sub-tidal, intertidal and wetland resources of the county's mainland coast in order to improve oil spill response and habitat restoration efforts. The program is initially funded by MMS and 5 offshore operators (Chevron, Exxon, Texaco, Unocal, and Clean Seas). San Luis Obispo and Orange Counties are later added to the program (Santa Barbara County Energy Division Status Report, September 1996).
- 1990: British Petroleum agrees to route tankers outside the Santa Barbara Channel, in the wake of an oil spill at Huntington Beach (Estrada, 1990).

- 1990: *Interior Department announces lease policy shift to increase coastal exploration and drilling, in April (Shabecoff, 1990).*
- 1990: Stream Energy Corporation of Oklahoma City acquires Arco's South Cuyama assets (Division of Oil & Gas Index of Well Records).
- 1991: Based on projections of declining offshore oil and gas production from its Point Pedernales Project, Unocal decides to abandon its Battles Gas Plant instead of complying with required safety upgrades and proposes a new, smaller gas processing facility (which it will never build) next to its Lompoc HS&P Facility (Santa Barbara County Energy Division Status Report, August 1996).
- 1991: Hallador Petroleum Company of Denver acquires Arco's former South Cuyama wells from Stream Energy and becomes the operator of the field's remaining producing wells (92 as of December 31, 1995, of which Hallador has a working interest in 80) (Hallador 10-K for fiscal year 1995).
- 1991: Chevron sues Santa Barbara County over tankering plan denial (*Santa Barbara News-Press*, May 11, 1991).
- 1991: *Federal OCS drilling ban is extended by one year (Santa Barbara News-Press, June 20, 1991).*
- 1992: *President Bush extends a one-year OCS oil-drilling ban (Santa Barbara News-Press, January 24, 1992).*
- 1992: *Department of Interior announces that Channel OCS Lease Sales are to be shelved for five years (Parker, 1992).*
- 1992: Vintage Petroleum of Houston acquires all of Shell's Cat Canyon and Santa Maria Valley wells (Division of Oil & Gas Index of Well Records).
- 1992: Chevron tankering is allowed (Walker-Klein, 1992).
- 1992: Oil and gas production ceases from Platforms Hazel and Hilda in Summerland offshore field and from Platforms Heidi and Hope in Carpinteria Offshore field, the latter pending plugging and abandonment operations (Division of Oil & Gas, 1992).
- 1992: Unocal subsidiary California Pipeline Company (UNOCAP) open its Sisquoc Pipeline. During its first rainy season, Santa Barbara County closes adjacent Garey Bridge, and the pipeline is shut down. To resume operations, Unocap relocates 1,100 feet of Sisquoc Pipeline from bridge to beneath Sisquoc River (Santa Barbara County Energy Division Status Report, August 1996).
- 1993: The State Lands Commission approves oil tanker loading at Gaviota.
- 1993: Mobil Oil takes over Arco's Platform Holly and its South Ellwood Offshore field development (Green, 1993a).
- 1993: Mobil proposes to remove Platform Holly in exchange for approval of the "Clearview" onshore slant-drilling project (Green, 1993b).
- 1993: The first tanker arrives to transport oil produced in the Point Arguello field (*Santa Barbara News-Press*, August 10, 1993).
- 1993: Chevron, Exxon, and others agree to use the All-American pipeline instead of tankers to transport oil (Green, 1993c).

- 1993: Saba Petroleum of Irvine acquires wells that produce 209,000 barrels of oil in 1995 from Unocal (Saba Petroleum 10-K for fiscal year, 1995).
- 1993: Mobil announces its plans to abandon oil piers near the Santa Barbara-Ventura County line.
- 1994: Point Conception (onshore) field is abandoned (Division of Oil & Gas, 1995.
- 1994: A 23-count civil complaint is filed against Unocal for diluent leak at Guadalupe Dunes (Finucane, 1994).
- 1994: Conoco sells its Santa Maria asphalt refinery to Saba Petroleum Company and agrees to remediate the site's existing soluble lead contamination. Saba forms the Santa Maria Refining Company, a wholly owned subsidiary, to operate the refinery. Conoco's proposed remediation technique will not remove the soluble lead from the soil but rather bind the contaminant to existing soils, potentially precluding future agricultural use of the site (Santa Barbara County Energy Division Status Reports, August and October 1996).
- 1994: Unocal sells to Torch Energy Advisors portions of its Point Pedernales Project: Platform Irene, the Lompoc HS&P Facility, connecting pipelines, and a power supply system (including the Surf Substation). In November, Torch forms the Torch Operating Company to operate these facilities (Santa Barbara County Energy Division Status Report, August 1996).
- 1995: For the first year in the post-1945 period, there were no exploratory wells drilled in the tri-county area (Division of Oil & Gas, 1996).
- 1995: Unocal begins to plug and abandon some 200 wells in the Santa Maria Unit of Santa Maria Valley field. By the end of the year, all but 12 are abandoned (Division of Oil & Gas, 1996, 1997).
- 1995: Shell Oil Company again reorganizes its California operations, this time as Cal Resources LLC, headquartered in Bakersfield (Division of Oil & Gas Index of Well Records).
- 1995: Vintage Petroleum of Houston, founded in 1983, acquires all of Texaco's interest in nine oil and seven gas fields in California for $26.7 million, including 66 Zaca wells (which Texaco acquired from Getty who acquired them from Tidewater) (Vintage Petroleum 10-K for fiscal year 1996; Division of Oil & Gas, 1996).
- 1995: Saba Petroleum acquires 75 Casmalia wells and 74 Santa Maria Valley wells from Unocal (Saba Petroleum 10-K for fiscal year 1995; Division of Oil & Gas Index, 1996).
- 1996: Atlantic Richfield plugs and abandons 20 of 22 wells directionally drilled from onshore sites into the offshore area of Ellwood field, retaining two idle wells in the field. The firm plans to construct a golf course on the land (Division of Oil & Gas, 1997).
- 1996: Having acquired most of Unocal's Point Pedernales Project two years earlier, Torch submits an application to Santa Barbara County for the construction of a gas plant which will deliver gas to Southern California Gas Company (Santa Barbara County Energy Division Status Report, August 1996).
- 1996: Mobil withdraws its Clearview application after UC Santa Barbara, landowner of proposed slant-drilling site, decides not to revise Mobil's existing lease because of incompatibility with the University's plans for new faculty housing.
- 1996: In two separate move Nuevo Energy Company agrees to buy Unocal's California upstream assets, which consisted of interests in 42 oil and gas fields (including some 20 in the tri-counties), for $481 million to Unocal and $31 million to Torch Energy Advisors. This

effectively ends Unocal's presence as a tri-county operator, the area's largest (*Oil & Gas Journal*, February 26, 1996).

- 1996: Removal begins of Platforms, Hope, Heidi, Hilda, and Hazel in Summerland and Carpinteria offshore fields (Division of Oil & Gas, 1997).
- 1996: Completing a 4-year reassessment of OCS reserves, MMS announces in that the Santa Barbara-Ventura Basin and Province hold the greatest potential for undiscovered and economically recoverable oil and gas reserves compared to other Pacific OCS basins or provinces (Santa Barbara County Energy Division Status Report, December 1996).

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List of Those Consulted or Interviewed

Persons are listed according to the county with which they are most knowledgeable (usually the county where they live or work). Many informants, however, provided useful information on other communities or counties with which they were familiar. Some informants wished to remain anonymous.

Santa Barbara County

Doug Anthony, Santa Barbara County Energy Division
Don Barthelmess, Director of the Santa Barbara City College Marine Diving Technology, Santa Barbara City College
Alex Benton, Benton Oil
Jim Bray, Unocal
Helen Christensen, United Way of the Central Coast
Bill Douros, Santa Barbara County Energy Division
Christine Doyle, Litton Guidance & Control Space Operations
Joanne Ferguson, Santa Barbara County United Way
Noel Ginest, Mobil Oil
David Griggs, Director/Curator at the Carpenteria Valley Historical Museum
Stephanie Grogan, Marian Hospital Foundation
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Raymond Huerta, Affirmative Action Coordinator, University of California Santa Barbara
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John Kramer, Pacific Operators Offshore
Bud Laurent, Supervisor, San Luis Obispo County Board of Supervisors
Joanne Minihan, Exxon
Janna Nichols, San Luis Obispo United Way
Cathy Rathbone, Cal Poly Foundation
Dan Tucker, Former Oil Field Operator

Non-local Informants

Betsy Bartscherer, Arco
Professor Robert Bea, University California Berkeley, Department of Engineering
John Bennett, Conoco
Susan Carpin, Amoco Foundation
Todd Crabtree, Berry Petroleum
Robert G. Davidson, Senior International Representative. International Union of Petroleum and Industrial Workers SIUNA, AFL-CIO
Bill R. McGoveran, Western Region Director, Oil, Chemical & Atomic Workers International Unin, AFL-CIO
Adrian Osivedo, Oryx Energy

James Wiseman, University of California at Berkeley, Graduate Researcher in the Department of Engineering, Marine Technology and Management Group

Twenty eight oil industry informants provided invaluable information regarding the industry today who will remain anonymous.

Appendix A

Data Tables and Sources

Note: All values are in real 1983 dollars

Table A.1: Adjusted Gross Personal Income

Year	SLO	SB	Ventura
1950	1.07E+08	3.60E+08	3.03E+08
1951	1.46E+08	4.12E+08	3.64E+08
1952	1.81E+08	4.57E+08	4.39E+08
1953	1.85E+08	4.86E+08	4.96E+08
1954	1.47E+08	4.43E+08	4.58E+08
1955	1.95E+08	5.44E+08	5.39E+08
1956	2.30E+08	7.16E+08	7.39E+08
1957	2.38E+08	8.43E+08	8.34E+08
1958	3.01E+08	8.47E+08	8.96E+08
1959	4.03E+08	1.08E+09	9.45E+08
1960	3.85E+08	1.21E+09	1.19E+09
1961	4.54E+08	1.35E+09	1.21E+09
1962	4.20E+08	1.49E+09	1.44E+09
1963	5.35E+08	1.75E+09	1.66E+09
1964	4.33E+08	1.58E+09	1.76E+09
1965	4.93E+08	1.79E+09	2.09E+09
1966	5.38E+08	1.96E+09	2.29E+09
1967	5.50E+08	1.86E+09	2.29E+09
1968	5.61E+08	1.97E+09	2.64E+09
1969	6.60E+08	1.95E+09	2.84E+09
1970	6.26E+08	1.81E+09	2.60E+09
1971	4.98E+08	2.13E+09	3.02E+09
1972	7.47E+08	2.23E+09	3.30E+09
1973	8.08E+08	2.33E+09	3.54E+09
1974	8.24E+08	2.29E+09	3.59E+09
1975	8.70E+08	2.33E+09	3.68E+09
1976	9.51E+08	2.45E+09	3.98E+09
1977	1.03E+09	2.58E+09	4.31E+09
1978	1.09E+09	2.70E+09	4.63E+09
1979	1.14E+09	2.76E+09	4.82E+09
1980	1.14E+09	2.85E+09	4.79E+09
1981	1.18E+09	2.90E+09	4.84E+09
1982	1.19E+09	2.93E+09	5.06E+09
1983	1.33E+09	3.10E+09	5.37E+09
1984	1.41E+09	3.31E+09	5.79E+09
1985	1.45E+09	3.48E+09	6.10E+09
1986	1.57E+09	4.39E+09	6.57E+09
1987	1.63E+09	3.73E+09	7.02E+09
1988	1.76E+09	3.82E+09	7.40E+09
1989	1.84E+09	3.97E+09	6.78E+09
1990	1.81E+09	4.12E+09	6.74E+09
1991	1.77E+09	3.87E+09	6.46E+09
1992	1.70E+09	3.75E+09	6.29E+09
1993	1.77E+09	3.15E+09	7.32E+09

Table A.2: Personal Income

Year	SLO	SB	Ventura
1969	9.52E+08	3.18E+09	4.10E+09
1970	1.01E+09	3.21E+09	4.12E+09
1971	1.07E+09	3.28E+09	4.33E+09
1972	1.16E+09	3.47E+09	4.72E+09
1973	1.24E+09	3.64E+09	5.07E+09
1974	1.30E+09	3.61E+09	5.22E+09
1975	1.34E+09	3.63E+09	5.41E+09
1976	1.47E+09	3.86E+09	5.77E+09
1977	1.55E+09	4.00E+09	6.26E+09
1978	1.72E+09	4.29E+09	6.92E+09
1979	1.79E+09	4.38E+09	7.09E+09
1980	1.79E+09	4.41E+09	7.28E+09
1981	1.81E+09	4.52E+09	7.48E+09
1982	1.83E+09	4.59E+09	7.63E+09
1983	2.14E+09	4.85E+09	8.02E+09
1984	2.26E+09	5.20E+09	8.57E+09
1985	2.35E+09	5.47E+09	9.04E+09
1986	2.51E+09	5.73E+09	9.70E+09
1987	2.62E+09	5.84E+09	1.02E+10
1988	2.77E+09	6.07E+09	1.08E+10
1989	2.92E+09	6.21E+09	1.11E+10
1990	2.93E+09	6.30E+09	1.12E+10
1991	2.87E+09	6.33E+09	1.10E+10
1992	2.93E+09	6.41E+09	1.10E+10
1993	2.92E+09	6.36E+09	1.11E+10

Table A.3: Retail Sales

Year	SLO	SB	Ventura
1950	1.84E+08	4.23E+08	3.89E+08
1951	2.14E+08	4.72E+08	4.15E+08
1952	2.38E+08	4.70E+08	4.33E+08
1953	2.67E+08	4.85E+08	4.88E+08
1954	2.14E+08	4.41E+08	4.97E+08
1955	2.14E+08	4.77E+08	5.38E+08
1956	2.31E+08	5.32E+08	6.07E+08
1957	2.41E+08	5.66E+08	6.33E+08
1958	2.50E+08	5.97E+08	6.27E+08
1959	3.07E+08	7.53E+08	6.91E+08
1960	3.18E+08	8.34E+08	7.32E+08
1961	3.12E+08	8.55E+08	7.69E+08
1962	3.31E+08	9.57E+08	8.65E+08
1963	3.44E+08	1.05E+09	9.62E+08
1964	3.51E+08	1.06E+09	1.11E+09
1965	3.62E+08	1.08E+09	1.20E+09
1966	3.69E+08	1.13E+09	1.20E+09
1967	3.55E+08	1.17E+09	1.20E+09
1968	3.84E+08	1.25E+09	1.32E+09
1969	4.09E+08	1.31E+09	1.51E+09
1970	4.20E+08	1.28E+09	1.60E+09
1971	4.53E+08	1.27E+09	1.63E+09
1972	5.13E+08	1.36E+09	1.77E+09
1973	6.55E+08	1.57E+09	2.03E+09
1974	6.40E+08	1.57E+09	2.02E+09
1975	6.51E+08	1.55E+09	2.06E+09
1976	7.76E+08	1.65E+09	2.25E+09
1977	8.13E+08	1.78E+09	2.43E+09
1978	9.04E+08	1.89E+09	2.68E+09
1979	9.04E+08	1.97E+09	2.98E+09
1980	9.02E+08	2.00E+09	3.00E+09
1981	8.94E+08	1.99E+09	2.96E+09
1982	8.87E+08	1.99E+09	2.93E+09
1983	9.07E+08	1.95E+09	2.86E+09
1984	1.06E+09	2.18E+09	3.34E+09
1985	1.14E+09	2.26E+09	3.52E+09
1986	1.17E+09	2.29E+09	3.70E+09
1987	1.26E+09	2.31E+09	3.97E+09
1988	1.26E+09	2.30E+09	4.16E+09
1989	1.28E+09	2.36E+09	4.32E+09
1990	1.39E+09	2.46E+09	4.47E+09
1991	1.27E+09	2.35E+09	4.06E+09
1992	1.19E+09	2.22E+09	3.98E+09
1993	1.18E+09	2.14E+09	3.84E+09

Table A.4: Total Employment

Year	SB	Ventura
1957	32600	42400
1958	35500	44600
1959	41400	46800
1960	46600	47400
1961	52400	48900
1962	58700	53000
1963	62300	60400
1964	63400	67300
1965	65400	71000
1966	70700	75400
1967	73200	78700
1968	75900	84300
1969	80300	91000
1970	81300	93000
1971	81600	95200
1972	84400	100800
1973	91300	105600
1974	94300	110500
1975	95700	114100
1976	100400	117800
1977	106100	128300
1978	113100	138700
1979	118600	147200
1980	120600	153000
1981	123100	158000
1982	123500	161200
1983	125700	167000
1984	134200	177800
1985	139200	186400
1986	143700	193700
1987	143900	205500
1988	144400	213300
1989	145500	221600
1990	148300	230300
1991	149700	230400
1992	144700	226600
1993	143400	227000
1987	143900	205500
1988	144400	213300
1989	145500	221600
1990	148300	230300
1991	149700	230400
1992	144700	226600
1993	143400	227000

Table A.5: Total Oil Production

Year	SLO	SB	Ventura
1950	3510316	29683931	33647787
1951	2723491	24055230	34046481
1952	3739226	38627994	37159509
1953	3367287	37048015	42188593
1954	3252870	35259329	47583526
1955	3173455	33220500	48536918
1956	2809019	30464208	43905759
1957	2331333	27894540	46529745
1958	1937386	24760113	46569697
1959	2285390	23189028	43613041
1960	1505444	24091683	40983131
1961	1361773	23720144	37946309
1962	1259915	25487729	33705091
1963	1218518	26149184	30646643
1964	1166640	26971894	27785564
1965	1123221	26682111	25968923
1966	1204642	26443506	24538817
1967	1489901	27221830	22721049
1968	1927910	26641472	23568157
1969	2082603	31654923	31568276
1970	1906348	45214138	48660069
1971	2050671	50128750	54682624
1972	1845406	40760977	46284648
1973	1764542	37951648	42411353
1974	1658981	35238787	39905008
1975	1540409	32492279	37916392
1976	1373127	30664203	35696618
1977	1840000	28322013	33118013
1978	1707646	27254950	30623847
1979	1729026	27450447	29097137
1980	1833246	25759574	27467714
1981	1929290	32975857	34270662
1982	1936838	39298697	40715812
1983	1654405	37790718	39244859
1984	1771007	37033578	38048380
1985	1658837	35151558	36570549
1986	1409567	30945955	34070553
1987	1125709	32678449	36214911
1988	1107273	33097786	37348812
1989	1012744	30548864	36377085
1990	681147	26883058	32702824
1991	767226	30091343	35527467
1992	811592	40834460	46390248
1993	759235	48090219	53656032

Note: Total oil production includes both and federal and state oil production. Additionally, both Ventura and Santa Barbara have the Dos Cuadras and Carpenteria pools incorporated into their total oil production.

