

Evaluation of Current Programs to Identify and Mitigate Socioeconomic Impacts in the Santa Barbara Channel: An Analysis of SEMP

FINAL REPORT

PROJECT 20

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Channel: An Analysis of SEMP

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Acronyms Used in this Report

CCOG: California Coastal Operators Group (largely oil industry)
OCS: Outer Continental Shelf
REMI: Regional Economic Modeling, Inc., also the regional model prepared for SEMP by
REMI.
SEMP: Socioeconomic Monitoring and Mitigation Program
SBC: Santa Barbara County
SBCAG: Santa Barbara County Association of Governments
TAC: Technical Advisory Committee
VCSEMP: Ventura County Socioeconomic Mitigation Program
V-TAC: Ventura County Technical Advisory Committee

PREFACE

The draft version of this report was circulated broadly among participants in SEMP and a number of comments were received. These comments were both constructive and reflected the serious commitment to the SEMP program by those involved--from industry, government, and consultants. In many cases, these comments clarified points and have resulted in a final report that is more precise. In other cases, participants provided us with additional information that had not previously been available. For these we are very appreciative.

The comments confirmed in many ways the extraordinary complexity of the SEMP project. Even participants with deep involvement do not always agree about exactly how the program works or how particular numbers produced by the project should be interpreted. On occasion, because of inconsistent interpretations offered to us, we have persisted in our own interpretations of available data. In those cases, we have included footnotes noting contrary interpretations.

One of the clearest lessons that has come from the reactions to the draft report is this: SEMP does not produce numbers and estimates that derive utility from a superior and validated representation of "reality." Rather, SEMP is an exercise in practical "policy politics." It is a mechanism constructed through and through by negotiated compromise. The compromises were reached, as in many bargaining settings, under time pressure and, sometimes, public scrutiny. It is emphatically **not** our view that the existence of those compromises make the program defective. Indeed, those compromises made the SEMP program--and, arguably, the more recent Santa Barbara Channel oil development--possible. SEMP provided many benefits for local governments, not least, assurance that they would be buffered from many of the worst consequences of a possible boom-bust cycle. We believe the project serves as a good prototype for other jurisdictions and industries. Others can now learn from the program's successes as well as shortcomings.

I. PURPOSE OF THE STUDY

The last several decades have witnessed increasingly elaborate means of measuring socioeconomic impacts and developing mitigations. Outer Continental Shelf (OCS) oil development¹ in the Santa Barbara Channel area of Southern California represents an especially remarkable instance both of development and of means to mitigate. It is a large-scale extractive activity occurring adjacent to an already developed region, rather than in a remote and sparsely-populated location--as is often the case with such development. Also unlike the usual scenario, local governments already had in place a complex system of land use regulation and a tradition of environmental protection. This "Tri-County area" (an official as well as informal designation) consisting of the counties of Santa Barbara, Ventura and San Luis Obispo, contained densely built communities with diversified economies (tourist dependent, in some cases) and well-organized citizen watchdog groups.

Although oil development would not, regardless of scale, ever completely dominate the Tri-County region (again unlike typical "boomtown" scenarios in the West), the potential for advance impacts was considerable. The response of the Tri-County governments led to a wide array of permit conditions for monitoring and mitigation. One of the most significant of these programs was the Socioeconomic Monitoring and Mitigation Program (SEMP), the focus of the present evaluation and study. SEMP is a pioneering effort in many ways--in its on-going, iterative aspect as well as in its explicit and directed linkage between monitoring and mitigation. As monitoring proceeds to uncover impacts, targeted mitigations to affected localities must be made as a matter of course. It is a long-term program, one that has outlived some of the few similar efforts elsewhere. It also provides mechanisms for full participation by jurisdictions which, while outside the boundary lines of the production activities, can nevertheless be compensated for impacts revealed through the monitoring process.

Elements of SEMP do exist in prior efforts applied elsewhere in the country (for examples see Leistriz, 1985). Under most monitoring programs, however, the purpose is to produce data that localities can use as documentation to generate grants from state or federal agencies or as a basis for requesting assistance from the developer. Examples include the Mercer County (North Dakota) energy projects (see Halstead and Leistriz, 1983), and the Missouri Basin Power Project (described in Leistriz, 1985: 49, 52). Even in cases of highly ambitious monitoring systems that have indeed led to significant mitigation efforts, the linkage between monitoring and mitigation has been less direct than in the case of SEMP, as for example with the Overthrust Industrial Association program for mitigation of oil and gas development in an area abutting four western states (Leistriz, 1985: 54-58).

One precedent for tight coupling between monitoring and mitigation is the Rio Blanco/Western Fuels program linked to the development of a Colorado coal mine. But in this case a single developer dealt with a small number of jurisdictions in the immediate area. In the SEMP instance, the number of participants is much greater on both sides and problems of monitoring and mitigation much more complicated by that fact. In the SEMP case, several of the major American integrated petroleum companies and hundreds of subcontractors interact with a large number of local government jurisdictions (over 100) ranging from sewer districts to county Boards of Supervisors--a multiplicity of units engendered by the "special district" nature of California local government. Nor is "the development" one specific project in a well-defined place but at least five separate oil-drilling operations and associated activities,² spreading for miles along the coast. Even in simpler situations, coordination problems have sometimes been insurmountable. In the case of the Revelstock Dam project on the Columbia River, for example, there was apparently "no easily identified process for decision making or appeal" (Leistriz, 1985: 21; see also Kopas, 1980; Vincent, 1981). Consequently, it was difficult to assure the public that their interests were represented, resulting in widespread disaffection from the program and major

1. When we refer to "oil" or "oil development" or "oil industry" in this report, we mean to be inclusive of oil, gas, pipelines and all related activities, including provision of supplies and services.

2. The corporations include Chevron, Texaco, UNOCAL, Celeron-All American Pipeline Company, Exxon, and the Gaviota Marine Terminal Company. The projects include Point Arguello (Chevron and Texaco), Point Pedernales, All American Pipeline, Gaviota Marine Terminal, and Exxon Santa Ynez Unit.

difficulties in its functioning. There has been little by way of successful precedent for a program as complex and administratively ambitious as SEMP. Its success would signal a new step in dealing with the impacts of industrial development in the U.S.--a key justification for detailed analysis.

This study presents a description of SEMP, closely examines some of the technical mechanisms it utilizes, and analyzes the organizational dynamics of creating and sustaining it. In addition to evaluating SEMP's methods and quantitative output (the impact numbers it generated and the dollar amounts awarded localities), we describe how the work was done over the years of negotiation and implementation. We lay out strategies used by jurisdictions to make claims and the way industry officials responded. We also report participants' perceptions of the program's assets and liabilities. We also examined how certain types of impacts--those having to do with growth in the local oil support industry--were occurring in ways not reflected in the formal SEMP program. Our goal is to lay the basis for improved monitoring and mitigation programs in the future.

We used a variety of data sources, including documentary evidence provided generously by program participants. There was also extensive use of interviews, over 76 in total. While several consisted of brief phone conversations, most involved substantial interaction of between 30 minutes and two hours in the offices of our informants.³ Our approach to these interviews is detailed in subsequent sections and in Appendices A and B. In addition to the interview materials, we also drew on 60 returned mailed questionnaires, the methods for which are included in Appendix B.

³. We use the word "informant," in the standard social science practice, to refer to those interviewed or consulted. Unlike in sample surveys where the word "respondent" is used, we are not assembling aggregate opinion data but instead are treating the information we receive as substantively important in understanding the subject under investigation.

II. BACKGROUND

Santa Barbara County has a history of concern with development in general and the oil industry in particular, in part because of the massive oil spill in the Santa Barbara Channel in 1969. This event has been said to not only have changed the course of politics in the region, but indeed to have been a symbolic start of the modern U.S. environmental movement.

While federal (and to a lesser degree, state) offshore projects are exempt from direct local control or regulation, localities can gain leverage through their control of permit conditions on the related onshore facilities. What was later to become SEMP emerged out of County government's response to two large proposed onshore oil projects. One was Exxon's facilities in Las Flores Canyon to support its Santa Ynez offshore oil field. By the time the Santa Ynez Unit development and production plan was submitted for consideration in 1983, several other offshore projects were in various stages of planning and permitting.⁴ While individual project effects were considerable, the cumulative consequences of so many potential projects caused the County to consider implementing some kind of comprehensive socioeconomic monitoring and mitigation program which would incorporate all oil operations as, in effect, a single project.

A comprehensive and sector-wide strategy offered many advantages. First, universal participation of all oil companies would prevent any single operator from bearing a disproportionate share of the program costs. Second, universal participation eliminates "free rider" problems within the industry, wherein each operator would be induced to shrug responsibility in favor of letting other operators deal with the problem. Third, it allows for potential mitigation of cumulative impacts not traceable to a single project. Fourth, such a program could provide the best chance for continuous assessment of impacts, rather than relying on uncertain and contentious EIR predictions.

THE EXXON EIR

Much of the stimulus was provided by the 1984 draft EIR/EIS for the Exxon Santa Ynez Unit. It projected peak year Tri-Counties employment impacts of 6,000 to 12,000 workers for Exxon alone, and more than 31,000 for all anticipated projects together (Science Applications Inc., 1984: 9-119). These projections flowed from assumptions that \$135-165 million would be spent in the Tri-Counties by Exxon during the peak construction period. Recognizing the inherent uncertainty of these forecasts, the authors of the EIR suggested a monitoring program to ascertain the actual type and magnitude of socioeconomic impact.

A subsequent addendum to the final EIR/EIS predicted an even larger total cumulative population gain by 1995 of 40,700 (Science Applications, Inc., 1984). The oil industry expressed disbelief in the large numbers. The combination of industry's doubts and public officials' fears gave rise to the detailed procedures in SEMP. Preferring not to make large up-front mitigation payments on the basis of contested projections and eager to gain permits and begin production, the industry agreed to participate in a socioeconomic monitoring and mitigation program to be developed jointly by industry and County officials. SEMP was intended to address disagreements and uncertainties about the speed of development and the actual volume of projects that would come on-line at a given time. SEMP was also to address analytic uncertainties arising at a more technical level concerning the relation of development activity to population and employment impacts. The industry and the counties agreed to a program with very little basis for knowing the details that would, in fact, determine how much money would be paid per unit of oil or how benefits would be distributed among jurisdictions.

While SEMP was in its initial design stage, the County of Santa Barbara carried out a comparison of completed EIRs for proposed Santa Barbara Channel oil projects to determine their degree of consistency in methods and projected impacts. The goal was to identify weaknesses that could be

⁴. These included the Gaviota facility (involving Getty, Chevron, and Texaco), the ARCO Coal Oil Point Project, various pipelines, UNOCAL's Project Shamrock; Cities/Celeron San Miguel Project.

remedied through SEMP (a copy of this preliminary draft document, as edited by our staff, is attached⁵). The analysis revealed large inconsistencies between the EIRs, thereby underscoring the difficulty of reliably projecting social and economic consequences. The variations were great in terms of numbers of employees predicted for particular phases (e.g. drilling vs. production), the proportion of employees who would be local hires, and the number of additional people who would migrate to the area (multiplier effects). These disagreements arose from the divergent analytic assumptions and forecasting models used by different consultants. The pattern of overall inconsistencies emphatically validated the idea of SEMP: when impacts cannot be reliably forecast, there is a need to gauge better what they are and to mitigate them--after the fact, if necessary.

This approach provided the oil companies with a way to move their projects forward without stipulating in advance the actual impacts that were expected. It avoided lengthy litigation over precise numbers and mechanisms of mitigation. Simultaneously, SEMP provided local governments with an "insurance policy"--a term printed in SEMP guidelines⁶ and often used by our informants (see below). Should anything like the predictions in the Exxon EIR analysis have turned out correct, localities would have been protected. Although the general concept served to launch the program, the details were anything but clear; for both industry and local government there was a need to "invent the wheel"--another phrase used recurrently (and to be elaborated in later discussions).

THE CHEVRON CONDITIONS

Although the Exxon EIR suggested the general concept of a monitoring program, an outline of the program which was later to become the SEMP was first specified in facility permit conditions imposed by Santa Barbara County on Chevron's Point Arguello project and adopted by the Board of Supervisors December 19, 1984. The program was later, in effect, standardized across projects by requiring each oil company's participation as a condition of project approval. The basic structure of the program outlined in the Chevron permit conditions include:⁷

1. Uniform application of criteria and cost to all industry participants, across all projects.
2. Credit against future mitigation payment for overcharges.
3. Development of methodology and calculation of impacts by a Technical Advisory Committee (TAC) composed of industry representatives and city and county government representatives.
4. Arbitration of unresolved methodological or computational questions by a Technical Arbitration Group.
5. Establishment of thresholds which trigger mitigation requirements.
6. Termination of program when it is deemed no longer necessary by the County.
7. Prepayment of 30 percent of specific mitigation measures as a method of front-load funding.
8. A three-element program of monitoring, impact assessment, and mitigation.

⁵. See Fulton-Bennett, Kim, "The Socioeconomic Impacts of Tri-County Oil and Gas Development: A Comparison of Nine Environmental Impact Reports" Santa Barbara County, Department of Regional Programs. July 1986. Copies are available at reproduction cost from the Ocean and Coastal Policy Center, Marine Science Institute, UCSB.

⁶. "Mitigation of Socioeconomic..." 1988: iii.

⁷. Our list is adapted from: Final Chevron Point Arguello Permit Conditions Santa Barbara County: Resource Management Department 1984: V-23 to V-27.

Since 1985, required participation in SEMP has been included among the permit conditions of all five relevant large-scale projects.⁸ Although the Chevron conditions were the basis for the program negotiated between industry and the counties, not all the listed elements were put into operation (there have been no prepayments, nor has formal arbitration been used) and other elements were modified and added over time.