Table A.6: Adjusted gross income and actual income in 1983 dollars

	Adjusted Gross Income						Actual Income					
Year	SLO	SB	Ventura	Monterey	S. Cruz	Sonoma	Slo	SB	Ventura	Monterey	S. Cruz	Sonoma
1950	1.07E+08	3.6E+08	3.03E+08	3.22E+08	1.75E+08	2.75E+08	N/A	N/A	N/A	N/A	N/A	N/A
1951	1.46E+08	4.12E+08	3.64E+08	3.74E+08	1.93E+08	2.68E+08	N/A	N/A	N/A	N/A	N/A	N/A
1952	1.81E+08	4.57E+08	4.39E+08	4.47E+08	2.06E+08	3.67E+08	N/A	N/A	N/A	N/A	N/A	N/A
1953	1.85E+08	4.86E+08	4.96E+08	4.75E+08	2.27E+08	4.09E+08	N/A	N/A	N/A	N/A	N/A	N/A
1954	1.47E+08	4.43E+08	4.58E+08	4.27E+08	2.7E+08	4.54E+08	N/A	N/A	N/A	N/A	N/A	N/A
1955	1.95E+08	5.44E+08	5.39E+08	5.12E+08	2.92E+08	5.14E+08	N/A	N/A	N/A	N/A	N/A	N/A
1956	2.3E+08	7.16E+08	7.39E+08	6.52E+08	3.46E+08	5.76E+08	N/A	N/A	N/A	N/A	N/A	N/A
1957	2.38E+08	8.43E+08	8.34E+08	7.02E+08	3.32E+08	6.51E+08	N/A	N/A	N/A	N/A	N/A	N/A
1958	3.01E+08	8.47E+08	8.96E+08	7.25E+08	3.67E+08	6.29E+08	N/A	N/A	N/A	N/A	N/A	N/A
1959	4.03E+08	1.08E+09	9.45E+08	8.7E+08	4.6E+08	7.02E+08	N/A	N/A	N/A	N/A	N/A	N/A
1960	3.85E+08	1.21E+09	1.19E+09	8.67E+08	4.69E+08	7.89E+08	N/A	N/A	N/A	N/A	N/A	N/A
1961	4.54E+08	1.35E+09	1.21E+09	1.02E+09	5.61E+08	8.58E+08	N/A	N/A	N/A	N/A	N/A	N/A
1962	4.2E+08	1.49E+09	1.44E+09	1.06E+09	5.69E+08	8.53E+08	N/A	N/A	N/A	N/A	N/A	N/A
1963	5.35E+08	1.75E+09	1.66E+09	1.11E+09	5.95E+08	1.06E+09	N/A	N/A	N/A	N/A	N/A	N/A
1964	4.33E+08	1.58E+09	1.76E+09	1.28E+09	7.57E+08	1.15E+09	N/A	N/A	N/A	N/A	N/A	N/A
1965	4.93E+08	1.79E+09	2.09E+09	1.3E+09	7.39E+08	1.23E+09	N/A	N/A	N/A	N/A	N/A	N/A
1966	5.38E+08	1.96E+09	2.29E+09	1.45E+09	6.71E+08	1.21E+09	N/A	N/A	N/A	N/A	N/A	N/A
1967	5.5E+08	1.86E+09	2.29E+09	1.55E+09	8.88E+08	1.29E+09	N/A	N/A	N/A	N/A	N/A	N/A
1968	5.61E+08	1.97E+09	2.64E+09	1.55E+09	9.39E+08	1.5E+09	N/A	N/A	N/A	N/A	N/A	N/A
1969	6.6E+08	1.95E+09	2.84E+09	1.46E+09	8.55E+08	1.45E+09	9.52E+08	3.18E+09	4.1E+09	3.02E+09	1.35E+09	2.29E+09
1970	6.26E+08	1.81E+09	2.6E+09	1.54E+09	9.02E+08	1.58E+09	1.01E+09	3.21E+09	4.12E+09	3.03E+09	1.4E+09	2.39E+09
1971	4.98E+08	2.13E+09	3.02E+09	1.95E+09	1.09E+09	1.91E+09	1.07E+09	3.28E+09	4.33E+09	3.24E+09	1.49E+09	2.54E+09
1972	7.47E+08	2.23E+09	3.3E+09	1.77E+09	1.12E+09	1.85E+09	1.16E+09	3.47E+09	4.72E+09	3.41E+09	1.63E+09	2.77E+09
1973	8.08E+08	2.33E+09	3.54E+09	1.42E+09	1.18E+09	1.99E+09	1.24E+09	3.64E+09	5.07E+09	3.61E+09	1.79E+09	2.98E+09
1974	8.24E+08	2.29E+09	3.59E+09	1.89E+09	1.22E+09	1.98E+09	1.3E+09	3.61E+09	5.22E+09	3.65E+09	1.83E+09	3.05E+09
1975	8.7E+08	2.33E+09	3.68E+09	1.91E+09	1.25E+09	2E+09	1.34E+09	3.63E+09	5.41E+09	3.56E+09	1.89E+09	3.16E+09

Table A.6, cont.

	Adjusted Gross Income						Actual Income					
Year	SLO	SB	Ventura	Monterey	S. Cruz	Sonoma	Slo	SB	Ventura	Monterey	S. Cruz	Sonoma
1976	9.51E+08	2.45E+09	3.98E+09	1.99E+09	1.38E+09	2.19E+09	1.47E+09	3.86E+09	5.77E+09	3.59E+09	2.07E+09	3.45E+09
1977	1.03E+09	2.58E+09	4.31E+09	2.09E+09	1.5E+09	2.37E+09	1.55E+09	4E+09	6.26E+09	3.72E+09	2.24E+09	3.68E+09
1978	1.09E+09	2.7E+09	4.63E+09	2.17E+09	1.58E+09	2.55E+09	1.72E+09	4.29E+09	6.92E+09	4E+09	2.43E+09	4.02E+09
1979	1.14E+09	2.76E+09	4.82E+09	2.21E+09	1.6E+09	2.61E+09	1.79E+09	4.38E+09	7.09E+09	3.93E+09	2.51E+09	4.18E+09
1980	1.14E+09	2.85E+09	4.79E+09	2.14E+09	1.61E+09	2.64E+09	1.79E+09	4.41E+09	7.28E+09	3.92E+09	2.57E+09	4.21E+09
1981	1.18E+09	2.9E+09	4.84E+09	2.11E+09	1.6E+09	2.64E+09	1.81E+09	4.52E+09	7.48E+09	4.04E+09	2.63E+09	4.34E+09
1982	1.19E+09	2.93E+09	5.06E+09	2.23E+09	1.66E+09	2.72E+09	1.83E+09	4.59E+09	7.63E+09	4.02E+09	2.64E+09	4.34E+09
1983	1.33E+09	3.1E+09	5.37E+09	2.35E+09	1.78E+09	2.89E+09	2.14E+09	4.85E+09	8.02E+09	4.42E+09	2.88E+09	4.61E+09
1984	1.41E+09	3.31E+09	5.79E+09	2.44E+09	1.93E+09	3.17E+09	2.26E+09	5.2E+09	8.57E+09	4.49E+09	3.06E+09	4.97E+09
1985	1.45E+09	3.48E+09	6.1E+09	2.5E+09	2.01E+09	3.33E+09	2.35E+09	5.47E+09	9.04E+09	4.63E+09	3.15E+09	5.26E+09
1986	1.57E+09	4.39E+09	6.57E+09	2.64E+09	2.26E+09	3.67E+09	2.51E+09	5.73E+09	9.7E+09	4.92E+09	3.31E+09	5.58E+09
1987	1.63E+09	3.73E+09	7.02E+09	2.76E+09	2.3E+09	3.81E+09	2.62E+09	5.84E+09	1.02E+10	5.08E+09	3.43E+09	5.78E+09
1988	1.76E+09	3.82E+09	7.4E+09	2.87E+09	2.42E+09	3.69E+09	2.77E+09	6.07E+09	1.08E+10	5.17E+09	3.6E+09	6.08E+09
1989	1.84E+09	3.97E+09	6.78E+09	2.97E+09	2.44E+09	4.32E+09	2.92E+09	6.21E+09	1.11E+10	5.1E+09	3.5E+09	6.48E+09
1990	1.81E+09	4.12E+09	6.74E+09	3.16E+09	2.56E+09	4.52E+09	2.93E+09	6.3E+09	1.12E+10	5.32E+09	3.83E+09	6.64E+09
1991	1.77E+09	3.87E+09	6.46E+09	2.99E+09	2.51E+09	4.33E+09	2.87E+09	6.33E+09	1.1E+10	5.29E+09	3.76E+09	6.57E+09
1992	1.7E+09	3.75E+09	6.29E+09	2.99E+09	2.51E+09	4.3E+09	2.93E+09	6.41E+09	1.1E+10	5.57E+09	3.89E+09	6.68E+09
1993	1.77E+09	3.15E+09	7.32E+09	2.89E+09	1.86E+09	4.25E+09	2.92E+09	6.36E+09	1.11E+10	5.5E+09	3.89E+09	6.71E+09
Mean	8.48E+08	2.18E+09	3.4E+09	1.69E+09	1.19E+09	1.99E+09	1.97E+09	4.75E+09	7.73E+09	4.25E+09	2.67E+09	4.51E+09
St. Dev.	5.55E+08	1.16E+09	2.3E+09	8.49E+08	7.59E+08	1.31E+09	6.92E+08	1.14E+09	2.51E+09	8.04E+08	8.43E+08	1.49E+09

Table A.7: Oil Production in Barrels

Year	SLOOIL	SBOIL	VOIL	MONTOIL	SOIL	FOIL	TOTOIL
1950	3510316	29683931	33647787	188068	928	0	67031030
1951	2723491	24055230	34046481	2745052	1508	0	63571762
1952	3739226	38627994	37159509	8280661	1173	0	87808563
1953	3367287	37048015	42188593	11283710	796	0	93888401
1954	3252870	35259329	47583526	11172184	352	0	97268261
1955	3173455	33220500	48536918	10912221	280	0	95843374
1956	2809019	30464208	43905759	11732789	532	0	88912307
1957	2331333	27894540	46529745	11844658	389	0	88600665
1958	1937386	24760113	46569697	10864728	350	0	84132274
1959	2285390	23189028	43613041	10994734	0	0	80082193
1960	1505444	24091683	40983131	11526457	0	0	78106715
1961	1361773	23720144	37946309	11865239	0	0	74893465
1962	1259915	25487729	33705091	11230352	0	0	71683087
1963	1218518	26149184	30646643	10175212	0	0	68189557
1964	1166640	26971894	27785564	10233805	0	0	66157903
1965	1123221	26682111	25968923	12780016	0	0	66554271
1966	1204642	26443506	24538817	17494483	0	0	69681448
1967	1489901	27221830	22721049	18348534	0	0	69781314
1968	1927910	24565312	21491997	14276039	0	2076160	64337418
1969	2082603	21712190	21625543	10512050	0	9942733	65875119
1970	1906348	20178967	23624898	10407058	0	25035171	81152442
1971	2050671	19025069	23578943	10068373	0	31103681	85826737
1972	1845406	18198411	23722082	10952063	0	22562566	77280528
1973	1764542	19133622	23593327	12676504	0	18818026	75986021
1974	1658981	18454687	23120908	12963826	0	16784100	72982502
1975	1540409	17057772	22481885	13928176	0	15434507	70442749
1976	1373127	16686767	21719182	12865126	500	13977436	66622138
1977	1840000	16064000	20860000	13245000	0	12258013	64267013
1978	1707646	15275276	18644173	12680724	0	11979674	60287493
1979	1729026	16479434	18126124	10951640	0	10971013	58257237
1980	1833246	15750101	17458241	10836581	0	10117634	55995803
1981	1929290	15913543	17208348	10279319	0	17624286	62954786
1982	1936838	16240263	17657378	9451560	0	25253696	70539735
1983	1654405	15771239	17225380	8113240	0	26634762	69399026
1984	1771007	16183924	17198726	7747294	116	25317096	68218163
1985	1658837	15443190	16862181	8151872	12	23249972	65366064
1986	1409567	12772894	15897492	6915635	0	21732321	58727909
1987	1125709	11634331	15170793	4972299	0	24441071	57344203
1988	1107273	10747061	14998087	4633312	0	25511474	56997207
1989	1012744	8372347	14200568	3778043	0	27453308	54817010
1990	681147	7974758	13794524	4127637	0	24578059	51156125
1991	767226	7562208	12998332	3753781	0	27041499	52123046
1992	811592	6507689	12063477	4341698	0	38329637	62054093
1993	759235	5828585	11394398	4721674	0	46860949	69564841
Mean	1803287	20466014	26018036	9795987	157.6364	12615656	70699136
St. Dev.	753090.7	8161634	11133113	3826698	343.5172	12852879	11762887

Table A.8: Gas Production in Thousands of Cubic Feet

Year	SLOGAS	SBGAS	VGAS	MONTGAS	SGAS	FGAS	TOTGAS
1950	259930	8054720	36488240	3710	0	0	44806600
1951	4120	8942430	34836940	172817	0	0	43956307
1952	516370	10560990	42175630	614649	0	0	53867639
1953	324400	6591920	51137180	1734501	4107	0	59792108
1954	307440	7021950	56183330	5045917	0	0	68558637
1955	237360	5507670	58325430	6135603	17400	0	70223463
1956	310570	4890490	56537050	5577331	136004	0	67451445
1957	1442386	19406472	96810331	4229296	99268	0	1.22E+08
1958	1377212	20305284	95748307	3314562	81666	0	1.21E+08
1959	1237713	18755179	91981779	3073803	59940	0	1.15E+08
1960	1058167	20178789	87289528	3537548	77691	0	1.12E+08
1961	967998	24775835	85809573	4536065	155007	0	1.16E+08
1962	791440	33459935	76385641	5646530	157393	0	1.16E+08
1963	645580	53385412	65289837	4608559	67673	0	1.24E+08
1964	703720	70196956	58912645	3941164	45477	0	1.34E+08
1965	713971	81675914	52567889	3022955	39888	0	1.38E+08
1966	586793	89575617	46263182	3230154	32776	0	1.4E+08
1967	571760	99425269	40501485	3124431	28358	0	1.44E+08
1968	798714	94365103	36599845	2968879	24939	1237180	1.36E+08
1969	1146134	78326235	31055657	2336509	22219	6016485	1.19E+08
1970	1273608	62643166	33304238	1480884	17466	13757148	1.12E+08
1971	1374866	48371245	31513403	1229149	19379	17853055	1E+08
1972	1338968	52498615	28671146	960162	4044	12546915	96019850
1973	1243068	46427807	27155005	492726	0	9157714	84476320
1974	1129600	29880072	25561815	270872	0	7234937	64077296
1975	1061897	21668191	22002821	160039	0	5978959	50871907
1976	862952	21752558	21534943	10599	1400	5533258	49695710
1977	997000	12875000	21070000	0	0	5366181	40308181
1978	650406	13840048	19047182	0	27745	5193985	38759366
1979	519171	14177201	19042908	0	6446	5430689	39176415
1980	271996	14094119	19002564	2664	14503	5964151	39349997
1981	525046	15566111	18127088	0	8550	9225848	43452643
1982	748772	15572804	19685702	0	4414	9539985	45551677
1983	772732	15056605	18943225	0	16714	15228643	50017919
1984	1145293	14249632	20130145	0	93602	36021364	71640036
1985	1183088	18215605	19211517	0	115025	50483222	89208457
1986	1230867	16576176	17555216	1119	86069	45544878	80994325
1987	943749	12120557	15570842	880	72360	43243665	71952053
1988	1083746	10940577	15209749	3482	74769	38911199	66223522
1989	973481	8581552	14426431	7285	71415	39284132	63344296
1990	470115	8358001	14601400	3640	38827	42793328	66265311
1991	457493	7730590	14051911	7718	49946	46117193	68414851
1992	536041	7298976	13996791	1461451	40362	50342395	73676016
1993	448468	5760977	12944569	1597424	25877	48264968	69042283
Mean	801004.6	28401326	38255912	1694206	41789.07	13097079	82291317
St. Dev.	374896	27038189	25107022	1956888	43637.78	17755980	33247518

Table A.9: Population

Year	SLO	SB	Ventura	Monterey	SC	Sonoma
1950	51115	97741	113415	129911	65920	102774
1951	52000	98500	117000	138500	67000	104000
1952	54000	99500	114647	155883	67000	105000
1953	63260	102000	114647	146000	68000	116000
1954	62320	103000	140000	175000	70000	115000
1955	61640	105000	150000	165000	70000	118500
1956	56130	106000	156300	180000	72000	120000
1957	60850	105000	159300	190000	75000	126000
1958	66500	123500	175300	192200	71200	144700
1959	72400	143100	184800	190700	72100	147800
1960	80510	167883	197591	197157	81609	145798
1961	85900	187000	215000	198700	88100	154200
1962	91300	213300	235800	206700	92900	158800
1963	93900	226700	252600	210200	94600	164900
1964	95700	231000	283300	220600	100300	171600
1965	100600	243100	302900	221300	103800	178400
1966	103000	247400	318000	240100	111100	183600
1967	104300	249800	330800	246100	112700	187500
1968	105400	254900	350100	246400	115200	194600
1969	102648	261991	369811	255128	122243	200920
1970	106280	265291	381174	248235	124788	206003
1971	109301	269930	395691	252730	129886	212402
1972	115484	276957	408523	254140	141878	224091
1973	119843	277414	419461	255261	145347	237957
1974	125535	278431	433885	263534	149828	243028
1975	126456	282626	448918	270976	158622	253255
1976	134260	286075	460485	275942	168026	262654
1977	138635	290381	478695	281545	175132	273175
1978	145914	295397	494086	284129	174865	281442
1979	150850	295423	512189	286882	184041	291859
1980	156786	300191	532827	292406	189305	301586
1981	161886	305588	546389	299677	193590	308609
1982	166563	313073	562142	306241	197353	314636
1983	171365	322294	575586	313698	201921	321580
1984	177566	329133	588790	321458	205964	326863
1985	185248	338569	602819	328102	212143	335355
1986	192497	345651	615422	335849	216661	345270
1987	199345	352021	632062	341268	221202	356111
1988	204261	355810	650851	345947	225700	367893
1989	213314	365695	664692	349872	231463	380633
1990	218126	370489	670278	357055	229437	390185
1991	219260	374731	674856	362577	229353	396976
1992	220855	377676	683543	368331	231689	403179
1993	222222	379606	691317	351935	233628	407690
Mean	126030.1	250337.9	395590.7	255758.4	143013.5	235966.5
St. Dev.	54248.17	91875.24	192052.6	67336.6	59845.97	96500.64