THE TECHNICAL ADVISORY COMMITTEES (TACS)

The task of developing guidelines for the program and working through methods of monitoring and mitigation fell upon a Tri-County Technical Advisory Committee (TAC) formed in 1985, comprised of representatives of each county and of each industry firm directly subject to SEMP permit conditions.⁹ Despite the fact that the major onshore projects were all destined for Santa Barbara County locations, SEMP was designed as a regional, Tri-County program, compensating for impacts that spill into jurisdictions that gain no property tax or licensing fees from development.

San Luis Obispo County representatives were involved in the initial negotiations, but dropped from active participation due to the low impact of oil operations on that County. Santa Barbara County's activities were directed by Michael Powers, the overall SEMP Program Manager, whom we will also refer to as the "Coordinator" in this report. At that time, Mr. Powers was on the staff of the Santa Barbara County Department of Regional Programs (the functions of which came to be absorbed by the County Association of Governments). Ventura County subsequently formed its own Ventura County Technical Advisory Committee (VCTAC) to negotiate directly with oil companies over Ventura County jurisdictions' claims, and had its own Project Manager, Gene Kjellberg, drawn from the County planning staff of its Resource Management Agency. Compared to the Tri-County TAC, the VCTAC was weighted more heavily toward government participants; it consisted of nine representatives of local government units (officials drawn from staffs of the County, cities, and school districts) with five industry representatives.¹⁰

INCONSISTENT BASIC VIEWS

A number of very basic disagreements had to be settled within the TAC negotiations that would determine the specifics of monitoring and mitigation. Industry officials began with the view that development is largely positive--that any induced growth would, in fact, benefit communities. From the industry's perspective, oil operations offset costs of their operations through the same mechanisms as other development: project property taxes, permit fees, and utility hook-up charges. Further, the oil companies had been paying taxes on "thousands of acres of open space" for years, with minimal impact on the County. Oil employees pay additional fees and taxes, including sales and gasoline tax, property tax, and users' fees for access to public facilities. To the oil companies, a demand for more implied greed, perhaps inspired by the prospect of picking their "deep pockets." Industry officials believed local government officials were insensitive to the investments the companies had made, the financial risks taken, and the service provided both the region as well as the national economy.

From the perspective of local government, OCS oil was different from other development because local governments lacked the capacity to control and plan for decisions reached in Federal waters. No taxes are collected on the otherwise valuable offshore installations themselves, even if they lead to costs--e.g. onshore air quality deterioration from offshore equipment. Further, many local officials perceived such large-scale oil operations as particularly out of character with many existing amenities

⁸. These are: Chevron-Texaco Point Arguello, UNOCAL Point Pedernales, All-American Pipeline, Gaviota Interim Marine Terminal, and the Exxon Santa Ynez Unit.

⁹. Thus, in 1986, the SEMP TAC included three county government representatives and representatives of Texaco, UNOCAL, Chevron, Celeron, Cities Service, Exxon, ARCO, and C-COG (California Coastal Operators Group, an industry association later replaced by Western States Petroleum Association).

¹⁰. As with the Tri-County TAC, the specific representatives shifted over time and so did their number; the principle was to include persons from all the major operators; at times one of them, UNOCAL, had two representatives.

and economic activities (especially tourism). Most basic, limits on localities' capacity to tax, imposed by state-wide laws in the form of Propositions 13 and 4, meant that revenues from oil facilities, as with any other, are limited by law and could not be increased should service costs turn out to exceed revenues. Under California's Proposition 13, only token property tax increases can occur over time unless a property is sold (an infrequent event for industrial properties such as these). Under the state's Proposition 4, there are ceilings on allowable government tax revenues, no matter how valuable the tax base may become and no matter how large the public burden of servicing facilities and populations. In part for these reasons, many of the localities in the Tri-County region had growth control measures in effect, as well as other programs aimed at mitigating the fiscal, social, and environmental costs of any type of development. The expectation was that the oil companies would, *at minimum*, conform to existing policy. Given the special fears of oil, a distinctive program of careful monitoring was thought necessary to avoid possible adverse impacts. In the process, there was the prospect of not only developing better ways to deal with local development costs, but for convincing the California State Lands Commission (or even the federal government) to make all lease sales contingent on programs like SEMP. This was still another view not shared by industry which had no desire to develop another regulatory mechanism that could become a precedent for wider application.

In the end, the SEMP program would recognize that OCS activities were to be monitored and mitigated, in a manner--at least in principle--consistent with other local regulations. Doing so led to a unique and highly complex program. The overall predicament and challenge for participants during the first two-year phase of developing guidelines, making initial claims, and negotiating mitigation, was that they were creating something new. They were coming from very different perspectives but had to work together.

In the next sections, we describe and analyze the two primary aspects of the program that were to result, first monitoring and then mitigation, followed by an analysis of how payments were distributed among jurisdictions. We will then review the processes of creating and implementing the program as revealed through interviews with participants. Next, we will present findings from our study of aspects of oil industry growth in the Tri-Counties not anticipated by either SEMP or the EIRs. Finally, we will end with overall conclusions, including recommendations for future SEMP-type programs.

III. MONITORING

SEMP developed an ambitious and intricate system of monitoring development and impacts (for a summary of this and other aspects of the program, see Powers, 1991). The monitoring task has been detailed in other documents (e.g., Centaur Associates, 1986), and was undergoing revision at the time this study was underway (see Frankel, 1991). Most of the monitoring objectives of SEMP have been reiterated in virtually identical language over time, reflecting the basic elements identified at the outset of the program:

1. Provide estimates of current Tri-County employment and population impacts related to offshore oil and gas development and its related onshore facilities;
2. Provide estimates of current public facilities/services impacts related to offshore development;
3. Project future employment, population, and public facilities/services effects on a two to five year horizon to allow counties, cities, school districts and special districts to plan as effectively as possible;
4. Provide the socioeconomic data necessary to develop cost effective mitigation programs and to meet the information needs of local officials; and

5. Establish, document and test a single method for impact assessment thereby improving the reliability and consistency of future EIR/EIS projections. (see Tri-County Socioeconomic Monitoring Program 1986: 2)

These self-imposed goals have not been achieved to an equal degree. Forecasting impacts (element 3, above) has proven especially difficult, exacerbated by the volatile nature of the oil, gas, and pipeline industry and the complexity of the surrounding regulatory environment. The difficulty of forecasting is evident in Figure 2, showing the wide disparity between actual oil company expenditures (marked as "A" in the figure) and SEMP forecasts made in various years.

SEMP's achievements have been in the area of monitoring and arriving at retrospective estimates of actual impacts (elements 1, 2, 4). These tasks are clearly regarded as the most important by all participants. SEMP's success in these areas is both technical and, in the best sense, political. The technical success has been in constructing a complex system that produces valuable information for all participants. The political success has been in achieving a stable and now-institutionalized consensus about how to resolve many difficult technical problems. But in achieving these two successes, SEMP has not succeeded in developing and testing a predictive method of impact assessment appropriate for future EIR/EIS applications (elements 3 and 5)--although even here, the cumulated data and experience would be highly useful for any such future effort.

There are two primary tasks in the monitoring phase. The first is the estimation of the total number of in-migrant persons to the Tri-Counties attributable to offshore oil development. The second is the allocation of those estimated population impacts to specific geographic locations in order to specify how local governments' service-provision burdens have been increased.

ESTIMATING IN-MIGRANTS

SEMP is sharply focused on the problem of estimating the number of new Tri-County residents (relative to a baseline which is subject to updating and revision) attributable to oil development. The relevant population of new residents--"in-migrants"--includes direct employees of the oil industry and their families; indirect employees (i.e., employees of major subcontractors who work primarily for the oil industry) and their families; and "induced" workers (and their families) who move to the Tri-Counties to take advantage of the general increase in economic activity created by the oil development (the multiplier).¹¹ The REMI model¹² (for Regional Economic Modeling, Inc., the model's developer) is used to calculate the total number of in-migrants to each of the Tri-Counties. Prior to 1991, these estimates were calculated on the basis of industry expenditures. In part due to certain deficiencies (to be noted below), beginning with the 1991 SEMP Monitoring Report, employment data, rather than expenditure data, became the basis for estimating in-migrants.

The REMI model was selected in consultation with the TAC after a review of different candidate modeling approaches. The background review of different kinds of modeling approaches is summarized in Centaur Associates, 1985. This report contrasted Economic Base Models, Econometric Models, Input-Output Models, and Modified Input-Output Models. REMI is an example of a modified input-output model. The Centaur Associates 1985 review concluded that the REMI model was theoretically sound, extensively peer-reviewed, fully documented, highly detailed, and capable of producing baseline forecasts.¹³

¹¹. This use of the terms direct, indirect, and induced reflects the usage in SEMP documents. See the Glossary of Terms in Centaur 1986 and Frankel 1991.

¹². This model has been applied for various jurisdictions since the mid-1970's. A general description is reproduced as Appendix A of Frankel, 1991.

¹³. But while such models are valuable for their detailed sector effects, "the rigid and static assumptions make a long-run forecasting analysis difficult" (Centaur, 1985, p 25).

But as the Centaur consultants (1985: 28) noted, "while these models are theoretically strong, in practice, they are often very complicated and exceed the limitations of available data." Further, according to the consultants, certain aspects of the model may involve

...only rough approximations which can lead to results that are not intuitively sensible. In addition, they are often very difficult for the non-expert to grasp.

Another caveat relevant to the REMI model is that no interaction between oil and other industries is presumed--e.g. the possibility that growth in oil development could decrease growth in, say, tourism. In an earlier comparison of econometric and a regional input-output model (Centaur 1984), the consultants noted that the REMI-type model will thus always show a positive economic effect of oil and gas development in terms of additional employment and population growth:

If as a result of oil and gas development, all tourism in the two counties [of Santa Barbara and Ventura] ceased, and therefore the counties' economies were affected negatively, the impact of oil and gas activity on the economies of the counties would still be positive. . . [E]ven if the economies of the two counties were to collapse due to the negative impacts of oil and gas activity, the estimated impacts here would be positive. . . [and] an impact is guaranteed. (Centaur 1984: 16-17)

The model will necessarily generate estimates of positive population impacts relative to a baseline no matter what negative effects oil may have on other economic sectors--an assumption that conceivably leads to overstatement of growth effects (but raises issues regarding other potential impacts).

Under the expenditure-based application of the REMI model (used before 1991) baseline data on the regional economy and detailed analyses of the components of oil company expenditures were the basic inputs. Based on historical relationships derived from this data, REMI generated estimates of the link between industry operations (expenditures pre-1991, employment post-1992) and the population flows into the Tri-Counties. The detailed data feeding the model came from industry, based on semi-annual surveys of the operating companies,¹⁴ as well as of their contractors, subcontractors and vendors (copies of the questionnaires used over the life of the program are included in Appendix C). The REMI model then distributed, based on the data, estimates of direct and induced population movement into each of the Tri-Counties attributable to oil spending.¹⁵

In both the expenditure and employment-based REMI systems, impacts *within* counties are allocated using semi-annual surveys (questionnaire attached in Appendix C) of all firms' employees; this provides information on workers' residential location and other sociodemographic aspects (e.g. family size, whether they own or rent, live in houses or campgrounds, where their children attend school, etc.). The semi-annual surveys are augmented by "special event" surveys when peak employment phases (e.g. pipeline construction) fall between regular survey periods. The surveys show what proportion of workers are in-migrant and, of that group, what percent resides in which geographical area (city, school district, etc.). The percentage distributions of in-migrants among locations as revealed by the surveys are then applied to the aggregated county-wide numbers of in-migrants produced by the REMI model to allocate impacts across jurisdictional sub-units.

REMI Ambiguities

¹⁴. In SEMP parlance, *operating companies* are the lead companies (or consortium of companies) associated with a given project (e.g., Exxon).

¹⁵. The SEMP User's Manual (Centaur Associates 1986, A-3) describes the expenditure-based process as follows: ". . . the Tri-County expenditures are allocated to each county based on the portion of the expenditures that are expected to be spent in each county. The expenditure allocations are developed using confidential industry data by project phase and expenditure category (i.e., chemicals, welding supplies, etc.). The county allocations were developed by taking the ratio of county expenditures to Tri-County expenditures for each phase that information was available on."

We have not evaluated the basic structure or theoretical underpinnings of the REMI model, in part because the model as implemented for SEMP was not available to us (for information on the general structure of the REMI model, see Centaur 1985, 1986). Virtually all of the input data are proprietary as are the detailed outputs of REMI (which are more disaggregated than those reported in public documents).

We have found no sources that precisely compare REMI forecasts for the Tri-County economies with actual experience. Centaur (1985) cites Centaur (1984) for having "demonstrated the consistency between REMI model results and actual measured data" (Centaur 1985: 33).¹⁶ The SEMP User's Manual indicates that some important REMI results are within ranges reasonably set by prior research (Centaur 1986: A-10 - A-17). In a simple test, we found that REMI's gross population forecasts for Santa Barbara County in 1990 were closer to the Census results than the estimates made by the Santa Barbara Area Planning Council.¹⁷

Consultants to Santa Barbara County characterized the inner workings of the REMI model as having a high degree of mystery to the lay user (Centaur, 1985: 30). In this respect, our interviewing suggests that the term "lay user" extends to everyone closely involved in the ongoing management of SEMP--not a positive aspect of the program.

An Anomaly: Expenditures that Decreasingly "Stick"

Besides its complexity, we have found an apparent anomaly in the way REMI has allocated Tri-County oil industry expenditures over the OCS development cycle between expenditures that "stick" within the local region and those which do not. The proportion of industry expenditures that "stick" generate local economic impacts (e.g. new jobs and new migrants) compared to those that generate impacts outside the region. The distinction is important because expenditures on products and services used locally but based on production elsewhere are (appropriately) omitted in calculating impacts.