Table A.10: Retail sales and property values in 1983 dollars

	Retail Sales						Property Values					
Year	SLO	SB	Ventura	Monterey	S. Cruz	Sonoma	SLO	SB	Ventura	Monterey	S. Cruz	Sonoma
1950	1.84E+08	4.23E+08	3.89E+08	4.84E+08	2.63E+08	4.01E+08	1.18E+09	3.35E+09	4.02E+09	3.03E+09	9.53E+08	1.91E+09
1951	2.14E+08	4.72E+08	4.15E+08	5.09E+08	2.69E+08	4.59E+08	1.14E+09	3.47E+09	3.96E+09	3.19E+09	1.07E+09	1.95E+09
1952	2.38E+08	4.7E+08	4.33E+08	5.11E+08	2.48E+08	4.57E+08	1.16E+09	3.66E+09	4.26E+09	3.48E+09	1.69E+09	2.11E+09
1953	2.67E+08	4.85E+08	4.88E+08	5.47E+08	2.6E+08	4.73E+08	1.22E+09	3.7E+09	4.5E+09	3.83E+09	1.72E+09	2.23E+09
1954	2.14E+08	4.41E+08	4.97E+08	5.12E+08	2.66E+08	4.43E+08	1.3E+09	3.88E+09	4.88E+09	3.91E+09	1.76E+09	2.31E+09
1955	2.14E+08	4.77E+08	5.38E+08	5.4E+08	2.79E+08	5.05E+08	1.8E+09	3.89E+09	5.16E+09	4.11E+09	1.85E+09	2.8E+09
1956	2.31E+08	5.32E+08	6.07E+08	6.29E+08	3.11E+08	5.7E+08	1.8E+09	4.08E+09	5.72E+09	4.4E+09	1.9E+09	2.91E+09
1957	2.41E+08	5.66E+08	6.33E+08	6.26E+08	3.08E+08	5.38E+08	1.81E+09	4.3E+09	5.82E+09	4.49E+09	1.89E+09	3.01E+09
1958	2.5E+08	5.97E+08	6.27E+08	6.13E+08	2.98E+08	5.09E+08	1.87E+09	4.39E+09	6.03E+09	4.64E+09	1.89E+09	3.03E+09
1959	3.07E+08	7.53E+08	6.91E+08	6.65E+08	3.26E+08	5.74E+08	1.96E+09	4.5E+09	6.28E+09	4.72E+09	1.99E+09	3.25E+09
1960	3.18E+08	8.34E+08	7.32E+08	7.32E+08	3.56E+08	6.08E+08	2.17E+09	5.03E+09	6.52E+09	4.87E+09	2.24E+09	3.37E+09
1961	3.12E+08	8.55E+08	7.69E+08	7.27E+08	3.64E+08	6.07E+08	2.29E+09	5.22E+09	6.8E+09	5.15E+09	2.29E+09	3.58E+09
1962	3.31E+08	9.57E+08	8.65E+08	7.8E+08	3.98E+08	6.6E+08	2.54E+09	5.58E+09	7.12E+09	5.35E+09	2.53E+09	3.71E+09
1963	3.44E+08	1.05E+09	9.62E+08	8.17E+08	4.2E+08	7.1E+08	2.88E+09	6.29E+09	7.59E+09	5.64E+09	2.63E+09	3.91E+09
1964	3.51E+08	1.06E+09	1.11E+09	8.82E+08	4.63E+08	7.93E+08	3.01E+09	6.75E+09	8.56E+09	5.86E+09	2.81E+09	4.15E+09
1965	3.62E+08	1.08E+09	1.2E+09	9.45E+08	4.9E+08	8.3E+08	3.01E+09	7.04E+09	9.95E+09	6.15E+09	3.05E+09	4.36E+09
1966	3.69E+08	1.13E+09	1.2E+09	9.77E+08	5.05E+08	8.81E+08	2.99E+09	7.2E+09	1.08E+10	6.38E+09	3.22E+09	4.59E+09
1967	3.55E+08	1.17E+09	1.2E+09	9.64E+08	4.96E+08	8.23E+08	2.99E+09	7.47E+09	1.09E+10	6.74E+09	3.47E+09	5.02E+09
1968	3.84E+08	1.25E+09	1.32E+09	1.05E+09	5.47E+08	8.85E+08	2.96E+09	7.47E+09	1.07E+10	6.86E+09	3.52E+09	5.13E+09
1969	4.09E+08	1.31E+09	1.51E+09	1.08E+09	5.69E+08	9.72E+08	2.96E+09	7.4E+09	1.13E+10	6.79E+09	3.49E+09	5.24E+09
1970	4.2E+08	1.28E+09	1.6E+09	1.06E+09	5.67E+08	9.99E+08	3.1E+09	7.2E+09	1.16E+10	6.91E+09	3.54E+09	5E+09
1971	4.53E+08	1.27E+09	1.63E+09	1.09E+09	5.89E+08	1.06E+09	3.25E+09	7.16E+09	1.2E+10	6.81E+09	3.65E+09	5.49E+09
1972	5.13E+08	1.36E+09	1.77E+09	1.21E+09	6.71E+08	1.21E+09	3.44E+09	7.26E+09	1.24E+10	7.19E+09	3.87E+09	5.98E+09
1973	6.55E+08	1.57E+09	2.03E+09	1.4E+09	7.93E+08	1.43E+09	3.58E+09	7.17E+09	1.22E+10	7.8E+09	3.96E+09	6.34E+09

Table A.10, Cont.

	Retail Sales						Property Values					
Year	SLO	SB	Ventura	Monterey	S. Cruz	Sonoma	SLO	SB	Ventura	Monterey	S. Cruz	Sonoma
1974	6.4E+08	1.57E+09	2.02E+09	1.44E+09	7.87E+08	1.45E+09	3.72E+09	7.23E+09	1.22E+10	8.09E+09	4.24E+09	6.73E+09
1975	6.51E+08	1.55E+09	2.06E+09	1.51E+09	7.77E+08	1.4E+09	4.04E+09	7.07E+09	1.2E+10	8.65E+09	4.58E+09	7.02E+09
1976	7.76E+08	1.65E+09	2.25E+09	1.53E+09	8.53E+08	1.48E+09	4.22E+09	7.79E+09	1.36E+10	8.98E+09	4.96E+09	7.34E+09
1977	8.13E+08	1.78E+09	2.43E+09	1.71E+09	9.84E+08	1.68E+09	4.93E+09	9.26E+09	1.62E+10	1E+10	5.58E+09	8.31E+09
1978	9.04E+08	1.89E+09	2.68E+09	1.78E+09	1.07E+09	1.86E+09	5.5E+09	9.53E+09	1.46E+10	9.88E+09	5.38E+09	8.96E+09
1979	9.04E+08	1.97E+09	2.98E+09	1.86E+09	1.1E+09	1.99E+09	5.76E+09	9.71E+09	1.58E+10	9E+09	5.65E+09	9.3E+09
1980	9.02E+08	2E+09	3E+09	1.8E+09	1.09E+09	1.98E+09	5.52E+09	9.8E+09	1.65E+10	9.03E+09	5.56E+09	9.25E+09
1981	8.94E+08	1.99E+09	2.96E+09	1.75E+09	1.06E+09	1.89E+09	5.74E+09	1.02E+10	1.75E+10	8.79E+09	5.73E+09	1.01E+10
1982	8.87E+08	1.99E+09	2.93E+09	1.78E+09	9.88E+08	1.83E+09	6.33E+09	1.07E+10	1.87E+10	9.15E+09	6.03E+09	1.1E+10
1983	9.07E+08	1.95E+09	2.86E+09	1.66E+09	1.04E+09	1.86E+09	7E+09	1.11E+10	1.94E+10	9.61E+09	6.3E+09	1.19E+10
1984	1.06E+09	2.18E+09	3.34E+09	1.87E+09	1.17E+09	2.22E+09	7.73E+09	1.2E+10	2.04E+10	9.92E+09	6.64E+09	1.28E+10
1985	1.14E+09	2.26E+09	3.52E+09	1.98E+09	1.23E+09	2.35E+09	8.61E+09	1.28E+10	2.16E+10	1.04E+10	6.96E+09	1.31E+10
1986	1.17E+09	2.29E+09	3.7E+09	1.98E+09	1.27E+09	2.41E+09	9.73E+09	1.36E+10	2.31E+10	1.11E+10	7.55E+09	1.36E+10
1987	1.26E+09	2.31E+09	3.97E+09	1.99E+09	1.29E+09	2.48E+09	1.04E+10	1.43E+10	2.49E+10	1.15E+10	7.95E+09	1.41E+10
1988	1.26E+09	2.3E+09	4.16E+09	2.08E+09	1.33E+09	2.58E+09	1.1E+10	1.49E+10	2.64E+10	1.18E+10	8.28E+09	1.49E+10
1989	1.28E+09	2.36E+09	4.32E+09	2.14E+09	1.35E+09	2.73E+09	1.14E+10	1.55E+10	2.83E+10	1.21E+10	8.73E+09	1.58E+10
1990	1.39E+09	2.46E+09	4.47E+09	2.19E+09	1.41E+09	2.92E+09	1.2E+10	1.63E+10	3.04E+10	1.27E+10	9E+09	1.68E+10
1991	1.27E+09	2.35E+09	4.06E+09	2.13E+09	1.34E+09	2.75E+09	1.21E+10	1.66E+10	3.06E+10	1.34E+10	9.35E+09	1.76E+10
1992	1.19E+09	2.22E+09	3.98E+09	2.09E+09	1.28E+09	2.69E+09	1.21E+10	1.68E+10	3.1E+10	1.37E+10	9.69E+09	1.82E+10
1993	1.18E+09	2.14E+09	3.84E+09	2.03E+09	1.23E+09	2.64E+09	1.21E+10	1.7E+10	3.07E+10	1.36E+10	9.84E+09	1.84E+10
Mean	6.46E+08	1.42E+09	2.02E+09	1.29E+09	7.43E+08	1.38E+09	4.92E+09	8.54E+09	1.39E+10	7.72E+09	4.52E+09	7.65E+09
St. Dev.	3.88E+08	6.69E+08	1.32E+09	5.85E+08	3.96E+08	8.14E+08	3.55E+09	4.14E+09	8.3E+09	3.07E+09	2.58E+09	5.06E+09

Table A.11: Santa Barbara - Santa Maria - Lompoc metropolitan statistical area employment

Year	Total Employment	Mining	Construction	Manufacturing	Transportation and Utilities	Trade (Wholesale and Retail)	Wholesale Trade	Retail Trade	Finance, Real Estate and Insurance	Services	Total Government	Federal Government	State Government
1950	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1951	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1952	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1953	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1954	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1955	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1956	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1957	32600	1000	3000	3800	1800	8800	N/A	N/A	1400	6800	6000	800	5200
1958	35500	1000	3700	4200	2000	9600	N/A	N/A	1500	6900	6600	1000	5600
1959	41400	900	4300	5900	2200	10800	N/A	N/A	1600	8000	7700	1700	6000
1960	46600	900	4300	7800	2300	11400	N/A	N/A	1800	9400	8700	2100	6600
1961	52400	900	5100	9700	2400	11600	2200	9400	1800	11100	9800	2600	7200
1962	58700	900	6400	11300	2500	12500	2100	10400	2100	12000	11000	2800	8200
1963	62300	900	5500	12100	2700	13200	2100	11100	2400	13200	12300	2900	9400
1964	63400	900	4900	10400	3100	14400	2500	11900	2500	14000	13200	3000	10200
1965	65400	1000	4300	9800	3100	15000	2800	12200	2600	14800	14800	3500	11300
1966	70700	1200	3900	10600	3400	16000	3100	12900	2600	16400	16600	3900	12700
1967	73200	1100	3600	10600	3400	16500	3000	13500	2700	17100	18200	4300	13900
1968	75900	900	3800	10200	3400	16700	2800	13900	2800	18400	19700	4300	15400
1969	80300	1200	4100	10600	3500	17400	2800	14600	3000	19700	20800	4200	16600
1970	81300	1000	3600	10400	3400	18300	3000	15300	3200	20000	21400	4200	17200
1971	81600	1000	3400	9600	3400	18800	3400	15400	3300	20500	21600	4000	17600
1972	84400	800	3300	10600	3400	20000	3800	16200	3600	20800	21900	3900	18000

Table A.11, Cont.

Year	Total Employ-ment	Mining	Construc-tion	Manu-facturing	Transport ation and Utilities	Trade (Whole-sale and Retail)	Whole-sale Trade	Retail Trade	Finance, Real Estate and Insurance	Services	Total Gover-nment	Federal Govern-ment	State Govern-ment
1973	91300	700	3600	12000	3300	21800	3900	17900	4100	23000	22800	3800	19000
1974	94300	800	3400	13400	3400	21600	3900	17700	4300	23500	23900	3800	20100
1975	95700	900	3100	12900	3400	22500	3800	18700	4400	23400	25100	3800	21300
1976	100400	1000	3500	13800	3400	24400	3700	20700	4500	24200	25800	3800	22000
1977	106100	1000	4200	13700	4000	26400	3900	22500	4600	26400	25800	3700	22100
1978	113100	1100	4900	15300	4300	28300	3900	24400	5100	29200	25000	3700	21300
1979	118600	1200	5200	18700	4600	29100	3800	25300	5400	29900	24300	3900	20400
1980	120600	1500	5000	19300	5100	29100	4000	25100	5700	30500	24600	4000	20600
1981	123100	1600	5100	20000	5200	29500	4100	25400	5900	30900	24900	4000	20900
1982	123500	1600	4500	20700	5300	29900	4100	25800	5900	31200	24400	4100	20300
1983	125700	1600	4600	21600	5200	30000	4200	25800	6300	32000	24400	4200	20200
1984	134200	1500	6100	23700	5400	31300	4500	26800	7000	34300	24800	4200	20600
1985	139200	1500	6600	23700	5500	33000	4900	28100	7500	35900	25600	4300	21300
1986	143700	1300	6500	23800	5400	34000	5100	28900	8100	38100	26500	4300	22200
1987	143900	1100	6400	22000	5100	34000	5200	28800	8600	39400	27100	4200	22900
1988	144400	1300	5700	21800	5200	34400	5700	28700	8100	40400	27500	4300	23200
1989	145500	1200	6000	21800	5400	34100	5800	28300	8200	40500	28400	4300	24100
1990	148300	1100	6400	21400	5200	34800	5600	29300	8100	41900	29300	4400	24900
1991	149700	1100	6400	20800	5000	35500	5200	30300	8100	43500	29200	4200	25100
1992	144700	1100	5900	19200	5300	33700	5200	28500	7600	42700	29200	4100	25100
1993	143400	900	5100	18300	4800	34100	5100	29100	7500	43400	29200	4100	25100
Mean	98786.49	1100	4740.541	14743.24	3932.432	23310.81	3915.152	20996.97	4700	25227.03	21029.73	3632.432	17400
St. Dev.	36690.33	242.6703	1123.353	5890.979	1162.864	8822.408	1071.833	6943.634	2357.14	11466.92	7099.643	918.0456	6321.216

Table A.12: Santa Barbara - Santa Maria - Lompoc statistical area employment as percentage of population

Year	Total Employ-ment	Mining	Construc-tion	Manu-facturing	Transpor-tation and Utilities	Trade (Whole-sale and Retail)	Whole-sale Trade	Retail Trade	Finance, Real Estate and Insurance	Services	Total Govern-ment	Federal Govern-ment	State Govern-ment
1950	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1951	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1952	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1953	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1954	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1955	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1956	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1957	0.310476	0.009524	0.028571	0.03619	0.017143	0.08381	N/A	N/A	0.013333	0.064762	0.057143	0.007619	0.049524
1958	0.287449	0.008097	0.02996	0.034008	0.016194	0.077733	N/A	N/A	0.012146	0.05587	0.053441	0.008097	0.045344
1959	0.289308	0.006289	0.030049	0.04123	0.015374	0.075472	N/A	N/A	0.011181	0.055905	0.053809	0.01188	0.041929
1960	0.277574	0.005361	0.025613	0.046461	0.0137	0.067904	N/A	N/A	0.010722	0.055991	0.051822	0.012509	0.039313
1961	0.280214	0.004813	0.027273	0.051872	0.012834	0.062032	0.011765	0.050267	0.009626	0.059358	0.052406	0.013904	0.038503
1962	0.275199	0.004219	0.030005	0.052977	0.011721	0.058603	0.009845	0.048758	0.009845	0.056259	0.051571	0.013127	0.038444
1963	0.274813	0.00397	0.024261	0.053375	0.01191	0.058227	0.009263	0.048963	0.010587	0.058227	0.054257	0.012792	0.041464
1964	0.274459	0.003896	0.021212	0.045022	0.01342	0.062338	0.010823	0.051515	0.010823	0.060606	0.057143	0.012987	0.044156
1965	0.269025	0.004114	0.017688	0.040313	0.012752	0.061703	0.011518	0.050185	0.010695	0.06088	0.06088	0.014397	0.046483
1966	0.285772	0.00485	0.015764	0.042846	0.013743	0.064673	0.01253	0.052142	0.010509	0.066289	0.067098	0.015764	0.051334
1967	0.293034	0.004404	0.014412	0.042434	0.013611	0.066053	0.01201	0.054043	0.010809	0.068455	0.072858	0.017214	0.055645
1968	0.297764	0.003531	0.014908	0.040016	0.013339	0.065516	0.010985	0.054531	0.010985	0.072185	0.077285	0.016869	0.060416
1969	0.306499	0.00458	0.015649	0.040459	0.013359	0.066414	0.010687	0.055727	0.011451	0.075193	0.079392	0.016031	0.063361
1970	0.306456	0.003769	0.01357	0.039202	0.012816	0.068981	0.011308	0.057673	0.012062	0.075389	0.080666	0.015832	0.064834
1971	0.302301	0.003705	0.012596	0.035565	0.012596	0.069648	0.012596	0.057052	0.012225	0.075946	0.080021	0.014819	0.065202
1972	0.30474	0.002889	0.011915	0.038273	0.012276	0.072213	0.013721	0.058493	0.012998	0.075102	0.079074	0.014082	0.064992

Table A.12, Cont.