The conventional expectation is that the acquisition of manufactured items produced non-locally will be a significantly larger component of the construction phase compared to the operations phase--hence, "sticking" should increase over time. Every SEMP monitoring report published so far has explained "leakages" outside of the local areas with the example of drill bits which, because used in early (production) phase and because not locally manufactured, imply less "sticking" and greater "leakage" in production compared to operations. This is also one of the few consistent expectations in the initial EIRs prepared for Tri-County OCS projects (See Santa Barbara County, 1986).¹⁸

Yet the SEMP calculations indicate the contrary. SEMP data that bear on the question of "sticking" are presented in each (annual) SEMP Monitoring Report (as in the Report's Table 2, which we have included as Appendix D). Table rows are organized by project phase and activity--e.g., permitting, gas plant construction, gas plant operations. The columns report "expenditures"¹⁹ (other than payroll),

¹⁶. It is clear that the Centaur 1984 study demonstrated that there was not much difference between econometric and regional economic model analyses in the relative magnitudes of forecast impacts of oil and gas developments. However, in terms of population impacts, the regional models included the lowest estimated impacts (0.0 as the lowest percentage impact in both Ventura and Santa Barbara versus a low impact of 2.8 and 0.3 percent in the respective counties estimated in the econometric approach). The regional model's low and high estimates were significantly below those of the econometric approach for Ventura County.

¹⁷. Forecast data are reported in Frankel, 1991; the County forecast by the APC was 350,900. REMI forecast 357,462. The Census report was 366,350.

¹⁸. See Fulton-Bennett (1986: 9). While the authors of this report document wide variation in local expenditure expectations, they note that "The only consistent values for local expenditures (i.e., those with a range of less than 20%) are those relating to platform and offshore pipeline construction. Both of these phases involve primarily (90%) non-local expenditure."

¹⁹. These operating company expenditures, reported in 1987 dollars, are taken to indirectly reflect payrolls of subcontractors (see also footnote 1 to the Report's Table 2). The notes to the table do

payroll by county, and the sum of expenditures and payroll for each phase/activity. Columns are totaled to show yearly expenditures for each phase/activity *minus* permitting.

The SEMP Report tables also show, for both "population" and expenditures the amount that "sticks," based on the application of the REMI model to the relevant data.²⁰ This provides the "sum of payrolls and expenditures that actually "stick" in each county's economy and are assumed to create population impact in each county" (see footnote 4 to the Report's Table 2). The "Population" entry is simply the result of multiplication of those "sticking" expenditures times a county-specific multiplier--which is discussed below in considerable detail.

Our Table 1 for this report reproduces the Tri-County totals from the published annual reports from 1986-1990 with all entries deflated to 1985 dollars (Figure 1 displays shares of overall spending for each production phase and year; this is the data from Table 1 displayed graphically).. One can see in our Table 1 that the proportion of total expenditures that "stick" locally in the Tri-Counties, as reflected in the SEMP data, has declined as the overall project has moved to involve a higher proportion of production expenditures. In the period from 1986-1990, the share of total expenditures that are production expenditures increased from nearly none to over 30 percent. Over the same period, Tri-County payroll expenses have grown from about 4 percent to nearly 20 percent of total expenditures. At the same time, the gross proportion of total expenditures that "stick" appears to have fallen from 76 percent to around 60 percent. Because a decline is so strongly contrary to all expectations, we tried to understand why the SEMP data should turn out this way.²¹

The direct answer is that this outcome is built into the basic functioning of REMI as it was applied in SEMP. Contrary to the assumption that there will be more "sticking" in the operations phase, the estimates produced by REMI at the outset of SEMP showed the highest rate of "sticking" to be in the construction phase.²² The process that led to such calculations was as follows:²³ Operating companies reported their expenditures by phase/activity for the entire Tri-County area. These expenditures were then allocated by formula among the counties; the between-county allocation rates were based on confidential industry data available as of 1985.²⁴ These county-level allocations were themselves adjusted for "leakage out of the area associated with non-local manufacturing." The non-local manufacturing component was produced by the REMI model's estimates of "regional purchase coefficients" (Trey and Stevens, 1985).

The result of this process was a set of coefficients for allocating expenditures by phase/activity to each county. Since the county proportions for each phase/activity summed to less than one, some leakage was always assumed. The calculations leading to per-county expenditure totals that serve as the basis of estimating population impacts can be reproduced (approximately) as follows: Take the total expenditure reported for all companies for a specific phase (the expenditure column of Table 2 from the

not specify whether reported payroll expenditures have also been discounted to base-year dollars (1987 dollars), but we assume that this is the case. The rows sum exactly as reported, and it would not have been appropriate to sum quantities reported in 1989 dollars and those in 1987 dollars.

²⁰. Under "Tot. Expenditures that stick."

²¹. It is not just of academic interest, but has implications for mitigation payments. If the leakage rates had been estimated to be roughly constant during the period (rather than increasing), the estimated gross population impacts in 1990 would have been approximately one-third higher for Santa Barbara County than what was reported. If the leakage rates had actually declined, as one might have expected *ex ante*, the growth impact underestimate would be greater still.

²². See Exhibit 3-2 from Centaur 1986, the SEMP Users Manual. This exhibit reports the "sticking factors" for different categories of expenditures.

²³. This account draws heavily on Centaur 1986, SEMP User's Manual.

²⁴. From Centaur 1986, p. A-3: "The county allocations were developed by taking the ratio of county expenditures to Tri-County expenditures for each phase that information was available on. If several projects provided data on the same phase, the county allocations for these phases were developed by taking a straight average of all the project specific ratios for that phase, by county."

SEMP report), multiply it times the county factor from Exhibit 3-2 of the User's Manual, and add to that the payroll amount for the county. After discounting to 1985 dollars, this amount should be (approximately) equal to the county-specific "Total Expenditures" listed at the bottom of the SEMP Report Table 2.

The specific "sticking factors" produced at the outset of SEMP have been fixed and unchanged whenever the expenditure data was utilized.²⁵ At the outset of the project, the SEMP User's Manual (Centaur 1986: A-4) suggested that with additional data the allocations among counties could be updated and improved, a reform rendered moot by the later change to an employment-based system.²⁶ Since the "regional purchase coefficients" that ultimately determine the "sticking" factors were determined within REMI independent of data provided by the oil contractors, revisions in those factors would depend on revisions to REMI.

The "sticking factors" were, according to a key informant, "highly contentious," containing as they do very different implications for how much money localities would receive for impacts. The fact that SEMP did not permit a better evaluation of the degree to which expenditures "stick" is a further liability of the expenditure-based system. It also means that the REMI-based "sticking" data has very limited use in enhancing understanding of the geographical and phase-related impacts of OCS activity.

Numbers of difficulties we have described were not lost on SEMP participants and their consultants. We have carried out further analysis of the REMI multiplier which we report as Appendix E to this report. We conclude there that elements of the expenditure-based REMI model, for a series of reasons, led to estimates of employment effects that understated oil impacts. But there are other elements of the system that probably overstate impacts. Given these ambiguities, it thus makes good sense to us, as it did to others, that the expenditure-based system was replaced on review.