Year	Total Employment	Mining	Construction	Manufacturing	Transportation and Utilities	Trade (Wholesale and Retail)	Wholesale Trade	Retail Trade	Finance, Real Estate and Insurance	Services	Total Government	Federal Government	State Government
1973	0.329111	0.002523	0.012977	0.043257	0.011896	0.078583	0.014058	0.064525	0.014779	0.082909	0.082188	0.013698	0.06849
1974	0.338684	0.002873	0.012211	0.048127	0.012211	0.077578	0.014007	0.063571	0.015444	0.084402	0.085838	0.013648	0.07219
1975	0.33861	0.003184	0.010969	0.045643	0.01203	0.079611	0.013445	0.066165	0.015568	0.082795	0.08881	0.013445	0.075365
1976	0.350957	0.003496	0.012235	0.048239	0.011885	0.085292	0.012934	0.072359	0.01573	0.084593	0.090186	0.013283	0.076903
1977	0.365382	0.003444	0.014464	0.047179	0.013775	0.090915	0.013431	0.077484	0.015841	0.090915	0.088849	0.012742	0.076107
1978	0.382875	0.003724	0.016588	0.051795	0.014557	0.095803	0.013203	0.082601	0.017265	0.09885	0.084632	0.012526	0.072106
1979	0.401458	0.004062	0.017602	0.063299	0.015571	0.098503	0.012863	0.08564	0.018279	0.101211	0.082255	0.013201	0.069054
1980	0.401744	0.004997	0.016656	0.064292	0.016989	0.096938	0.013325	0.083613	0.018988	0.101602	0.081948	0.013325	0.068623
1981	0.40283	0.005236	0.016689	0.065448	0.017016	0.096535	0.013417	0.083118	0.019307	0.101117	0.081482	0.01309	0.068393
1982	0.394477	0.005111	0.014374	0.066119	0.016929	0.095505	0.013096	0.082409	0.018845	0.099657	0.077937	0.013096	0.064841
1983	0.390017	0.004964	0.014273	0.06702	0.016134	0.093083	0.013032	0.080051	0.019547	0.099288	0.075707	0.013032	0.062676
1984	0.407738	0.004557	0.018534	0.072007	0.016407	0.095098	0.013672	0.081426	0.021268	0.104213	0.075349	0.012761	0.062589
1985	0.411142	0.00443	0.019494	0.070001	0.016245	0.097469	0.014473	0.082996	0.022152	0.106035	0.075612	0.012701	0.062912
1986	0.415737	0.003761	0.018805	0.068856	0.015623	0.098365	0.014755	0.08361	0.023434	0.110227	0.076667	0.01244	0.064227
1987	0.408782	0.003125	0.018181	0.062496	0.014488	0.096585	0.014772	0.081813	0.02443	0.111925	0.076984	0.011931	0.065053
1988	0.405835	0.003654	0.01602	0.061269	0.014615	0.096681	0.01602	0.080661	0.022765	0.113544	0.077288	0.012085	0.065203
1989	0.397873	0.003281	0.016407	0.059613	0.014766	0.093247	0.01586	0.077387	0.022423	0.110748	0.07766	0.011758	0.065902
1990	0.400282	0.002969	0.017274	0.057761	0.014036	0.09393	0.015115	0.079085	0.021863	0.113094	0.079085	0.011876	0.067208
1991	0.399487	0.002935	0.017079	0.055506	0.013343	0.094735	0.013877	0.080858	0.021616	0.116083	0.077923	0.011208	0.066981
1992	0.383133	0.002913	0.015622	0.050837	0.014033	0.08923	0.013768	0.075462	0.020123	0.11306	0.077315	0.010856	0.066459
1993	0.37776	0.002371	0.013435	0.048208	0.012645	0.08983	0.013435	0.076658	0.019757	0.114329	0.076922	0.010801	0.066121
Mean	0.344297	0.004206	0.017928	0.051276	0.014108	0.081482	0.013018	0.069116	0.01593	0.085865	0.0735	0.013011	0.060496
St. Dev.	0.052864	0.001432	0.005478	0.010981	0.001695	0.013975	0.001596	0.013336	0.004722	0.021055	0.011715	0.001964	0.011379

Table A.13: Santa Barbara - Santa Maria - Lompoc statistical area employment as percentage of total employment

Year	Mining	Construction	Manufacturing	Transportation and Utilities	Trade (Wholesale and Retail)	Wholesale Trade	Retail Trade	Finance, Real Estate and Insurance	Services	Total Government	Federal Government	State Government
1950	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1951	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1952	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1953	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1954	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1955	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1956	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1957	0.030675	0.092025	0.116564	0.055215	0.269939	N/A	N/A	0.042945	0.208589	0.184049	0.02454	0.159509
1958	0.028169	0.104225	0.11831	0.056338	0.270423	N/A	N/A	0.042254	0.194366	0.185915	0.028169	0.157746
1959	0.021739	0.103865	0.142512	0.05314	0.26087	N/A	N/A	0.038647	0.193237	0.18599	0.041063	0.144928
1960	0.019313	0.092275	0.167382	0.049356	0.244635	N/A	N/A	0.038627	0.201717	0.186695	0.045064	0.141631
1961	0.017176	0.097328	0.185115	0.045802	0.221374	0.041985	0.179389	0.034351	0.211832	0.187023	0.049618	0.137405
1962	0.015332	0.109029	0.192504	0.042589	0.212947	0.035775	0.177172	0.035775	0.204429	0.187394	0.0477	0.139693
1963	0.014446	0.088283	0.194222	0.043339	0.211878	0.033708	0.17817	0.038523	0.211878	0.197432	0.046549	0.150883
1964	0.014196	0.077287	0.164038	0.048896	0.227129	0.039432	0.187697	0.039432	0.22082	0.208202	0.047319	0.160883
1965	0.015291	0.065749	0.149847	0.047401	0.229358	0.042813	0.186544	0.039755	0.2263	0.2263	0.053517	0.172783
1966	0.016973	0.055163	0.149929	0.048091	0.226308	0.043847	0.182461	0.036775	0.231966	0.234795	0.055163	0.179632
1967	0.015027	0.04918	0.144809	0.046448	0.22541	0.040984	0.184426	0.036885	0.233607	0.248634	0.058743	0.189891
1968	0.011858	0.050066	0.134387	0.044796	0.220026	0.036891	0.183136	0.036891	0.242424	0.259552	0.056653	0.202899
1969	0.014944	0.051059	0.132005	0.043587	0.216687	0.034869	0.181818	0.03736	0.24533	0.259029	0.052304	0.206725
1970	0.0123	0.04428	0.127921	0.04182	0.225092	0.0369	0.188192	0.03936	0.246002	0.263223	0.051661	0.211562
1971	0.012255	0.041667	0.117647	0.041667	0.230392	0.041667	0.188725	0.040441	0.251225	0.264706	0.04902	0.215686
1972	0.009479	0.0391	0.125592	0.040284	0.236967	0.045024	0.191943	0.042654	0.246445	0.259479	0.046209	0.21327

Table A.13, Cont.

Year	Mining	Construction	Manufacturing	Transportation and Utilities	Trade (Wholesale and Retail)	Wholesale Trade	Retail Trade	Finance, Real Estate and Insurance	Services	Total Government	Federal Government	State Government
1973	0.007667	0.03943	0.131435	0.036145	0.238773	0.042716	0.196057	0.044907	0.251917	0.249726	0.041621	0.208105
1974	0.008484	0.036055	0.1421	0.036055	0.229056	0.041357	0.187699	0.045599	0.249205	0.253446	0.040297	0.21315
1975	0.009404	0.032393	0.134796	0.035528	0.23511	0.039707	0.195402	0.045977	0.244514	0.262278	0.039707	0.222571
1976	0.00996	0.034861	0.13745	0.033865	0.243028	0.036853	0.206175	0.044821	0.241036	0.256972	0.037849	0.219124
1977	0.009425	0.039585	0.129123	0.0377	0.248822	0.036758	0.212064	0.043355	0.248822	0.243167	0.034873	0.208294
1978	0.009726	0.043324	0.135279	0.038019	0.250221	0.034483	0.215738	0.045093	0.258179	0.221043	0.032714	0.188329
1979	0.010118	0.043845	0.157673	0.038786	0.245363	0.03204	0.213322	0.045531	0.252108	0.20489	0.032884	0.172007
1980	0.012438	0.041459	0.160033	0.042289	0.241294	0.033167	0.208126	0.047264	0.252902	0.20398	0.033167	0.170813
1981	0.012998	0.04143	0.16247	0.042242	0.239643	0.033306	0.206336	0.047929	0.251015	0.202275	0.032494	0.169781
1982	0.012955	0.036437	0.167611	0.042915	0.242105	0.033198	0.208907	0.047773	0.252632	0.197571	0.033198	0.164372
1983	0.012729	0.036595	0.171838	0.041368	0.238663	0.033413	0.205251	0.050119	0.254574	0.194113	0.033413	0.1607
1984	0.011177	0.045455	0.176602	0.040238	0.233234	0.033532	0.199702	0.052161	0.255589	0.184799	0.031297	0.153502
1985	0.010776	0.047414	0.170259	0.039511	0.237069	0.035201	0.201868	0.053879	0.257902	0.183908	0.030891	0.153017
1986	0.009047	0.045233	0.165623	0.037578	0.236604	0.035491	0.201113	0.056367	0.265136	0.184412	0.029923	0.154489
1987	0.007644	0.044475	0.152884	0.035441	0.236275	0.036136	0.200139	0.059764	0.273801	0.188325	0.029187	0.159138
1988	0.009003	0.039474	0.15097	0.036011	0.238227	0.039474	0.198753	0.056094	0.279778	0.190443	0.029778	0.160665
1989	0.008247	0.041237	0.149828	0.037113	0.234364	0.039863	0.194502	0.056357	0.278351	0.195189	0.029553	0.165636
1990	0.007417	0.043156	0.144302	0.035064	0.234659	0.037761	0.197572	0.054619	0.282535	0.197572	0.02967	0.167903
1991	0.007348	0.042752	0.138945	0.0334	0.237141	0.034736	0.202405	0.054108	0.290581	0.195057	0.028056	0.167669
1992	0.007602	0.040774	0.132688	0.036628	0.232896	0.035936	0.196959	0.052522	0.295093	0.201797	0.028334	0.173462
1993	0.006276	0.035565	0.127615	0.033473	0.237796	0.035565	0.202929	0.052301	0.30265	0.203626	0.028591	0.175035
Mean	0.012692	0.054366	0.148711	0.041571	0.23621	0.037412	0.195779	0.04533	0.246175	0.214946	0.03894	0.176024
St. Dev.	0.005419	0.023172	0.020557	0.005996	0.013063	0.003588	0.01081	0.007012	0.027508	0.029748	0.009857	0.025212

Table A.14: Ventura - Oxnard metropolitan statistical area employment

Year	Total Employment	Mining	Construction	Manufacturing	Transportation and Utilities	Trade (Wholesale and Retail)	Wholesale Trade	Retail Trade	Finance, Real Estate and Insurance	Services	Total Government	Federal Government	State Government
1950	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1951	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1952	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1953	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1954	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1955	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1956	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1957	42400	3200	3100	6100	2300	8500	N/A	N/A	900	4900	13400	5800	7600
1958	44600	3000	3600	6900	2300	8900	N/A	N/A	1000	4900	14000	6000	8000
1959	46800	2900	3700	7000	2400	9700	N/A	N/A	1100	5400	14600	6400	8200
1960	47400	2800	3200	6700	2400	10100	N/A	N/A	1300	5800	15100	6600	8500
1961	48900	2600	3400	6500	2600	10600	2800	7800	1400	6100	15700	6900	8800
1962	53000	2400	3900	7600	2700	11500	3000	8500	1600	6700	16600	7100	9500
1963	60400	2300	4000	10400	3000	13100	3000	10100	1700	7600	18300	7200	11100
1964	67300	2500	4600	11800	3100	14800	3300	11500	2000	9100	19400	7000	12400
1965	71000	2400	4500	12300	3300	15400	3800	12100	2200	10100	20800	7300	13500
1966	75400	2300	3700	12400	3700	16900	3600	13300	2300	11100	23000	8700	14300
1967	78700	2200	3000	12900	3600	17200	3700	13500	2500	12000	25300	10400	14900
1968	84300	1900	3300	14300	3800	17900	3400	14500	2800	12800	27500	11300	16200
1969	91000	1900	4700	14500	4100	19800	3700	16100	3000	14200	28800	11400	17400
1970	93000	1800	4600	13700	4000	22000	4000	18000	3300	14800	28800	10400	18400
1971	95200	1700	4800	13200	4300	22700	4100	18600	3400	15300	29800	10500	19300
1972	100800	1600	4800	14200	4400	24000	4400	19600	3500	17300	31000	10500	20500

Table A.14, Cont.

Year	Total Employment	Mining	Construction	Manufacturing	Transportation and Utilities	Trade (Wholesale and Retail)	Wholesale Trade	Retail Trade	Finance, Real Estate and Insurance	Services	Total Government	Federal Government	State Government
1973	105600	1700	4900	15500	4500	24600	4600	20000	3700	18800	31900	10400	21500
1974	110500	1800	4300	17200	4400	25600	5400	20200	4000	18900	34300	10800	23500
1975	114100	2000	4100	17000	4300	26900	5700	21200	4000	19800	36000	10600	25400
1976	117800	2100	4800	18000	4600	27600	5200	22400	4500	20500	35700	10000	25700
1977	128300	2200	6100	19600	5200	29900	5700	24200	5400	22900	37200	10100	27100
1978	138700	2400	7300	21400	5800	33000	5800	27200	6100	26100	36700	9900	26800
1979	147200	2500	8700	23300	6200	34500	6100	28400	7000	28800	36200	9900	26300
1980	153000	2600	7800	24100	6500	36300	6800	29500	7500	30700	37500	9900	27700
1981	158000	2900	7100	25000	6800	37900	7100	30800	8300	32100	37800	9800	28000
1982	161200	3100	5500	26400	6600	38800	6700	32100	9800	32900	38100	10000	28100
1983	167000	3300	6200	27200	6800	41200	7400	33900	10600	33800	37700	10100	27600
1984	177800	3400	8100	29100	7100	44400	7700	36700	10900	36800	38000	10400	27700
1985	186400	3300	9400	29600	7900	47500	8000	39500	10300	39300	39100	10800	28400
1986	193700	2900	10700	29200	9200	48300	7800	40500	10100	43600	39700	10900	28800
1987	205500	2600	12600	29700	10900	51100	8300	42800	10500	48000	40100	11000	29100
1988	213300	2300	12500	30800	11100	54600	10400	44200	10600	50300	41100	11400	29700
1989	221600	2300	14600	31400	11500	56100	10700	45400	11600	52000	42100	11600	30500
1990	230300	2300	14000	32100	11800	57700	11600	46200	12100	56100	44200	12100	32100
1991	230400	2200	11600	30400	11700	58200	12300	45900	11700	59800	44900	12300	32600
1992	226600	2100	9800	31400	10600	54200	11400	42800	12100	61600	44800	12200	32600
1993	227000	2200	9100	30400	10200	54500	11200	43300	12600	64800	43200	11400	31900
Mean	127410.8	2424.324	6543.243	19170.27	5829.73	30432.43	6324.242	26690.91	5875.676	25829.73	31308.11	9705.405	21613.51
St. Dev.	62521.7	486.7154	3349.92	8838.233	3077.054	16349.38	2860.183	12647.79	4062.252	18215.93	10033.04	1886.641	8383.123

Table A.15: Ventura - Oxnard metropolitan statistical area employment as a percentage of population

Year	Total Employ-ment	Mining	Construc-tion	Manu-facturing	Transpor-tation and Utilities	Trade (Whole-sale and Retail)	Whole-sale Trade	Retail Trade	Finance, Real Estate and Insurance	Services	Total Govern-ment	Federal Govern-ment	State Govern-ment
1950	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1951	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1952	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1953	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1954	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1955	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1956	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1957	0.266164	0.020088	0.01946	0.038293	0.014438	0.053358	N/A	N/A	0.00565	0.03076	0.084118	0.036409	0.047709
1958	0.254421	0.017114	0.020536	0.039361	0.01312	0.05077	N/A	N/A	0.005705	0.027952	0.079863	0.034227	0.045636
1959	0.253247	0.015693	0.020022	0.037879	0.012987	0.052489	N/A	N/A	0.005952	0.029221	0.079004	0.034632	0.044372
1960	0.239889	0.014171	0.016195	0.033908	0.012146	0.051116	N/A	N/A	0.006579	0.029354	0.07642	0.033402	0.043018
1961	0.227442	0.012093	0.015814	0.030233	0.012093	0.049302	0.013023	0.036279	0.006512	0.028372	0.073023	0.032093	0.04093
1962	0.224767	0.010178	0.016539	0.032231	0.01145	0.04877	0.012723	0.036047	0.006785	0.028414	0.070399	0.03011	0.040288
1963	0.239113	0.009105	0.015835	0.041172	0.011876	0.051861	0.011876	0.039984	0.00673	0.030087	0.072447	0.028504	0.043943
1964	0.237557	0.008825	0.016237	0.041652	0.010942	0.052241	0.011648	0.040593	0.00706	0.032121	0.068479	0.024709	0.04377
1965	0.234401	0.007923	0.014856	0.040607	0.010895	0.050842	0.012545	0.039947	0.007263	0.033344	0.06867	0.0241	0.044569
1966	0.237107	0.007233	0.011635	0.038994	0.011635	0.053145	0.011321	0.041824	0.007233	0.034906	0.072327	0.027358	0.044969
1967	0.237908	0.006651	0.009069	0.038996	0.010883	0.051995	0.011185	0.04081	0.007557	0.036276	0.076481	0.031439	0.045042
1968	0.240788	0.005427	0.009426	0.040845	0.010854	0.051128	0.009712	0.041417	0.007998	0.036561	0.078549	0.032276	0.046272
1969	0.246072	0.005138	0.012709	0.039209	0.011087	0.053541	0.010005	0.043536	0.008112	0.038398	0.077878	0.030827	0.047051
1970	0.243983	0.004722	0.012068	0.035942	0.010494	0.057716	0.010494	0.047223	0.008657	0.038827	0.075556	0.027284	0.048272
1971	0.240592	0.004296	0.012131	0.033359	0.010867	0.057368	0.010362	0.047006	0.008593	0.038667	0.075311	0.026536	0.048775
1972	0.246743	0.003917	0.01175	0.034759	0.010771	0.058748	0.010771	0.047978	0.008567	0.042348	0.075883	0.025702	0.050181

Table A.15, Cont.