The New REMI

After 1991, company employment survey reports replaced expenditure data as the basis for determining impacts.²⁷ Only employees of firms classified as "mining and construction" (in SIC categorization) are automatically included. Workers employed by firms not so classified but which also do oil work are added ad hoc (e.g. diving companies). Judging which work forces are to be included involves some subjective determinations carried out by the consultants, in consultation with the operating companies and the Santa Barbara County Association of Governments staff (see Frankel, 1991, F-3). Further refinement occurs to determine, from employee surveys, the proportion of workers' time that is devoted to a given project. This adjusted "mining and construction" employment number is then used in a modified REMI multiplier equation.

Mining and construction is a more narrowly drawn classification than the total employment figures used previously in SEMP. Under the old system (by our calculation) total Tri-County employment for 1990 was 805²⁸; under the new more narrowly defined system it is only 672 (Frankel, 1991: 22), a reduction of some 17 percent.

In the new system, the operating companies report directly their employment in each county. Employment is reported by phase for each project and for each operating company and their contractors (Frankel, 1991: 19). Special surveys are conducted when a company's employment peak does not coincide with the scheduled employment survey periods (March and October).

²⁵. Communication from Michael Powers.

²⁶. Obviously, the initial estimates of "sticking factors" and county-level allocations were based on data from only a few projects, some in fairly early stages of development.

²⁷. For a description of the new REMI procedures, see Frankel, 1991.

²⁸. This is the average of the two semi-annual employment totals drawn from the Employer Survey; See our Table 2, line 3.

We can examine the effects of the new system by working through the numbers for Santa Barbara County. Under the new rules for counting employment, SEMP's consultants estimate 1990 Santa Barbara County operating company and contractor employment (using the oil-related mining and construction basis) to have been 359 persons. In the case of Santa Barbara County, this employment number is to be multiplied by 4.02²⁹ to arrive at total Santa Barbara County population changes due to oil activities. Thus 359 times 4.02 gives a total estimated population impact of 1443 in-migrants.³⁰ Under the old system, the REMI estimate for Santa Barbara County was 795 (or only 55 percent of the new impact).³¹ The revision thus substantially raises how much industry will have to pay in mitigation payments since the estimated in-migrant impacts are much greater. For the companies, an offsetting compensation may be the increased efficiencies and lower administrative costs involved, compared to a process they found cumbersome and intrusive (attitudes of participants are further discussed below).

Why the multiplier produces such significantly larger in-migrant population estimates than before has not been clearly explained in any public documents we have seen, nor did any reviewers of the draft version of this report provide us with any additional documentation on this point despite our requests.³² Our own detailed analysis (see above and Appendix E) of inconsistencies between the old REMI and SEMP survey results indicated that the old REMI was generating estimates that were too low--our own estimates suggested an increase slightly smaller than the numbers that come out of the newly implemented procedure.

The new employment multiplier is analogous to the old "intermediate multipliers" linking employment and in-migration (see Appendix E). As in that case, the new multiplier is actually drawn from a secondary analysis of two different numbers generated in the process of running a REMI simulation.³³ A new and more up-to-date REMI model was used in reaching the new estimates resulting in output judged to be "more realistic."³⁴ Thus, as before, the resulting coefficient is a summary expression of relationships that exist within the REMI model, and their magnitude has not been independently validated.

We are also advised that experience suggested that at the outset of SEMP the construction cost estimates for payroll for the platform construction phase were underestimated. The original data were based on an assumed eight-hour shift rather than the round-the-clock multiple shifts actually used. There were apparently other technical factors that suggested that the inputs to the old REMI understated the magnitude or timing of economic stimulus to the Tri-Counties.³⁵

In any case, it is our judgment that the revisions to REMI clearly go in the appropriate direction of increasing the estimated volumes of Tri-County in-migration related to oil development. Moreover, while the need to adopt such revisions may well have been evident some time prior to the actual reforms, the fact that the reforms were adopted speaks very well of the level of flexibility in the SEMP program on the part of all the participants. This is highly commendable and reflects the generally pragmatic spirit evident in our interview reports, which are discussed in more detail below.

What Impacts Count?

²⁹. For Ventura, the multiplier is 4.24; for San Luis Obispo, it is 5.29.

³⁰. As always, these population impacts are defined to be impacts occurring in a specific year relative to an earlier baseline year rather than the preceding calendar year. Each year is a separate measurement relative to the baseline, and cumulating is not appropriate.

³¹. No commentators have disagreed with or questioned the accuracy of this representation of the comparative in-migrant impacts in the old and new REMI models.

³². In addition to Frankel 1991, we have a copy of a manual prepared for an industry briefing on the new SEMP (Pacific Research Inc., 1991).

³³. One is the employment number, the other is the estimated population effect. The multiplier is the coefficient produced from a secondary regression analysis of employment on estimated population.

³⁴. Communication from Michael Powers.

³⁵. Communication from Michael Powers.

A final point about the monitoring is more purely conceptual, but potentially of great importance. The REMI approach treats local hiring (as opposed to "importing" workers) as having zero impact--only in-migrant populations are estimated and then subsequently mitigated. REMI estimates of in-migrants are made each year (now using the employment-multiplier formula described above) relative to a baseline. Each year's "in-migrants" are determined by the observation of that year's level of oil industry employment. There is no coherent basis for cumulating these estimates over time or, indeed, for independently validating the volume of out-migration or in-migration associated with the oil industry activity.³⁶

The treatment of local hiring as not having an impact is not uncommon in impact analysis practice, but is of doubtful validity. Unless local hires are drawn from a pool of the unemployed or underemployed, a new oil hire causes an exit from some other local job which then, in turn, creates a vacancy that may well be filled--at least at some point in the job-chain--by a migrant.³⁷ Local hires may thus only be instances of indirectly rather than directly generating in-migrants. This suggests that an appropriate conservative estimate of the lower bound volume of in-migrant labor is simply the total number of oil-jobs created. The number of in-migrant persons would be greater because workers would come with households and there would be associated "induced" migrations resulting from the economic activity generated by the new hiring in the oil industry. Thus, total hires (times family size) is a simple way of getting at a *lower bound* for estimates of in-migration, not necessarily an exhaustive final total.

We suggest below that this logic could be combined with other reasonable assumptions about family size and demographics to simplify the process of estimating population impacts and allocating them on a geographical basis. At this point, however, it is sufficient to note that a possible estimate of the total in-migrant population size is equal to the total size of the oil-related population (our estimate for this number is in our Table 2, line 19). By our calculations, using data developed in the SEMP employee surveys (see Table 2, line 25), the implied total oil-related population was 56 percent greater than the REMI estimate of in-migrant persons in 1987, but only 16 percent greater in 1990.³⁸

Indeed, the new REMI population estimates comes very close to the number one would arrive at (as suggested above) by simply taking all oil-related employees (and their families) as in-migrants for purposes of SEMP. Perhaps this is just purely coincidental. Further investigation would be justified into the tradeoff between cost, transparency of process, and accuracy of estimates implied by substituting a simpler approach for the complexity and expense of the REMI-based approach.

ALLOCATION OF IMPACTS WITHIN COUNTIES

Our analysis thus far has dealt with the SEMP method of determining aggregate impacts broken down only at the county level. Allocating impacts among jurisdictions within counties makes use of questionnaires distributed among oil workers (Appendix C). We now describe how this SEMP survey component operates.

Under the aegis of the oil industry's regional trade association, the Western States Petroleum Association (the successor to the California Coastal Operators Group--CCOG), employment questionnaires are mailed to contractors and subcontractors by the consulting firm, Pacific Research Inc. (PRI). Forms are then distributed by companies to their employees, with an allowable turn-around time of three to four weeks. The forms are returned to the consulting firm which then carries out the analysis.

³⁶. SEMP questionnaires do provide some data on in-migrants, but these data are subject to their own peculiarities and are deliberately designed not to be able to illuminate the questions about cumulative impacts.

³⁷. In arriving at the original multipliers REMI estimates were based on a model that did include indicators of the tightness in the local employment market. Of course, subsequent use of fixed multipliers also implied fixed assumptions about the local employment market.

³⁸. Inspection of our Table 3 allows comparison with company expenditure data, by year and by county.

Over the course of the SEMP project, the procedures for distributing, collecting and coding the questionnaires have become increasingly standardized.³⁹ An earlier lack of standard procedures for administering the employee questionnaires was a cause for serious concern about data validity. We believe even now this procedure may present at least the appearance of a conflict of interest. Managers are responsible for distributing and collecting questionnaires, the results of which will determine their own industry's mitigation payments.⁴⁰ Vigorous monitoring by SEMP administrators and persistent prodding by the survey consultant (PRI) has recently resulted in good performance in terms of response rates.

In the questionnaire, employees are asked a series of questions about work-site and phase of employment. In the most critical portion of the questionnaire, employees are asked three questions about prior employment and residence:

Question 5. In [date one year ago], were you:

- Employed by a company which worked in any way with the oil and gas industry
- Employed by a company without any connection to or clients in the oil and gas industry
- Unemployed

Question 6. In [date one year ago], where did you live?

- Santa Barbara County
- Ventura County
- San Luis Obispo County
- Not in one of these counties

Question 7. Where do you live now?

- Santa Barbara County
- Ventura County
- San Luis Obispo County
- Not in one of these counties

Question 8. If you checked Santa Barbara, Ventura or San Luis Obispo County in Question 7, what city/community do you live in?

City or Community _____ Zip Code _____

Those oil employees who indicate they lived outside the Tri-Counties a year prior are classified as "in-migrants" (recall: these responses are not used to determine aggregate in-migrants, only to allocate REMI-estimated in-migrants within counties). The in-migrants' self-identified residential locations are then used to represent the distribution of *all* the in-migrant population impacts estimated by REMI.

This is an important point to understand because it is a weakness in the SEMP design. There is little basis for being confident that the residential pattern of direct oil-employee in-migrants is identical to the residential pattern of in-migrants who are indirect or induced employees. The SEMP employee survey is, conceptually, a *sample* from that larger universe of in-migrants. Thus, there are two sampling issues to consider: the adequacy of SEMP procedures in telling us about the direct oil-employees, and the validity of generalizing from the oil-employee in-migrants to the entire population of REMI-estimated in-migrants.

A descriptive example may help here. The percent of in-migrant respondents (as defined above) indicating that they reside in the city of Santa Barbara is taken also to be the percent of all the REMI-estimated in-migrant population that resides in the city of Santa Barbara. Responses are, appropriately, checked to avoid double counting of a single respondent between the two semi-annual surveys. Less appropriately, if we are trying to describe the universe of in-migrants, employees are excluded who worked less than 50 percent time on any single oil-related project. These adjustments are referred to as "filtering."

³⁹. See Tri-County Socioeconomic Monitoring Program, 1990b.

⁴⁰. We note that government officials express confidence that there are no problems in practice that arise from current practice.

We can use the year 1988 to provide a concrete example. After the filtering process, the employee survey results for 1988 reported a total of 1182 project-related employees (see our Table 2, lines 4 & 5, col. 6) of which 943 (or 80 percent) were Tri-County oil worker responses. Of those, 178 (19 percent) were identified as in-migrants, that is, they selected the fourth option to Question 6 above and one of the first three options on Question 7. The employer survey responses from the same period indicate Tri-County total employees of between 1557 (November) and 2195 (May), for a response rate of about 40 percent.

The 178 in-migrant respondents actually represented a larger number of in-migrant employees--266--since there is sometimes more than one worker per household. Of the 266, 167 lived in Santa Barbara County. Of those, 31 (or 18.6 percent) lived in Santa Maria, and 41 (or 24.6 percent) lived in Lompoc. In 1988, REMI estimated the oil-related population impact in Santa Barbara County to be 886 people. These estimated 886 were then allocated among jurisdictions in Santa Barbara County according to the percent results of the in-migrant survey--18.6 percent (165 people) to Santa Maria, and 24.6 percent (218 people) to Lompoc. The respondents, who represented about 40 percent of the relevant population of employees, were about 30 percent of the estimated total population of in-migrants.

The proportions associated with a given jurisdiction within a county can be quite small and the "sample" upon which those proportions are based can also be very small. Even assuming (doubtfully) that the sample is random--that is that it accurately reflects the underlying population--the smaller the number of cases surveyed, the greater the uncertainty about the resulting proportions that are observed. Surveyed in-migrant workers have declined as a percentage of all oil employees over time (see line 7 our Table 2), thus the sample that is the basis for allocating the in-migrant population between jurisdictions has grown smaller. This means that the distribution of impacts across localities has been estimated less and less precisely over time.⁴¹

Based on unpublished SEMP data for Santa Barbara County for the period 1988-90 that was made available to us, it is evident that as numbers of in-migrant respondents have declined, the residential locations reported by in-migrants has increasingly diverged from the geographical choices reported for project employees overall. From one survey to the next, the in-migrant choices of residential location, as reflected in the survey results, have increased in variability.⁴² During the same period, there was increasing stability over time in the geographical distribution of residential location of non in-migrant employee respondents. Thus, not only is it true on statistical grounds that we have less confidence in

⁴¹. The overall number of in-migrant responses declined from 587 in 1987 to 80 in 1990. Suppose that in both time periods, the proportion of in-migrant responses indicating that their place of residence was Goleta was 15 percent. In standard statistical practice, assuming that the sample is random, there is a .95 probability that the "true" in-migrant proportion lies somewhere within a range that depends on the size of the sample. For a sample of 600, that range is from 13.5 percent to 16.4 percent. For a sample of only 100, that range is from 11.4 to 18.6. That is, with a smaller sample size, we are less confident that the estimated percentage is the true percentage. For a REMI-estimated total in-migrant population of 2000, the broader range implies a difference of 144 people between the lower and upper bound. This difference would have been worth as much as \$70,000 to a particular jurisdiction in 1988.

We note the comment of PRI manager Charles MacLean that sample size is irrelevant because "those data are not used for anything. It *does not mean* [his emphasis] the distribution of impacts across localities has been estimated less and less precisely over time because these numbers are used only to develop a percentage of people living in the community." Communication of August 26, 1993. We do not agree with this conclusion.