Year	Total Employ-ment	Mining	Construc-tion	Manu-facturing	Transpor-tation and Utilities	Trade (Whole-sale and Retail)	Whole-sale Trade	Retail Trade	Finance, Real Estate and Insurance	Services	Total Govern-ment	Federal Govern-ment	State Govern-ment
1973	0.251752	0.004053	0.011682	0.036952	0.010728	0.058647	0.010966	0.04768	0.008821	0.044819	0.07605	0.024794	0.051256
1974	0.254676	0.004149	0.00991	0.039642	0.010141	0.059002	0.012446	0.046556	0.009219	0.04356	0.079053	0.024891	0.054162
1975	0.254167	0.004455	0.009133	0.037869	0.009579	0.059922	0.012697	0.047225	0.00891	0.044106	0.080193	0.023612	0.05658
1976	0.255817	0.00456	0.010424	0.039089	0.009989	0.059937	0.011292	0.048644	0.009772	0.044518	0.077527	0.021716	0.055811
1977	0.26802	0.004596	0.012743	0.040945	0.010863	0.062461	0.011907	0.050554	0.011281	0.047838	0.077711	0.021099	0.056612
1978	0.28072	0.004857	0.014775	0.043312	0.011739	0.06679	0.011739	0.055051	0.012346	0.052825	0.074279	0.020037	0.054242
1979	0.287394	0.004881	0.016986	0.045491	0.012105	0.067358	0.01191	0.055448	0.013667	0.056229	0.070677	0.019329	0.051348
1980	0.287148	0.00488	0.014639	0.04523	0.012199	0.068127	0.012762	0.055365	0.014076	0.057617	0.070379	0.01858	0.051987
1981	0.289171	0.005308	0.012994	0.045755	0.012445	0.069365	0.012994	0.05637	0.015191	0.058749	0.069181	0.017936	0.051246
1982	0.28676	0.005515	0.009784	0.046963	0.011741	0.069022	0.011919	0.057103	0.017433	0.058526	0.067776	0.017789	0.049987
1983	0.290139	0.005733	0.010772	0.047256	0.011814	0.071579	0.012856	0.058896	0.018416	0.058723	0.065498	0.017547	0.047951
1984	0.301975	0.005775	0.013757	0.049423	0.012059	0.075409	0.013078	0.062331	0.018513	0.062501	0.064539	0.017663	0.047046
1985	0.309214	0.005474	0.015593	0.049103	0.013105	0.078796	0.013271	0.065525	0.017086	0.065194	0.064862	0.017916	0.047112
1986	0.314743	0.004712	0.017386	0.047447	0.014949	0.078483	0.012674	0.065809	0.016412	0.070846	0.064509	0.017711	0.046797
1987	0.325126	0.004114	0.019935	0.046989	0.017245	0.080846	0.013132	0.067715	0.016612	0.075942	0.063443	0.017403	0.04604
1988	0.327725	0.003534	0.019206	0.047323	0.017055	0.08389	0.015979	0.067911	0.016286	0.077283	0.063148	0.017516	0.045633
1989	0.333387	0.00346	0.021965	0.04724	0.017301	0.0844	0.016098	0.068302	0.017452	0.078232	0.063338	0.017452	0.045886
1990	0.343589	0.003431	0.020887	0.047891	0.017605	0.086084	0.017306	0.068927	0.018052	0.083697	0.065943	0.018052	0.047891
1991	0.341406	0.00326	0.017189	0.045047	0.017337	0.086241	0.018226	0.068015	0.017337	0.088611	0.066533	0.018226	0.048307
1992	0.331508	0.003072	0.014337	0.045937	0.015507	0.079293	0.016678	0.062615	0.017702	0.090119	0.065541	0.017848	0.047693
1993	0.328359	0.003182	0.013163	0.043974	0.014754	0.078835	0.016201	0.062634	0.018226	0.093734	0.062489	0.01649	0.046144
Mean	0.273865	0.006637	0.014636	0.041522	0.012616	0.064024	0.012782	0.052767	0.011561	0.051062	0.071813	0.023871	0.04796
St. Dev.	0.036926	0.004158	0.003651	0.005137	0.002315	0.012325	0.002142	0.010611	0.004694	0.019927	0.006013	0.006218	0.004031

Table A.16: Ventura - Oxnard metropolitan statistical area employment as a percentage of total employment

Year	Mining	Construction	Manufacturing	Transportation and Utilities	Trade (Wholesale and Retail)	Wholesale Trade	Retail Trade	Finance, Real Estate and Insurance	Services	Total Government	Federal Government	State Government
1950	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1951	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1952	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1953	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1954	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1955	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1956	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1957	0.075472	0.073113	0.143868	0.054245	0.200472	N/A	N/A	0.021226	0.115566	0.316038	0.136792	0.179245
1958	0.067265	0.080717	0.154709	0.05157	0.199552	N/A	N/A	0.022422	0.109865	0.313901	0.134529	0.179372
1959	0.061966	0.07906	0.149573	0.051282	0.207265	N/A	N/A	0.023504	0.115385	0.311966	0.136752	0.175214
1960	0.059072	0.067511	0.14135	0.050633	0.21308	N/A	N/A	0.027426	0.122363	0.318565	0.139241	0.179325
1961	0.05317	0.06953	0.132924	0.05317	0.216769	0.05726	0.159509	0.02863	0.124744	0.321063	0.141104	0.179959
1962	0.045283	0.073585	0.143396	0.050943	0.216981	0.056604	0.160377	0.030189	0.126415	0.313208	0.133962	0.179245
1963	0.038079	0.066225	0.172185	0.049669	0.216887	0.049669	0.167219	0.028146	0.125828	0.30298	0.119205	0.183775
1964	0.037147	0.068351	0.175334	0.046062	0.219911	0.049034	0.170877	0.029718	0.135215	0.288262	0.104012	0.18425
1965	0.033803	0.06338	0.173239	0.046479	0.216901	0.053521	0.170423	0.030986	0.142254	0.292958	0.102817	0.190141
1966	0.030504	0.049072	0.164456	0.049072	0.224138	0.047745	0.176393	0.030504	0.147215	0.30504	0.115385	0.189655
1967	0.027954	0.038119	0.163914	0.045743	0.218551	0.047014	0.171537	0.031766	0.152478	0.321474	0.132147	0.189327
1968	0.022539	0.039146	0.169632	0.045077	0.212337	0.040332	0.172005	0.033215	0.151839	0.326216	0.134045	0.192171
1969	0.020879	0.051648	0.159341	0.045055	0.217582	0.040659	0.176923	0.032967	0.156044	0.316484	0.125275	0.191209
1970	0.019355	0.049462	0.147312	0.043011	0.236559	0.043011	0.193548	0.035484	0.15914	0.309677	0.111828	0.197849
1971	0.017857	0.05042	0.138655	0.045168	0.238445	0.043067	0.195378	0.035714	0.160714	0.313025	0.110294	0.202731
1972	0.015873	0.047619	0.140873	0.043651	0.238095	0.043651	0.194444	0.034722	0.171627	0.30754	0.104167	0.203373

Table A.16, Cont.

Year	Mining	Construction	Manufacturing	Transportation and Utilities	Trade (Wholesale and Retail)	Wholesale Trade	Retail Trade	Finance, Real Estate and Insurance	Services	Total Government	Federal Government	State Government
1973	0.016098	0.046402	0.14678	0.042614	0.232955	0.043561	0.189394	0.035038	0.17803	0.302083	0.098485	0.203598
1974	0.01629	0.038914	0.155656	0.039819	0.231674	0.048869	0.182805	0.036199	0.171041	0.310407	0.097738	0.21267
1975	0.017528	0.035933	0.148992	0.037686	0.235758	0.049956	0.185802	0.035057	0.173532	0.315513	0.092901	0.222612
1976	0.017827	0.040747	0.152801	0.039049	0.234295	0.044143	0.190153	0.0382	0.174024	0.303056	0.08489	0.218166
1977	0.017147	0.047545	0.152767	0.04053	0.233048	0.044427	0.18862	0.042089	0.178488	0.289945	0.078722	0.211224
1978	0.017304	0.052632	0.15429	0.041817	0.237924	0.041817	0.196107	0.04398	0.188176	0.2646	0.071377	0.193223
1979	0.016984	0.059103	0.158288	0.04212	0.234375	0.04144	0.192935	0.047554	0.195652	0.245924	0.067255	0.178668
1980	0.016993	0.05098	0.157516	0.042484	0.237255	0.044444	0.19281	0.04902	0.200654	0.245098	0.064706	0.181046
1981	0.018354	0.044937	0.158228	0.043038	0.239873	0.044937	0.194937	0.052532	0.203165	0.239241	0.062025	0.177215
1982	0.019231	0.034119	0.163772	0.040943	0.240695	0.041563	0.199132	0.060794	0.204094	0.236352	0.062035	0.174318
1983	0.01976	0.037126	0.162874	0.040719	0.246707	0.044311	0.202994	0.063473	0.202395	0.225749	0.060479	0.165269
1984	0.019123	0.045557	0.163667	0.039933	0.249719	0.043307	0.206412	0.061305	0.206974	0.213723	0.058493	0.155793
1985	0.017704	0.050429	0.158798	0.042382	0.254828	0.042918	0.21191	0.055258	0.210837	0.209764	0.05794	0.152361
1986	0.014972	0.05524	0.150749	0.047496	0.249355	0.040268	0.209086	0.052142	0.22509	0.204956	0.056273	0.148684
1987	0.012652	0.061314	0.144526	0.053041	0.248662	0.040389	0.208273	0.051095	0.233577	0.195134	0.053528	0.141606
1988	0.010783	0.058603	0.144398	0.052039	0.255977	0.048758	0.20722	0.049695	0.235818	0.192686	0.053446	0.139241
1989	0.010379	0.065884	0.141697	0.051895	0.253159	0.048285	0.204874	0.052347	0.234657	0.189982	0.052347	0.137635
1990	0.009987	0.06079	0.139383	0.051238	0.250543	0.050369	0.200608	0.05254	0.243595	0.191924	0.05254	0.139383
1991	0.009549	0.050347	0.131944	0.050781	0.252604	0.053385	0.199219	0.050781	0.259549	0.194878	0.053385	0.141493
1992	0.009267	0.043248	0.13857	0.046778	0.239188	0.050309	0.188879	0.053398	0.271845	0.197705	0.053839	0.143866
1993	0.009692	0.040088	0.133921	0.044934	0.240088	0.049339	0.190749	0.055507	0.285463	0.190308	0.05022	0.140529
Mean	0.025509	0.0537	0.152172	0.046004	0.232222	0.046314	0.189441	0.040936	0.180901	0.268579	0.090924	0.177715
St. Dev.	0.01748	0.012725	0.011681	0.004695	0.015615	0.004678	0.014485	0.012013	0.046559	0.050653	0.032623	0.024362

Table A.17
Percent Unemployed by County

Year	San Luis Obispo	Santa Barbara	Ventura
1958	na	3.8	5.2
1959	na	3.7	5.0
1960	5.9	4.4	5.6
1961	6.1	4.6	6.4
1962	5.5	4.0	5.9
1963	6.2	4.7	5.7
1964	6.1	5.3	5.6
1965	5.8	5.3	6.8
1966	5.1	4.5	6.0
1967	4.9	4.5	5.6
1968	4.4	4.3	4.8
1969	4.8	4.0	4.4
1970	5.3	5.3	6.4
1971	5.1	6.3	7.7
1972	na	5.5	6.9
1973	na	6.0	7.5
1974	na	6.1	7.7
1975	na	7.9	9.2
1976	na	7.9	9.2
1977	na	7.3	8.0
1978	na	6.5	7.9
1979	na	5.8	7.5
1980	na	5.5	7.2
1981	na	6.1	7.9
1982	na	7.9	10.5
1983	na	7.6	9.9
1984	na	5.9	8.1
1985	na	5.6	7.3
1986	na	5.1	6.9
1987	4.5	4.7	5.5
1988	4.2	4.4	5.3
1989	3.7	4.2	5.1
1990	4.2	4.5	5.5
1991	6.1	6.0	7.3
1992	7.8	7.5	8.8
1993	8.4	7.6	8.9

Note data prior to 1970 is not comparable to data from 1970 to the present.
Source: California Statistical Abstract

Data Sources

Adjusted Gross Income:
State Board of Equalization Annual Report.
Published by the California State Board ofEqualization.
Issues Used: Various Years

Consumer Price Index:
Obtained from the United States Bureau of Labor Statistics World Wide Web Page

Employment:
California Statistical Abstract
Published by the California Department of Finance
Issues Used: Various Years

Gas Prices:
Basic Petroleum Data Book 1978.
Published by the American Petroleum Institute
Issue Used: 1978

Natural Gas Annual.
Published by the Department of Energy, Energy Information Administration.
Issues Used: Various Years

Gas Production:
Annual Report of the State Oil & Gas Supervisor
Published by the California Department of Conservation, Division of Oil, Gas, & Geothermal Resources
Issues Used: Various Years

Income:
Obtained directly from the California Department of Finance

Oil Production:
Annual Report of the State Oil & Gas Supervisor.
Published by the California Department of Conservation, Division of Oil, Gas, & Geothermal Resources
Issues Used: Various Years

Oil Prices:
Basic Petroleum Data Book 1978.
Published by the American Petroleum Institute

Issue Used: 1978

California Historical Petroleum Prices Staff Report March 1983.
Published by the California Energy Commission.
Issue Used: March 1983

Petroleum Marketing Monthly.
Published by the Department of Energy, Energy Information Administration.
Issues Used: Various Years

Population:

Annual Report of Financial Transactions Concerning Counties of California.
Published by the Office of the State Controller.
Issues Used: Various Years

Data from 1969 to 1993 obtained from the Department of Finance

Property Values:

California Franchise Tax Board Annual Report.
Published by the California Franchise Tax Board
Issues Used: Various Years

Retail Sales:

California Franchise Tax Board Annual Report.
Published by the California Franchise Tax Board
Issues Used: Various Years

Unemployment Rate:

California Statistical Abstract
Published by the California Department of Finance
Issues Used: Various Years

APPENDIX B
County Income and Adjusted Gross Income

An F-test was performed to determine whether the Adjusted Gross Income underreported County Income by a constant amount. The error sums of squares for the following regressions were used in the F-test.

Where: Y_{it}: True County Income

I_{it}: Adjusted County Income

i: County (San Luis Obispo, Santa Barbara, or Ventura)

t: Year

Below is the restricted equation for the F-test where the three counties data are stacked to perform one regression:

Dependent Variable: $Y_i - Y_{i69}$
Method: Least Squares
Sample(adjusted): 20 132
Included observations: 75
Excluded observations: 38 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16459615	63869431	0.257707	0.7974
$I_i - I_{i69}$	1.603543	0.036335	44.13187	0.0000

R-squared	0.963873	Mean dependent var	2.07E+09
Adjusted R-squared	0.963378	S.D. dependent var	1.97E+09
S.E. of regression	3.78E+08	Akaike info criterion	42.36468
Sum squared resid	1.04E+19	Schwarz criterion	42.42648
Log likelihood	-1586.675	F-statistic	1947.622
Durbin-Watson stat	0.939623	Prob(F-statistic)	0.000000

Below are the regressions for the individual counties. Summing the error sum of squares for the following regressions gave the unrestricted equations error sum squares for the F-test:

Regression for Santa Barbara County

Dependent Variable: $Y_{SB} - Y_{SB69}$
Method: Least Squares
Sample(adjusted): 20 44
Included observations: 25 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	47718089	1.41E+08	0.337390	0.7389
$I_{SB} - I_{SB69}$	1.461276	0.111446	13.11196	0.0000

R-squared	0.882005	Mean dependent var	1.58E+09
Adjusted R-squared	0.876875	S.D. dependent var	1.14E+09
S.E. of regression	4.01E+08	Akaike info criterion	42.53209
Sum squared resid	3.69E+18	Schwarz criterion	42.62960
Log likelihood	-529.6512	F-statistic	171.9235
Durbin-Watson stat	0.953879	Prob(F-statistic)	0.000000

Regression for San Luis Obispo County

Dependent Variable: $Y_{SLO} - Y_{SLO69}$
Method: Least Squares
Sample(adjusted): 108 132
Included observations: 25 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-19257445	1.80E+08	-0.106720	0.9159
$Y_{SLO} - Y_{SLO69}$	1.634789	0.067430	24.24425	0.0000

R-squared	0.962343	Mean dependent var	3.63E+09
Adjusted R-squared	0.960706	S.D. dependent var	2.51E+09
S.E. of regression	4.98E+08	Akaike info criterion	42.96476
Sum squared resid	5.69E+18	Schwarz criterion	43.06227
Log likelihood	-535.0594	F-statistic	587.7837
Durbin-Watson stat	0.915752	Prob(F-statistic)	0.000000

Regression for Ventura County

Dependent Variable: $Y_V - Y_{V69}$
Method: Least Squares
Sample(adjusted): 64 88
Included observations: 25 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	84256669	29808099	2.826637	0.0096
$I_V - I_{V69}$	1.630922	0.042263	38.58993	0.0000

R-squared	0.984790	Mean dependent var	1.02E+09
Adjusted R-squared	0.984129	S.D. dependent var	6.92E+08
S.E. of regression	87121452	Akaike info criterion	39.48012
Sum squared resid	1.75E+17	Schwarz criterion	39.57763
Log likelihood	-491.5015	F-statistic	1489.183
Durbin-Watson stat	1.503577	Prob(F-statistic)	0.000000

H_0: Coefficients for $I_{SB} - I_{SB69}$, $I_{SLO} - I_{SLO69}$, and $I_V - I_{V69}$ are the same

The F-test performed was: $$F_{n,d} = \frac{\dfrac{ESS_{ur} - ESS_r}{n}}{\dfrac{ESS_r}{d}}$$

Where:

$F_{n,d}$: Is distributed F with n degrees of freedom in the numerator and d degrees of freedom in the denominator

n: Is the number of variables in the unrestricted equation minus the number of variables in the restricted equation.

d: Is the number of observations in the unrestricted equation minus the number of variables in the unrestricted equation.

ESS: Error sum of squares

r: restricted equation

ur: unrestricted equation

The values used for the F-test are given below:

ESS_r = 1.04E+19

ESS_{ur} = 9.56E+18; which is the sum of the ESS for the three county regressions.

n = 4; the restricted equation contains a constant and one coefficient. The unrestricted equation has six variables because each county regression contained two variables.

d = 69; Each county regression has 25 observations and 2 variables. Thus the unrestricted regression has 75 observations and 6 variables.

Thus the F-test is: $$F_{4,69} = \frac{\dfrac{1.04E+19 - 9.56E+18}{4}}{\dfrac{9.56E+18}{69}} = 1.53$$

APPENDIX C

Vector Auto Regression

An alternative approach to the analysis of the effects of oil production on the Tri-County area is a Vector Auto Regression (VAR) model. A VAR is essentially a simultaneous equation regression model with lagged variables.

Two models were used to determine the effect of oil production for each county, as well as an estimate for the combined economy of all three counties. The first model used income, retail sales, property values and population as the endogenous variables with local oil production, federal oil production and California crude oil prices as the exogenous variables. The second VAR model used income, retail sales, property values, population, and total county employment as the endogenous variables. The exogenous variables in the second model are local oil production, federal oil production, California crude oil price and county mining employment. The reduced form of each equation is given below:

Model I:

$$INCOME_t = \alpha_1 + \sum_{i=1} \beta_{1i} INCOME_{t-i} + \sum_{i=1} \gamma_{1i} SALES_{t-i} + \sum_{i=1} \delta_{1i} PROPERTY_{t-i}$$
$$+ \sum_{i=1} \lambda_i POPULATION_{t-i} + \sum_{i=0} \pi_{1i} LOCALOIL_{t-i} + \sum_{i=9} v_{1i} FEDOIL_{t-i}$$
$$+ \sum_{i=0} \omega_{1i} OILPRICE_{t-i} + \varepsilon_{1t}$$

$$SALES_t = \alpha_2 + \sum_{i=1} \beta_{2i} INCOME_{t-i} + \sum_{i=1} \gamma_{2i} SALES_{t-i} + \sum_{i=1} \delta_{2i} PROPERTY_{t-i}$$
$$+ \sum_{i=1} \lambda_{2i} POPULATION_{t-i} + \sum_{i=0} \pi_{2i} LOCALOIL_{t-i} + \sum_{i=9} v_{2i} FEDOIL_{t-i}$$
$$+ \sum_{i=0} \omega_{2i} OILPRICE_{t-i} + \varepsilon_{2t}$$

$$PROPERTY_t = \alpha_3 + \sum_{i=1} \beta_{3i} INCOME_{t-i} + \sum_{i=1} \gamma_{3i} SALES_{t-i} + \sum_{i=1} \delta_{3i} PROPERTY_{t-i}$$
$$+ \sum_{i=1} \lambda_{3i} POPULATION_{t-i} + \sum_{i=0} \pi_{3i} LOCALOIL_{t-i} + \sum_{i=9} v_{3i} FEDOIL_{t-i}$$
$$+ \sum_{i=0} \omega_{3i} OILPRICE_{t-i} + \varepsilon_{3t}$$

$$POPULATION_t = \alpha_4 + \sum_{i=1} \beta_{4i} INCOME_{t-i} + \sum_{i=1} \gamma_{4i} SALES_{t-i} + \sum_{i=1} \delta_{4i} PROPERTY_{t-i}$$
$$+ \sum_{i=1} \lambda_{4i} POPULATION_{t-i} + \sum_{i=0} \pi_{4i} LOCALOIL_{t-i} + \sum_{i=9} v_{4i} FEDOIL_{t-i}$$
$$+ \sum_{i=0} \omega_{4i} OILPRICE_{t-i} + \varepsilon_{4t}$$

Model II:

$$INCOME_t = \alpha_1 + \sum_{i=1} \beta_{1i} INCOME_{t-i} + \sum_{i=1} \gamma_{1i} SALES_{t-i} + \sum_{i=1} \delta_{1i} PROPERTY_{t-i}$$
$$+ \sum_{i=1} \lambda_i POPULATION_{t-i} + \sum_{i=1} \phi_{1i} TOTEMP_{t-i} + \sum_{i=0} \pi_{1i} LOCALOIL_{t-i} + \sum_{i=9} \nu_{1i} FEDOIL_{t-i}$$
$$+ \sum_{i=0} \omega_{1i} OILPRICE_{t-i} + \sum_{i=0} \varphi_{1i} MINEMP_{t-i} + \varepsilon_{1t}$$
$$SALES_t = \alpha_2 + \sum_{i=1} \beta_{2i} INCOME_{t-i} + \sum_{i=1} \gamma_{2i} SALES_{t-i} + \sum_{i=1} \delta_{2i} PROPERTY_{t-i}$$
$$+ \sum_{i=1} \lambda_{2i} POPULATION_{t-i} + \sum_{i=1} \phi_{2i} TOTEMP_{t-i} + \sum_{i=0} \pi_{2i} LOCALOIL_{t-i} + \sum_{i=9} \nu_{2i} FEDOIL_{t-i}$$
$$+ \sum_{i=0} \omega_{2i} OILPRICE_{t-i} + \sum_{i=0} \varphi_{2i} MINEMP_{t-i} + \varepsilon_{2t}$$
$$PROPERTY_t = \alpha_3 + \sum_{i=1} \beta_{3i} INCOME_{t-i} + \sum_{i=1} \gamma_{3i} SALES_{t-i} + \sum_{i=1} \delta_{3i} PROPERTY_{t-i}$$
$$+ \sum_{i=1} \lambda_{3i} POPULATION_{t-i} + \sum_{i=1} \phi_{3i} TOTEMP_{t-i} + \sum_{i=0} \pi_{3i} LOCALOIL_{t-i} + \sum_{i=9} \nu_{3i} FEDOIL_{t-i}$$
$$+ \sum_{i=0} \omega_{3i} OILPRICE_{t-i} + \sum_{i=0} \varphi_{3i} MINEMP_{t-i} + \varepsilon_{3t}$$
$$POPULATION_t = \alpha_4 + \sum_{i=1} \beta_{4i} INCOME_{t-i} + \sum_{i=1} \gamma_{4i} SALES_{t-i} + \sum_{i=1} \delta_{4i} PROPERTY_{t-i}$$
$$+ \sum_{i=1} \lambda_{4i} POPULATION_{t-i} + \sum_{i=1} \phi_{4i} TOTEMP_{t-i} + \sum_{i=0} \pi_{4i} LOCALOIL_{t-i} + \sum_{i=9} \nu_{4i} FEDOIL_{t-i}$$
$$+ \sum_{i=0} \omega_{4i} OILPRICE_{t-i} + \sum_{i=0} \varphi_{4i} MINEMP_{t-i} + \varepsilon_{4t}$$
$$TOTEMP_t = \alpha_5 + \sum_{i=1} \beta_{5i} INCOME_{t-i} + \sum_{i=1} \gamma_{5i} SALES_{t-i} + \sum_{i=1} \delta_{5i} PROPERTY_{t-i}$$
$$+ \sum_{i=1} \lambda_{5i} POPULATION_{t-i} + \sum_{i=1} \phi_{5i} TOTEMP_{t-i} + \sum_{i=0} \pi_{5i} LOCALOIL_{t-i} + \sum_{i=9} \nu_{5i} FEDOIL_{t-i}$$
$$+ \sum_{i=0} \omega_{5i} OILPRICE_{t-i} + \sum_{i=0} \varphi_{5i} MINEMP_{t-i} + \varepsilon_{5t}$$

The second model was not used for either San Luis Obispo County or the combination of the three counties because a complete time series for employment is not available for San Luis Obispo County. For both models regressions were performed in levels and in first differences[1]. The variables were first differenced because all of them contained at least one unit root.[2,3] It should be noted that the second model was only used for Santa Barbara and Ventura Counties. Because lags of the variables are used in these models, elimination of unit roots via first differencing is necessary to remove the effects of multicollinearity inherent with these types of variables.

In the initial construction of the first model each equation of the VAR contained three lags for all the variables. In addition to three lags for each variable, each equation in a VAR contained a constant as well as contemporaneous parameter for each exogenous variable. In the initial VARs of the first model each equation in a VAR contained twenty-five variables (lags, contemporaneous values, and a constant). Longer lag lengths were not used because of the limited number of observations.

While there were three lags for each variable in Model I, there were only two lags per variable in Model II. There were fewer lags in the second model for two reasons. First, the number of parameters increased from the first model, and second the number of observations decreased. As a result it was necessary to reduce the initial number of lags.

Once the number of lags was set for the initial VARs for both models, log likelihood tests were performed to reduce the number of lags in both models. The restricted VAR used was one with a constant, one lag per variable, and contemporaneous variables for the exogenous data series. The restricted VARs contained eleven variables for the first model and fourteen variables for the second model.

The log likelihood equation used to determine the number of lags is:

$$(T-c) * (\log|\Sigma_r| - \log|\Sigma_u|)$$

Where:

T: is the number of usable observation (The regression is from the sample range of the unrestricted regression)

c: is the number of variables per equation of the unrestricted VAR

S: is the determinant of the covariance matrix of the residuals of the equations in the unrestricted and restricted VARs

r: is for the restricted equation

u: is for the unrestricted equation.

This likelihood ratio test is distributed c^2 with the number of degrees of freedom equal to the total number of restrictions in the restricted VAR. The total number of restrictions equals the number restrictions per equation of the restricted VAR multiplied by the number of equations in the VAR.

Using log likelihood ratios we were able to test the hypothesis that the coefficients on lags greater than one period are equal to zero. We failed to reject this hypothesis for all counties and both models at the five percent significance level.

Once the appropriate lag length was determined, the same log likelihood statistic was used to determine whether the coefficients of the exogenous variables are equal to zero. Testing this hypothesis we could only reject the null hypothesis for three of the twelve VARs at the five per cent significance level. The three VARs that rejected the null hypothesis were for Model I in levels for San Luis Obispo, Santa Barbara, and the combined Tri-County VAR. Thus the exogenous variables which were placed in the model to determine the oil industries effect on the Tri-County region generally have no statistically significant effect on the local economies. Additionally, examining the final regressions the VARs for each county do a very poor job of explaining the effects on the individual counties. Very few of the endogenous variables have t-statistics that are statistically significant at the five percent level.

Although there seems to be little in the way of statistical significance for either model it is worthwhile to examine the two models and the effects of the oil industry on the three counties.

Below are the variables used in the following VARs.

Variable Definitions:

SLOINC: San Luis Obispo County Adjusted Gross Income
SLOSALES: San Luis Obispo County Retail Sales
SLOPROP: San Luis Obispo County Property Values based on Tax Assessments
SLOPOP: San Luis Obispo County Population
SLOOIL: San Luis Obispo County Oil Production

SBINC: Santa Barbara County Adjusted Gross Income
SBSALES: Santa Barbara County Retail Sales
SBPROP: Santa Barbara County Property Values based on Tax Assessments
SBPOP: Santa Barbara County Population
SBOIL: Santa Barbara County Oil Production
SBTOTEMP: Santa Barbara County Total Employment
SBMINEMP: Santa Barbara County Mining Employment

VINC: Ventura County Adjusted Gross Income
VSALES: Ventura County Retail Sales
VPROP: Ventura County Property Values based on Tax Assessments
VPOP: Ventura County Population
VOIL: Ventura County Oil Production
VTOTEMP: Ventura County Total Employment
VMINEMP: Ventura County Mining Employment

ALLINC: Sum of the Tri-County Area's County Adjusted Gross Income
ALLSALES: Sum of the Tri-County Area's County Retail Sales
ALLPROP: Sum of the Tri-County Area's County Property Values based on Tax Assessments
ALLPOP: Sum of the Tri-County Area's County Population
ALLOIL: Sum of the Tri-County Area's County Oil Production

FOIL: Federal Waters Oil Production
OILPRICE: California Crude Oil Price

Variables with a D before their names are first difference versions of the above variables.

Below are the two Model I VARs in reduced form for San Luis Obispo County. The first VAR is levels and the second VAR is in first differences.

Model I in Levels for San Luis Obispo County

Sample(adjusted): 1951 1993

Included observations: 43 after adjusting endpoints

Standard errors & t-statistics in parentheses

	SLOINC	SLOSALES	SLOPROP	SLOPOP4
SLOINC(-1)	0.482755	0.697003	1.409865	2.07E-05
	(0.22554)	(0.13468)	(0.66807)	(9.5E-06)
	(2.14045)	(5.17514)	(2.11035)	(2.17467)
SLOSALES(-1)	0.266759	0.310024	0.012212	9.08E-06
	(0.24725)	(0.14765)	(0.73239)	(1.0E-05)
	(1.07890)	(2.09974)	(0.01667)	(0.87126)
SLOPROP(-1)	-0.002856	-0.018496	0.853255	-5.43E-07
	(0.01577)	(0.00942)	(0.04671)	(6.6E-07)
	(-0.18110)	(-1.96431)	(18.2683)	(-0.81639)
SLOPOP4(-1)	3476.272	-611.3009	-497.9857	0.710203
	(2084.44)	(1244.74)	(6174.32)	(0.08789)
	(1.66773)	(-0.49111)	(-0.08065)	(8.08013)
C	-1.28E+08	-25931002	-3.14E+08	20999.14
	(1.4E+08)	(8.4E+07)	(4.2E+08)	(5959.30)
	(-0.90824)	(-0.30726)	(-0.74954)	(3.52376)
SLOOIL	-6.085600	16.44617	-10.89225	-0.002219
	(34.2902)	(20.4767)	(101.571)	(0.00145)
	(-0.17747)	(0.80316)	(-0.10724)	(-1.53481)
SLOOIL(-1)	2.718568	26.69142	139.6064	-0.000590
	(38.0517)	(22.7229)	(112.713)	(0.00160)
	(0.07144)	(1.17465)	(1.23860)	(-0.36744)
FOIL	-5.808699	-7.882117	-22.12805	-9.33E-05
	(2.82743)	(1.68843)	(8.37515)	(0.00012)
	(-2.05441)	(-4.66832)	(-2.64211)	(-0.78260)
FOIL(-1)	6.856255	8.549338	18.39996	0.000247
	(2.76854)	(1.65326)	(8.20070)	(0.00012)
	(2.47649)	(5.17120)	(2.24370)	(2.11663)
OILPRICE	-3747249.	-1759546.	-59443007	2.045487
	(3920506)	(2341167)	(1.2E+07)	(165.317)
	(-0.95581)	(-0.75157)	(-5.11869)	(0.01237)
OILPRICE(-1)	4473859.	1459176.	58177442	161.1647
	(3723563)	(2223560)	(1.1E+07)	(157.012)
	(1.20150)	(0.65623)	(5.27468)	(1.02645)
R-squared	0.990806	0.993341	0.998063	0.998283
Adj. R-squared	0.987933	0.991260	0.997457	0.997746
Sum sq. resids	1.17E+17	4.16E+16	1.02E+18	2.07E+08
Determinant Residual Covariance		1.63E+53		

Model I in First Differences for San Luis Obispo County

Sample(adjusted): 1952 1993

Included observations: 42 after adjusting endpoints

Standard errors & t-statistics in parentheses

	DSLOINC	DSLOSALES	DSLOPROP	DSLOPOP4
DSLOINC(-1)	-0.237033	0.494000	0.591015	8.85E-06
	(0.19132)	(0.12109)	(0.56251)	(8.8E-06)
	(-1.23891)	(4.07976)	(1.05067)	(1.00819)
DSLOSALES(-1)	-0.024382	-0.201634	0.545017	7.60E-06
	(0.24798)	(0.15694)	(0.72909)	(1.1E-05)
	(-0.09832)	(-1.28476)	(0.74753)	(0.66749)
DSLOPROP(-1)	0.040219	0.017939	0.499384	8.53E-07
	(0.04800)	(0.03038)	(0.14113)	(2.2E-06)
	(0.83787)	(0.59050)	(3.53849)	(0.38691)
DSLOPOP4(-1)	141.6627	-1565.998	20353.87	0.200606
	(3909.42)	(2474.20)	(11494.1)	(0.17945)
	(0.03624)	(-0.63293)	(1.77082)	(1.11790)
C	47489361	17745479	14895972	2558.257
	(2.0E+07)	(1.3E+07)	(5.9E+07)	(921.429)
	(2.36572)	(1.39680)	(0.25239)	(2.77640)
DSLOOIL	24.15832	17.77020	20.50602	-0.001944
	(38.9340)	(24.6406)	(114.470)	(0.00179)
	(0.62049)	(0.72118)	(0.17914)	(-1.08802)
DSLOOIL(-1)	20.56659	24.86040	88.51327	0.001603
	(36.1165)	(22.8574)	(106.186)	(0.00166)
	(0.56945)	(1.08763)	(0.83357)	(0.96691)
DFOIL	-7.046998	-7.861278	-5.795294	-0.000140
	(3.21486)	(2.03462)	(9.45199)	(0.00015)
	(-2.19201)	(-3.86375)	(-0.61313)	(-0.94875)
DFOIL(-1)	-0.028657	4.533999	12.67033	0.000123
	(3.38680)	(2.14344)	(9.95753)	(0.00016)
	(-0.00846)	(2.11529)	(1.27244)	(0.79089)
DOILPRICE	-4635343.	-1341304.	-41519196	48.14703
	(3941494)	(2494495)	(1.2E+07)	(180.922)
	(-1.17604)	(-0.53771)	(-3.58283)	(0.26612)
DOILPRICE(-1)	-1196493.	-365079.1	10159897	-28.30759
	(4546510)	(2877398)	(1.3E+07)	(208.693)
	(-0.26317)	(-0.12688)	(0.76006)	(-0.13564)
R-squared	0.284053	0.517481	0.672663	0.290841
Adj. R-squared	0.053102	0.361829	0.567070	0.062080
Sum sq. resids	1.36E+17	5.43E+16	1.17E+18	2.86E+08
Determinant Residual Covariance		5.39E+53		

Examining both the first differenced and level versions of Model I, one can clearly see that local oil production, SLOOIL or DSLOOIL, does not have a statistically significant effect on the county economy. Although local oil productions effects on San Luis Obispo County are statistically insignificant, federal oil production, FOIL or DFOIL, does have statistically significant coefficients. However, the contemporaneous effects in both versions of Model I seem to be countered by changes in sign in the lagged value of federal oil production.

Similar to San Luis Obispo County, the VARs for Santa Barbara County performed poorly in estimating the interactions of various economic variables and oil industry's effect on the county. Below are the Model I VARs for Santa Barbara County:

Model I in Levels for Santa Barbara County

Sample(adjusted): 1951 1993

Included observations: 43 after adjusting endpoints

Standard errors & t-statistics in parentheses

	SBINC	SBSALES	SBPROP	SBPOP4
SBINC(-1)	0.210072	0.077389	0.384498	8.98E-06
	(0.19373)	(0.06976)	(0.32542)	(6.6E-06)
	(1.08437)	(1.10929)	(1.18154)	(1.36206)
SBSALES(-1)	1.060575	0.736632	-0.087995	-2.70E-05
	(0.39973)	(0.14395)	(0.67147)	(1.4E-05)
	(2.65320)	(5.11728)	(-0.13105)	(-1.98508)
SBPROP(-1)	0.011925	-0.011311	0.979540	-3.08E-07
	(0.03042)	(0.01095)	(0.05110)	(1.0E-06)
	(0.39202)	(-1.03262)	(19.1702)	(-0.29746)
SBPOP4(-1)	1951.968	882.8418	-1602.683	1.013539
	(1582.21)	(569.774)	(2657.78)	(0.05382)
	(1.23370)	(1.54946)	(-0.60302)	(18.8307)
C	-56964093	2.21E+08	3.76E+08	49801.91
	(3.8E+08)	(1.4E+08)	(6.4E+08)	(12945.2)
	(-0.14969)	(1.61017)	(0.58759)	(3.84713)
SBOIL	-13.38397	-4.499703	6.900343	-0.000595
	(10.9063)	(3.92750)	(18.3203)	(0.00037)
	(-1.22718)	(-1.14569)	(0.37665)	(-1.60349)
SBOIL(-1)	7.713647	-1.829680	-16.07561	-0.000666
	(11.0876)	(3.99281)	(18.6249)	(0.00038)
	(0.69570)	(-0.45824)	(-0.86312)	(-1.76443)
FOIL	-28.18709	-8.913040	-28.72135	-0.000230
	(7.49814)	(2.70018)	(12.5953)	(0.00026)
	(-3.75921)	(-3.30090)	(-2.28032)	(-0.90221)
FOIL(-1)	20.70739	7.616572	17.93743	-0.000160
	(7.40771)	(2.66762)	(12.4434)	(0.00025)
	(2.79538)	(2.85520)	(1.44152)	(-0.63487)
OILPRICE	-37307199	2462830.	-24977217	-344.2182
	(1.1E+07)	(4039194)	(1.9E+07)	(381.564)
	(-3.32611)	(0.60973)	(-1.32566)	(-0.90213)
OILPRICE(-1)	35887050	2149347.	38512625	806.7450
	(1.0E+07)	(3729269)	(1.7E+07)	(352.286)
	(3.46540)	(0.57635)	(2.21392)	(2.29003)
R-squared	0.983035	0.993472	0.996351	0.996868
Adj. R-squared	0.977733	0.991432	0.995211	0.995890
Sum sq. resids	9.18E+17	1.19E+17	2.59E+18	1.06E+09
Determinant Residual Covariance		5.86E+55		

Model I in Levels for Santa Barbara County

Sample(adjusted): 1952 1993

Included observations: 42 after adjusting endpoints

Standard errors & t-statistics in parentheses

	DSBINC	DSBSALES	DSBPROP	DSBPOP4
DSBINC(-1)	-0.330462	0.006673	0.151287	4.22E-07
	(0.18286)	(0.05853)	(0.27814)	(4.9E-06)
	(-1.80715)	(0.11400)	(0.54393)	(0.08668)
DSBSALES(-1)	0.667346	-0.013647	-0.258056	7.48E-08
	(0.56964)	(0.18233)	(0.86642)	(1.5E-05)
	(1.17153)	(-0.07485)	(-0.29784)	(0.00494)
DSBPROP(-1)	-0.069241	-0.012899	0.498613	-7.27E-07
	(0.10768)	(0.03447)	(0.16378)	(2.9E-06)
	(-0.64303)	(-0.37424)	(3.04441)	(-0.25348)
DSBPOP4(-1)	6504.001	3175.412	7335.571	0.681653
	(5277.09)	(1689.13)	(8026.49)	(0.14047)
	(1.23250)	(1.87991)	(0.91392)	(4.85253)
C	61706433	30966155	1.23E+08	2218.444
	(6.0E+07)	(1.9E+07)	(9.2E+07)	(1610.42)
	(1.01998)	(1.59912)	(1.33980)	(1.37756)
DSBOIL	-10.54587	-2.854460	6.385307	-0.000271
	(12.3269)	(3.94567)	(18.7492)	(0.00033)
	(-0.85552)	(-0.72344)	(0.34056)	(-0.82657)
DSBOIL(-1)	-1.229853	-3.557863	-7.600492	-0.000126
	(11.9441)	(3.82316)	(18.1671)	(0.00032)
	(-0.10297)	(-0.93061)	(-0.41837)	(-0.39552)
DFOIL	-26.47159	-7.980365	-15.79231	-0.000131
	(8.89509)	(2.84720)	(13.5295)	(0.00024)
	(-2.97598)	(-2.80288)	(-1.16725)	(-0.55432)
DFOIL(-1)	4.469486	-2.712402	5.779675	9.24E-05
	(10.1667)	(3.25423)	(15.4636)	(0.00027)
	(0.43962)	(-0.83350)	(0.37376)	(0.34149)
DOILPRICE	-28645573	3026508.	-6738150.	-81.03632
	(1.3E+07)	(4144749)	(2.0E+07)	(344.692)
	(-2.21222)	(0.73020)	(-0.34212)	(-0.23510)
DOILPRICE(-1)	13941407	-2595975.	-1173915.	60.98519
	(1.3E+07)	(4208119)	(2.0E+07)	(349.962)
	(1.06044)	(-0.61690)	(-0.05871)	(0.17426)
R-squared	0.439132	0.414672	0.376351	0.478317
Adj. R-squared	0.258207	0.225856	0.175174	0.310032
Sum sq. resids	1.26E+18	1.29E+17	2.92E+18	8.96E+08
Determinant Residual Covariance		1.13E+56		

Looking above at the two Model I VARs Santa Barbara County, Santa Barbara local oil production, SBOIL or DSBOIL, has statistically insignificant but generally negative coefficients in both models. Unlike local oil production, federal oil production is statistically significant in several of the equations in both VARs, however, in both VARs the signs in the contemporaneous and lagged coefficient regularly switch signs. From Model I, one has the impression that there is some negative effects of oil production to the local economy. Examining Model II, shown below, the impression that oil production has a negative effect on the county in some ways is reaffirmed. However, in Model II mining employment (SBMINEMP or DSBMINEMP), which includes crude oil production employment, is generally positive although it has a statistically insignificant effect on the local economy in both versions of Model II. Additionally, comparing the coefficients of mining employment compared to total employment the effect of mining employment are much greater than the coefficients on total employment (SBTOTEMP, or DSBTOTEMP).

Model II in Levels for Santa Barbara County

Sample(adjusted): 1958 1993

Included observations: 36 after adjusting endpoints

Standard errors & t-statistics in parentheses

	SBINC	SBSALES	SBPROP	SBPOP4	SBTOTEMP
SBINC(-1)	-0.038941	0.000894	0.131003	7.31E-07	-6.54E-07
	(0.23492)	(0.08600)	(0.43566)	(6.1E-06)	(3.0E-06)
	(-0.16576)	(0.01040)	(0.30070)	(0.12061)	(-0.21967)
SBSALES(-1)	0.812003	0.190300	-2.301510	-1.51E-05	2.65E-06
	(0.97538)	(0.35707)	(1.80890)	(2.5E-05)	(1.2E-05)
	(0.83250)	(0.53294)	(-1.27233)	(-0.59946)	(0.21447)
SBPROP(-1)	-0.008416	-0.032340	0.892633	7.38E-07	-8.48E-07
	(0.03690)	(0.01351)	(0.06843)	(9.5E-07)	(4.7E-07)
	(-0.22809)	(-2.39421)	(13.0450)	(0.77549)	(-1.81508)
SBPOP4(-1)	-85.46856	594.3735	-2784.069	0.809508	0.039284
	(3129.10)	(1145.52)	(5803.08)	(0.08069)	(0.03963)
	(-0.02731)	(0.51887)	(-0.47976)	(10.0324)	(0.99131)
SBTOTEMP(-1)	15032.53	12457.06	50719.10	0.336235	0.865018
	(21356.3)	(7818.23)	(39606.4)	(0.55071)	(0.27046)
	(0.70389)	(1.59333)	(1.28058)	(0.61055)	(3.19828)
C	-80536266	4.94E+08	1.51E+09	46210.50	16638.10
	(5.8E+08)	(2.1E+08)	(1.1E+09)	(15048.9)	(7390.80)
	(-0.13800)	(2.31267)	(1.39169)	(3.07068)	(2.25119)
SBOIL	-21.46654	-6.491348	44.08647	0.000635	-0.000123
	(34.4207)	(12.6009)	(63.8349)	(0.00089)	(0.00044)
	(-0.62365)	(-0.51515)	(0.69063)	(0.71591)	(-0.28287)
SBOIL(-1)	9.745463	-11.91965	-97.77427	-0.001050	-0.000606
	(29.1079)	(10.6560)	(53.9821)	(0.00075)	(0.00037)
	(0.33480)	(-1.11859)	(-1.81123)	(-1.39836)	(-1.64492)
FOIL	-33.75598	-11.92155	-36.68103	-0.000148	-0.000390
	(8.21543)	(3.00754)	(15.2359)	(0.00021)	(0.00010)
	(-4.10885)	(-3.96388)	(-2.40754)	(-0.69740)	(-3.74890)
FOIL(-1)	24.99571	5.955593	7.521796	9.41E-05	0.000231
	(8.16055)	(2.98746)	(15.1342)	(0.00021)	(0.00010)
	(3.06299)	(1.99353)	(0.49701)	(0.44714)	(2.23081)
OILPRICE	-43666754	-1222109.	-45318007	-390.0659	-237.6978
	(1.3E+07)	(4608826)	(2.3E+07)	(324.642)	(159.437)
	(-3.46851)	(-0.26517)	(-1.94099)	(-1.20153)	(-1.49085)
OILPRICE(-1)	10961765	-4116355.	23623780	241.0584	19.70601
	(1.4E+07)	(5013533)	(2.5E+07)	(353.149)	(173.438)
	(0.80042)	(-0.82105)	(0.93014)	(0.68260)	(0.11362)
SBMINEMP	235378.5	36411.57	152096.1	4.875853	4.740199
	(362525.)	(132715.)	(672321.)	(9.34833)	(4.59113)
	(0.64928)	(0.27436)	(0.22623)	(0.52157)	(1.03247)
SBMINEMP(-1)	515383.5	192507.6	501657.9	1.630861	6.846505
	(340165.)	(124529.)	(630854.)	(8.77174)	(4.30796)
	(1.51510)	(1.54588)	(0.79520)	(0.18592)	(1.58927)
R-squared	0.980915	0.992605	0.996099	0.997370	0.997864
Adj. R-squared	0.969637	0.988235	0.993793	0.995816	0.996602
Sum sq. resids	5.85E+17	7.84E+16	2.01E+18	3.89E+08	93883729
Determinant Residual Covariance		1.24E+61			

Model II in First Differences for Santa Barbara County

Sample(adjusted): 1959 1993

Included observations: 35 after adjusting endpoints

Standard errors & t-statistics in parentheses

	DSBINC	DSBSALES	DSBPROP	DSBPOP4	DSBTOTEMP
DSBINC(-1)	-0.381579	-0.039598	0.072239	-7.31E-07	-5.95E-08
	(0.19563)	(0.07223)	(0.35965)	(5.2E-06)	(2.3E-06)
	(-1.95053)	(-0.54821)	(0.20086)	(-0.13947)	(-0.02568)
DSBSALES(-1)	-0.810022	-0.097416	0.384068	-1.78E-05	6.50E-06
	(0.90438)	(0.33393)	(1.66263)	(2.4E-05)	(1.1E-05)
	(-0.89566)	(-0.29173)	(0.23100)	(-0.73548)	(0.60706)
DSBPROP(-1)	-0.059468	-0.006087	0.465098	-5.03E-07	-4.60E-07
	(0.10968)	(0.04050)	(0.20164)	(2.9E-06)	(1.3E-06)
	(-0.54220)	(-0.15032)	(2.30662)	(-0.17121)	(-0.35442)
DSBPOP4(-1)	8366.122	2325.015	2055.284	0.746404	0.092984
	(6086.76)	(2247.42)	(11190.0)	(0.16301)	(0.07210)
	(1.37448)	(1.03452)	(0.18367)	(4.57892)	(1.28957)
DSBTOTEMP(-1)	60230.14	5276.559	-16682.23	0.642745	0.143878
	(26790.3)	(9891.81)	(49251.5)	(0.71747)	(0.31736)
	(2.24821)	(0.53343)	(-0.33871)	(0.89585)	(0.45336)
C	-1.15E+08	23259876	2.41E+08	33.48346	1927.934
	(9.5E+07)	(3.5E+07)	(1.8E+08)	(2557.21)	(1131.14)
	(-1.20845)	(0.65973)	(1.37201)	(0.01309)	(1.70441)
DSBOIL	-83.73910	3.041681	48.75233	-0.000744	0.000157
	(35.7435)	(13.1976)	(65.7113)	(0.00096)	(0.00042)
	(-2.34278)	(0.23047)	(0.74192)	(-0.77686)	(0.37093)
DSBOIL(-1)	-5.029238	-21.96341	-20.46001	-0.000293	-0.000609
	(32.8477)	(12.1284)	(60.3876)	(0.00088)	(0.00039)
	(-0.15311)	(-1.81091)	(-0.33881)	(-0.33357)	(-1.56456)
DFOIL	-36.94899	-9.534741	-20.18563	-0.000194	-0.000302
	(9.27227)	(3.42362)	(17.0463)	(0.00025)	(0.00011)
	(-3.98489)	(-2.78499)	(-1.18417)	(-0.78186)	(-2.75223)
DFOIL(-1)	12.57390	-2.989734	3.774396	0.000168	-5.46E-05
	(10.1834)	(3.76003)	(18.7213)	(0.00027)	(0.00012)
	(1.23474)	(-0.79514)	(0.20161)	(0.61643)	(-0.45221)
DOILPRICE	-32702502	3409821.	-16410121	-10.25029	-140.2476
	(1.4E+07)	(5082669)	(2.5E+07)	(368.653)	(163.068)
	(-2.37568)	(0.67087)	(-0.64845)	(-0.02780)	(-0.86006)
DOILPRICE(-1)	14901967	-1369762.	-19710037	47.41755	1.243906
	(1.5E+07)	(5669342)	(2.8E+07)	(411.205)	(181.890)
	(0.97053)	(-0.24161)	(-0.69825)	(0.11531)	(0.00684)
DSBMINEMP	202084.8	-64972.98	159381.8	3.127863	2.923989
	(317379.)	(117186.)	(583474.)	(8.49969)	(3.75971)
	(0.63673)	(-0.55444)	(0.27316)	(0.36800)	(0.77772)
DSBMINEMP(-1)	322943.6	22623.69	665920.1	-0.922230	3.370319
	(324191.)	(119702.)	(595997.)	(8.68212)	(3.84040)
	(0.99615)	(0.18900)	(1.11732)	(-0.10622)	(0.87760)
R-squared	0.654366	0.504146	0.402835	0.597622	0.575708
Adj. R-squared	0.440402	0.197188	0.033162	0.348530	0.313051
Sum sq. resids	7.67E+17	1.05E+17	2.59E+18	5.50E+08	1.08E+08
Determinant Residual Covariance		5.78E+61			

Because of the availability of employment data we used both Model I and Model II in our analysis of Ventura County. Unfortunately, the results were extremely weak. Looking below, one sees a vast majority of the coefficients were statistically insignificant. In fact, only three times in the four VAR models were the oil industry coefficients statistically significant.

Model I in Levels for Ventura County
Sample(adjusted): 1951 1993
Included observations: 43 after adjusting endpoints
Standard errors & t-statistics in parentheses

	VINC	VSALES	VPROP	VPOP4
VINC(-1)	0.858238	0.406906	0.440235	5.97E-06
	(0.21321)	(0.08745)	(0.62761)	(5.2E-06)
	(4.02539)	(4.65283)	(0.70145)	(1.14377)
VSALES(-1)	-0.324061	0.386369	1.007977	-1.13E-05
	(0.38855)	(0.15938)	(1.14375)	(9.5E-06)
	(-0.83403)	(2.42427)	(0.88129)	(-1.18386)
VPROP(-1)	0.017035	0.000912	0.826123	-6.35E-07
	(0.03565)	(0.01462)	(0.10493)	(8.7E-07)
	(0.47787)	(0.06235)	(7.87282)	(-0.72785)
VPOP4(-1)	2880.190	-479.1234	-1686.220	1.061784
	(2647.68)	(1086.03)	(7793.87)	(0.06484)
	(1.08782)	(-0.44117)	(-0.21635)	(16.3759)
C	-2.31E+08	13923837	3.38E+08	249.7442
	(7.3E+08)	(3.0E+08)	(2.1E+09)	(17860.9)
	(-0.31730)	(0.04654)	(0.15754)	(0.01398)
VOIL	-9.848275	1.436204	7.252462	-0.000407
	(26.7569)	(10.9752)	(78.7633)	(0.00066)
	(-0.36806)	(0.13086)	(0.09208)	(-0.62148)
VOIL(-1)	9.849054	1.793336	2.723869	0.000593
	(22.1992)	(9.10575)	(65.3471)	(0.00054)
	(0.44367)	(0.19695)	(0.04168)	(1.09035)
FOIL	-10.64609	-5.351957	-4.428675	4.44E-05
	(11.3674)	(4.66271)	(33.4618)	(0.00028)
	(-0.93655)	(-1.14782)	(-0.13235)	(0.15954)
FOIL(-1)	17.64216	5.984230	-12.94198	-0.000359
	(11.0495)	(4.53233)	(32.5261)	(0.00027)
	(1.59664)	(1.32034)	(-0.39790)	(-1.32734)
OILPRICE	-15669037	7226812.	-34815809	135.9685
	(1.7E+07)	(7106838)	(5.1E+07)	(424.291)
	(-0.90436)	(1.01688)	(-0.68264)	(0.32046)
OILPRICE(-1)	22357696	-5345944.	17096776	-235.3601
	(1.5E+07)	(5967253)	(4.3E+07)	(356.256)
	(1.53684)	(-0.89588)	(0.39924)	(-0.66065)
R-squared	0.991649	0.995752	0.994504	0.999276
Adj. R-squared	0.989040	0.994425	0.992786	0.999050
Sum sq. resids	1.82E+18	3.06E+17	1.57E+19	1.09E+09
Determinant Residual Covariance		2.09E+57		

Model I in First Differences for Ventura County
Sample(adjusted): 1952 1993
Included observations: 42 after adjusting endpoints
Standard errors & t-statistics in parentheses

	DVINC	DVSALES	DVPROP	DVPOP4
DVINC(-1)	0.040937	0.117296	-0.724099	1.02E-05
	(0.24418)	(0.12008)	(0.77013)	(5.9E-06)
	(0.16765)	(0.97683)	(-0.94023)	(1.72216)
DVSALES(-1)	0.235491	0.073777	1.595051	2.81E-06
	(0.38954)	(0.19156)	(1.22859)	(9.5E-06)
	(0.60453)	(0.38513)	(1.29828)	(0.29666)
DVPROP(-1)	-0.059744	-0.027640	0.116909	-8.22E-07
	(0.05841)	(0.02872)	(0.18422)	(1.4E-06)
	(-1.02285)	(-0.96229)	(0.63462)	(-0.57930)
DVPOP4(-1)	-412.3608	7925.779	29520.49	0.193521
	(7768.12)	(3820.07)	(24500.1)	(0.18882)
	(-0.05308)	(2.07477)	(1.20491)	(1.02488)
C	1.63E+08	-15261078	1.58E+08	9305.763
	(1.0E+08)	(4.9E+07)	(3.1E+08)	(2427.32)
	(1.62865)	(-0.31077)	(0.50239)	(3.83376)
DVOIL	-11.94606	12.01443	68.27163	-0.000863
	(26.5906)	(13.0763)	(83.8648)	(0.00065)
	(-0.44926)	(0.91880)	(0.81407)	(-1.33563)
DVOIL(-1)	-17.82945	-2.893070	-37.40375	0.000260
	(23.7226)	(11.6659)	(74.8194)	(0.00058)
	(-0.75158)	(-0.24799)	(-0.49992)	(0.45165)
DFOIL	-17.14386	-8.380487	-13.52582	8.87E-05
	(11.2855)	(5.54976)	(35.5935)	(0.00027)
	(-1.51911)	(-1.51006)	(-0.38001)	(0.32339)
DFOIL(-1)	26.54943	-1.618368	3.573397	0.000156
	(11.8369)	(5.82096)	(37.3328)	(0.00029)
	(2.24293)	(-0.27802)	(0.09572)	(0.54337)
DOILPRICE	-28070414	2889258.	-1191793.	249.7546
	(1.6E+07)	(7883989)	(5.1E+07)	(389.700)
	(-1.75089)	(0.36647)	(-0.02357)	(0.64089)
DOILPRICE(-1)	-4929262.	-17129747	-78670438	233.0393
	(1.6E+07)	(7819740)	(5.0E+07)	(386.524)
	(-0.30999)	(-2.19058)	(-1.56864)	(0.60291)
R-squared	0.276128	0.419358	0.192748	0.295224
Adj. R-squared	0.042621	0.232055	-0.067656	0.067878
Sum sq. resids	1.93E+18	4.67E+17	1.92E+19	1.14E+09
Determinant Residual Covariance		5.22E+57		

Model II in Levels for Ventura County

Sample(adjusted): 1958 1993

Included observations: 36 after adjusting endpoints

Standard errors & t-statistics in parentheses

	VINC	VSALES	VPROP	VPOP4	VTOTEMP
VINC(-1)	0.438705	0.273811	-0.256737	7.38E-06	6.20E-06
	(0.26995)	(0.11178)	(0.84254)	(3.8E-06)	(2.3E-06)
	(1.62514)	(2.44962)	(-0.30472)	(1.92473)	(2.64380)
VSALES(-1)	0.180114	0.229886	0.844400	-3.94E-06	3.52E-06
	(0.65983)	(0.27321)	(2.05940)	(9.4E-06)	(5.7E-06)
	(0.27297)	(0.84141)	(0.41002)	(-0.42046)	(0.61361)
VPROP(-1)	-0.038303	-0.054639	0.466252	-2.24E-06	6.20E-07
	(0.07637)	(0.03162)	(0.23837)	(1.1E-06)	(6.6E-07)
	(-0.50151)	(-1.72777)	(1.95597)	(-2.06488)	(0.93427)
VPOP4(-1)	10317.14	628.3811	-19689.82	0.739462	0.026732
	(6310.16)	(2612.81)	(19694.6)	(0.08958)	(0.05482)
	(1.63500)	(0.24050)	(-0.99976)	(8.25521)	(0.48761)
VTOTEMP(-1)	-7776.847	12376.85	100789.0	0.544941	0.569317
	(24100.4)	(9979.12)	(75219.5)	(0.34211)	(0.20938)
	(-0.32269)	(1.24027)	(1.33993)	(1.59286)	(2.71905)
C	-2.06E+09	-3.54E+08	5.68E+09	97415.80	-485.5779
	(1.8E+09)	(7.5E+08)	(5.6E+09)	(25572.7)	(15651.0)
	(-1.14605)	(-0.47429)	(1.01057)	(3.80937)	(-0.03103)
VOIL	-58.62890	-6.306736	47.26939	-0.001971	-0.000181
	(54.3385)	(22.4996)	(169.595)	(0.00077)	(0.00047)
	(-1.07896)	(-0.28030)	(0.27872)	(-2.55567)	(-0.38351)
VOIL(-1)	56.64826	8.379206	-156.7091	0.000574	-2.69E-05
	(54.6253)	(22.6184)	(170.491)	(0.00078)	(0.00047)
	(1.03703)	(0.37046)	(-0.91917)	(0.73967)	(-0.05671)
FOIL	2.787050	-5.684458	-19.54397	0.000143	-0.000112
	(13.9803)	(5.78876)	(43.6339)	(0.00020)	(0.00012)
	(0.19936)	(-0.98198)	(-0.44791)	(0.72136)	(-0.92522)
FOIL(-1)	7.141545	4.255856	24.31136	0.000138	0.000125
	(14.4366)	(5.97767)	(45.0579)	(0.00020)	(0.00013)
	(0.49468)	(0.71196)	(0.53956)	(0.67176)	(1.00031)
OILPRICE	-17951497	2888363.	-52917729	91.09883	11.91353
	(2.1E+07)	(8515633)	(6.4E+07)	(291.942)	(178.674)
	(-0.87288)	(0.33918)	(-0.82441)	(0.31204)	(0.06668)
OILPRICE(-1)	-21189284	-18178664	-41233241	-130.4582	-284.1574
	(2.2E+07)	(9232051)	(7.0E+07)	(316.503)	(193.706)
	(-0.95036)	(-1.96908)	(-0.59253)	(-0.41219)	(-1.46695)
VMINEMP	23873.26	111611.8	488439.2	6.113096	6.195183
	(449473.)	(186111.)	(1402849)	(6.38045)	(3.90497)
	(0.05311)	(0.59971)	(0.34818)	(0.95810)	(1.58649)
VMINEMP(-1)	525096.1	14196.10	345935.6	-3.659608	-0.313603
	(353929.)	(146550.)	(1104647)	(5.02417)	(3.07490)
	(1.48362)	(0.09687)	(0.31316)	(-0.72840)	(-0.10199)
R-squared	0.991257	0.995791	0.994188	0.999717	0.999276
Adj. R-squared	0.986091	0.993304	0.990753	0.999549	0.998848
Sum sq. resids	1.28E+18	2.19E+17	1.25E+19	2.58E+08	96509929
Determinant Residual Covariance		3.97E+62			

Model II in First Differences for Ventura County

Sample(adjusted): 1959 1993
Included observations: 35 after adjusting endpoints
Standard errors & t-statistics in parentheses

	DVINC	DVSALES	DVPROP	DVPOP4	DVTOTEMP
DVINC(-1)	0.044981	0.039837	-1.000404	1.01E-05	1.47E-06
	(0.30146)	(0.14178)	(0.95275)	(4.4E-06)	(2.7E-06)
	(0.14921)	(0.28098)	(-1.05002)	(2.31772)	(0.54356)
DVSALES(-1)	0.769621	-0.196548	0.686398	-1.54E-06	2.49E-06
	(0.57514)	(0.27049)	(1.81772)	(8.3E-06)	(5.2E-06)
	(1.33814)	(-0.72663)	(0.37761)	(-0.18466)	(0.48277)
DVPROP(-1)	-0.018740	-0.051409	0.126834	-9.96E-07	7.02E-07
	(0.07370)	(0.03466)	(0.23292)	(1.1E-06)	(6.6E-07)
	(-0.25428)	(-1.48322)	(0.54454)	(-0.93264)	(1.06021)
DVPOP4(-1)	-3081.475	9681.069	33856.90	0.089758	0.098313
	(13102.1)	(6161.97)	(41408.6)	(0.18987)	(0.11766)
	(-0.23519)	(1.57110)	(0.81763)	(0.47274)	(0.83558)
DVTOTEMP(-1)	-37089.91	18455.38	25546.33	0.455906	0.373659
	(25321.2)	(11908.7)	(80026.6)	(0.36694)	(0.22739)
	(-1.46478)	(1.54974)	(0.31922)	(1.24246)	(1.64326)
C	3.46E+08	-60637133	2.57E+08	7325.298	1246.036
	(1.9E+08)	(8.9E+07)	(6.0E+08)	(2741.28)	(1698.74)
	(1.82853)	(-0.68158)	(0.42906)	(2.67222)	(0.73350)
DVOIL	43.74884	26.26101	323.9339	-0.001509	0.000598
	(69.4606)	(32.6677)	(219.528)	(0.00101)	(0.00062)
	(0.62984)	(0.80388)	(1.47560)	(-1.49908)	(0.95949)
DVOIL(-1)	-65.45439	-0.790240	-179.3726	-0.000997	-0.000481
	(63.1660)	(29.7073)	(199.634)	(0.00092)	(0.00057)
	(-1.03623)	(-0.02660)	(-0.89851)	(-1.08889)	(-0.84804)
DFOIL	-16.36733	-12.84463	-39.39019	6.68E-05	-0.000304
	(14.1966)	(6.67672)	(44.8677)	(0.00021)	(0.00013)
	(-1.15291)	(-1.92379)	(-0.87792)	(0.32486)	(-2.38607)
DFOIL(-1)	18.43863	0.136760	-0.274812	0.000398	9.25E-05
	(15.7158)	(7.39122)	(49.6692)	(0.00023)	(0.00014)
	(1.17325)	(0.01850)	(-0.00553)	(1.74779)	(0.65531)
DOILPRICE	-35427523	1531814.	877754.6	301.8500	41.80184
	(2.0E+07)	(9619045)	(6.5E+07)	(296.389)	(183.669)
	(-1.73216)	(0.15925)	(0.01358)	(1.01842)	(0.22759)
DOILPRICE(-1)	-8663637.	-20082124	-87702486	155.6178	-341.4743
	(2.0E+07)	(9533826)	(6.4E+07)	(293.763)	(182.042)
	(-0.42738)	(-2.10641)	(-1.36891)	(0.52974)	(-1.87580)
DVMINEMP	175987.0	89924.97	-214314.8	2.294376	6.658823
	(431913.)	(203131.)	(1365045)	(6.25902)	(3.87865)
	(0.40746)	(0.44269)	(-0.15700)	(0.36657)	(1.71679)
DVMINEMP(-1)	167648.3	-125107.9	5083.999	-0.397429	-4.046980
	(402362.)	(189233.)	(1271650)	(5.83079)	(3.61328)
	(0.41666)	(-0.66113)	(0.00400)	(-0.06816)	(-1.12003)
R-squared	0.354718	0.528357	0.269525	0.570283	0.671172
Adj. R-squared	-0.044743	0.236388	-0.182674	0.304268	0.467613
Sum sq. resids	1.66E+18	3.67E+17	1.66E+19	3.48E+08	1.34E+08
Determinant Residual Covariance		2.73E+63			

The final VAR analysis performed combines all the three counties data for income, retail sales, property values, population, and local oil production into five time series. Once the data was combined VARs using Model I were performed. The results are similar to the previous results we obtained when examining the individual counties. Using the log likelihood ratio test we failed to reject the null hypothesis that coefficients for lags beyond one time period were equal to zero at the five percent level. Only one lag was necessary for both versions of Model I. Additionally, after testing the previous null hypothesis, we also failed to reject the null hypothesis that coefficients on the exogenous variables were different from zero at the five percent significance level. However, for VAR in levels we rejected the null hypothesis at the six percent significance level. Looking at two VARs below one sees that the local oil production variable, ALLOIL or DALLOIL, was not statistically significant for either model. However, the federal oil variable was statistically significant in the levels model for income (ALLINC) and the retail sales variable (ALLSALES). Although the federal oil statistic was statistically significant, it should be noted that the contemporaneous and lagged coefficients are of the same order of magnitude and of opposite signs. Finally, the first differenced federal oil production statistic, DFOIL, was only statistically significant for income.

Model I in Levels for the Tri-County Area
Sample(adjusted): 1951 1993
Included observations: 43 after adjusting endpoints
Standard errors & t-statistics in parentheses

	ALLINC	ALLSALES	ALLPROP	ALLPOP
ALLINC(-1)	0.837907	0.419954	0.920594	1.09E-05
	(0.15836)	(0.09908)	(0.53641)	(5.9E-06)
	(5.29127)	(4.23854)	(1.71622)	(1.84846)
ALLSALES(-1)	-0.003459	0.423383	-0.182059	-1.29E-05
	(0.25622)	(0.16031)	(0.86790)	(9.5E-06)
	(-0.01350)	(2.64104)	(-0.20977)	(-1.35425)
ALLPROP(-1)	-0.012665	-0.011357	0.916520	-4.76E-07
	(0.01758)	(0.01100)	(0.05954)	(6.5E-07)
	(-0.72052)	(-1.03261)	(15.3927)	(-0.72903)
ALLPOP(-1)	2377.302	-693.2911	-1052.703	0.984530
	(1568.52)	(981.387)	(5313.13)	(0.05820)
	(1.51563)	(-0.70644)	(-0.19813)	(16.9152)
C	-4.02E+08	5.72E+08	-2.69E+09	35762.64
	(1.3E+09)	(8.1E+08)	(4.4E+09)	(47992.0)
	(-0.31094)	(0.70748)	(-0.61470)	(0.74518)
ALLOIL	-10.48636	-1.220197	39.77096	-0.000838
	(15.1094)	(9.45357)	(51.1807)	(0.00056)
	(-0.69403)	(-0.12907)	(0.77707)	(-1.49513)
ALLOIL(-1)	11.69131	-0.502449	2.414675	0.000729
	(13.6880)	(8.56428)	(46.3662)	(0.00051)
	(0.85413)	(-0.05867)	(0.05208)	(1.43516)
FOIL	-36.74610	-17.21560	-48.54765	-0.000272
	(12.9711)	(8.11574)	(43.9378)	(0.00048)
	(-2.83291)	(-2.12126)	(-1.10492)	(-0.56578)
FOIL(-1)	41.44972	21.77154	22.96615	-7.42E-05
	(13.0830)	(8.18574)	(44.3168)	(0.00049)
	(3.16821)	(2.65969)	(0.51823)	(-0.15279)
OILPRICE	-54878941	11444907	-81502832	-31.58725
	(2.0E+07)	(1.2E+07)	(6.7E+07)	(736.578)
	(-2.76470)	(0.92152)	(-1.21214)	(-0.04288)
OILPRICE(-1)	67653993	-869212.7	97262344	449.3277
	(1.8E+07)	(1.1E+07)	(6.0E+07)	(659.858)
	(3.80456)	(-0.07812)	(1.61471)	(0.68095)
R-squared	0.995849	0.995409	0.997075	0.999188
Adj. R-squared	0.994552	0.993974	0.996161	0.998934
Sum sq. resids	2.70E+18	1.06E+18	3.10E+19	3.72E+09
Determinant Residual Covariance		5.81E+58		

Model I in First Differences for the Tri-County Area

Sample(adjusted): 1952 1993

Included observations: 42 after adjusting endpoints

Standard errors & t-statistics in parentheses

	DALLINC	DALLSALES	DALLPROP	DALLPOP4
DALLINC(-1)	0.000421	0.193023	-0.117435	4.87E-06
	(0.18692)	(0.13547)	(0.69940)	(5.5E-06)
	(0.00225)	(1.42484)	(-0.16791)	(0.87890)
DALLSALES(-1)	0.207708	-0.025179	0.766019	2.43E-06
	(0.26682)	(0.19337)	(0.99834)	(7.9E-06)
	(0.77846)	(-0.13021)	(0.76730)	(0.30725)
DALLPROP(-1)	-0.057153	-0.012078	0.365899	-9.51E-07
	(0.04660)	(0.03377)	(0.17435)	(1.4E-06)
	(-1.22650)	(-0.35763)	(2.09860)	(-0.68937)
DALLPOP4(-1)	5759.469	5240.330	23424.73	0.581973
	(4983.97)	(3612.02)	(18648.2)	(0.14761)
	(1.15560)	(1.45080)	(1.25614)	(3.94254)
C	1.80E+08	5326648.	1.53E+08	9400.513
	(1.3E+08)	(9.4E+07)	(4.9E+08)	(3854.57)
	(1.38345)	(0.05647)	(0.31360)	(2.43880)
DALLOIL	-9.923732	1.194551	33.52798	-0.000577
	(14.3330)	(10.3875)	(53.6287)	(0.00042)
	(-0.69237)	(0.11500)	(0.62519)	(-1.36029)
DALLOIL(-1)	-1.584648	-0.513709	-6.551799	0.000239
	(13.7824)	(9.98847)	(51.5685)	(0.00041)
	(-0.11498)	(-0.05143)	(-0.12705)	(0.58583)
DFOIL	-48.60074	-18.90300	-26.64040	-0.000166
	(13.7430)	(9.95992)	(51.4211)	(0.00041)
	(-3.53640)	(-1.89791)	(-0.51808)	(-0.40851)
DFOIL(-1)	31.83847	2.054512	25.33560	0.000306
	(15.0234)	(10.8879)	(56.2121)	(0.00044)
	(2.11925)	(0.18870)	(0.45071)	(0.68851)
DOILPRICE	-64923277	7574016.	-14485207	36.65013
	(1.9E+07)	(1.4E+07)	(7.2E+07)	(567.376)
	(-3.38906)	(0.54555)	(-0.20209)	(0.06460)
DOILPRICE(-1)	11908734	-14508827	-75000098	-26.31984
	(2.1E+07)	(1.5E+07)	(7.9E+07)	(627.096)
	(0.56245)	(-0.94553)	(-0.94671)	(-0.04197)
R-squared	0.490302	0.384881	0.322365	0.494563
Adj. R-squared	0.325884	0.186456	0.103773	0.331518
Sum sq. resids	2.92E+18	1.54E+18	4.09E+19	2.56E+09
Determinant Residual Covariance		1.01E+59		

In conclusion, given the poor performance of the models used we do not believe the effect of oil production on the Tri-County region is significant. The wide confidence intervals given show that the effect given the available data is very difficult to measure.

Notes

1. First differencing of a variable is performed by subtracting the previous periods value from the current value: $\Delta y_t = y_t - y_{t-1}$

The value Dyt is defined as the change of y at time t.

2. The presence of a unit root implies that a variable can be modeled as the following:

$$y_t = y_{t-1} + \varepsilon_t$$

Where: yt-1 is the previous value of y

et is the error term at time t

3. Augmented Dickey-Fuller Tests failed to reject the presence of unit roots for the first difference of San Luis Obispo County population, the first differenced combined Tri-County population time series (DALLPOP), as well as the first differences of the employment variables.

The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

The Minerals Management Service Mission

As a bureau of the Department of the Interior, the Minerals Management Service's (MMS) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS), collect revenue from the Federal OCS and onshore Federal and Indian lands, and distribute those revenues.

Moreover, in working to meet its responsibilities, the **Offshore Minerals Management Program** administers the OCS competitive leasing program and oversees the safe and environmentally sound exploration and production of our Nation's offshore natural gas, oil and other mineral resources. The MMS **Royalty Management Program** meets its responsibilities by ensuring the efficient, timely and accurate collection and disbursement of revenue from mineral leasing and production due to Indian tribes and allottees, States and the U.S. Treasury.

The MMS strives to fulfill its responsibilities through the general guiding principles of: (1) being responsive to the public's concerns and interests by maintaining a dialogue with all potentially affected parties and (2) carrying out its programs with an emphasis on working to enhance the quality of life for all Americans by lending MMS assistance and expertise to economic development and environmental protection.