⁴². We calculated the proportion of respondents--both in-migrants and all respondents--identifying particular locations as their residence. We used those proportions to calculate absolute differences between the proportions reporting a different location for (a) all project-related employees and in-migrants in a given survey round; (b) all project related employees in successive survey rounds; and (c) all in-migrant employees in successive rounds. The sum of these absolute differences provides an indication of how much "geographical agreement" there is between all employees and in-migrants at a particular point in time, between all employees at successive periods of time, and between all in-migrants at successive periods of time.

specific percentage estimates given from small samples, but we also observe, in fact, greater instability over time in the residential outcomes generated by small SEMP survey samples.

A number of other factors mean that at least some of the samples have not been good representations even of the population of direct oil-employee in-migrants. Response rates have varied substantially across time, as well as between contractors (see Table 3). Response rates were low at the very outset when project outlays were highest (e.g. under 50 percent among Texaco employees in March 1987), and when in-migrant percentages were highest. By 1992 response rates had apparently improved significantly. Government officials have expressed concern to us about perceived lack of cooperation on some occasions by some individuals in the distribution and collection of employee surveys (and a consultant refers to a "reluctance to fill-out forms" as well as other difficulties--see Frankel, 1991: 15).

Low response rates⁴³ are a special problem when those least likely to respond are the individuals whose response is most important: it is generally the case in surveys that the most mobile groups--i. e., the in-migrants in this instance--are less likely than others to respond. Moreover, gaining compliance from subcontractors was difficult in many cases, which means that subcontractor employees have in the past been especially likely not to be surveyed accurately.⁴⁴

Another possible source of bias is that response rates vary with education and occupational status. Those with better education and managerial jobs tend to respond at higher rates. Given the likelihood that employee residence is not randomly distributed across the regions (higher income workers more likely to live in the city of Santa Barbara, for example), mitigation will be biased against areas impacted by the lower-income employees. The SEMP process apparently has included no mechanisms to check the representativeness of the surveyed respondents.⁴⁵

It is important to note once again, that with diligent monitoring it has apparently been possible to attain much better response rates in recent surveys than in the earlier surveys.

A second concern is the issue of the generalizability of the employee results to all estimated in-migrants (the issue of external validity). Even with 100 percent response by oil employee in-migrants (note again above how that category is defined for purposes of this task), we doubt the validity of the assumption that all project-related in-migrants have the same residential patterns as the sampled oil employee in-migrants. We have already noted the increasing divergence between residential patterns for oil in-migrants and all oil employees. By 1990, the oil in-migrant population represented well under 20 percent of the total in-migrant population being estimated by REMI. Significantly, however, the correlation between Census data on residential patterns of census-in-migrants and the cumulative totals of SEMP-surveyed in-migrants is reasonably strong--stronger than between census in-migrants and all surveyed oil employees.⁴⁶

⁴³. Response rates of 40-60 percent are not considered low in a mailed survey when the sample is randomly chosen and there are means to compare non-respondents with respondents -- conditions not met here.

⁴⁴. Nor is confidence enhanced by some early response rates (see Table 3) of above 100 percent. We received different accounts from different sources about why this was possible. One explanation focused on the treatment of responses by part-time workers; another focused on treatment of responses by employees working more than 40 hours per week. This anomaly was one of many taken care of relatively early in SEMP.

⁴⁵. One possible way to construct some evidence on this issue would be to compare the proportion of responses by phase with the employers' estimate of employment by phase. Such a check is not yet part of the published SEMP documentation and data unavailability hinders outside researchers from carrying out such a check independently. If we could document different in-migrant rates associated with different phases of construction and operations, it would be possible to identify and correct for lopsided response patterns.

⁴⁶. The Pearson product-moment correlation coefficient between proportions of Census in-migrants residing in particular locations and the cumulative total of SEMP in-migrants residing in the

These issues matter because localities are enabled to make claims for mitigation payments based on the way the SEMP survey data apportion REMI-estimated impacts among local jurisdictions. Because the SEMP procedures have over time produced more randomness and variability in the estimated location of in-migrant impacts, it has undoubtedly been the case that actual mitigation payments have not flowed, in a very precise manner, to the jurisdictions most affected by oil-related in-migration.

In fact, if SEMP wants to make generic allocations of REMI-estimated in-migrant populations among local jurisdictions in the county, it would probably do better to substitute for the current employee survey a scientifically designed random survey of the entire county population (stratified to hit target groups) and ask where recent in-migrants actually live. The scientific survey would produce better information about oil-related in-migrant behavior than does the tiny sample of oil-employees now used. Such a survey could also gather information about the reasons for in-migration (including the attractiveness of the area; prospects of oil-industry direct employment) and provide estimates of the actual volume of in-migration over time. Such a data source would be a very valuable adjunct to the current SEMP data and would provide a means for directly calibrating some of the elements in the REMI model.⁴⁷

Short of a more complex and thorough survey operation, an alternative is to allocate impacts within counties by simply using the cumulative residential distribution (across all available surveys to date) of *all* oil employee in-migrants. Or, nearly as good, use the distribution for all oil employees. The latter would involve abandoning any pretense at tracing in-migrants per se. If in-migrant population had been allocated in the past according to the entire population of oil-employees, then the distribution of estimated impacts would have been significantly different in at least a few cases. For example, in the round 9 survey in 1990, only 6 percent of in-migrant employee responses (N=16) were from Santa Maria while 28 percent of the total employee group (218 responses) were from Santa Maria. Santa Barbara claimed 44 percent of the in-migrants, but had only 25 percent of all employees. Again, as only one possibility, these results could be due to under-reporting by lower-income migrants--the group more likely to live in lower-cost Santa Maria.

ADDITIONAL GOALS OF SEMP MONITORING

Besides providing the program with population impact figures to allocate among localities and guide mitigation, monitoring was initially conceived as a way to further other goals as well. One, discussed above, was to forecast future impacts for the localities. As pointed out (see Figure 2), SEMP has not proven to be a particularly good forecasting tool. This is not inherent in SEMP, but reflects the inability of the industry to accurately forecast its own development activities.

Another goal was to determine the effectiveness of past EIRs in predicting expenditure-employment relations. It was hoped that by monitoring actual population impacts over time, past predictions--and the methods behind them--could be evaluated. In research terms, a useful time-series

same set of locations is 0.76 for Santa Barbara County. The correlation with *all* SEMP-sampled employees is 0.62. Cumulation is done across surveys from rounds 5 through round 9 (May 1988 through June 1990). The locations are Carpinteria, Isla Vista, Santa Barbara City, Santa Maria, Lompoc, Buellton, Guadalupe, Mission Hills, Vandenburg Village, Solvang, Santa Ynez, and "other." In the latter category we placed all the SEMP-sampled locations other than those listed above. A Census in-migrant was someone who lived outside the County in 1985. This is plainly a very different definition from the SEMP definition.

⁴⁷. Such a survey would require special attention to design questions to assure sufficient representation of migrant populations. More frequent reporting of company employment totals can provide information about peaks and valleys in employment. Existing SEMP data could be analyzed to clarify what the consequences would be of any inability to reliably sample in-migrants in campgrounds or in motels. To our knowledge, these kinds of demographic issues have not been explored using SEMP data. Other data sources might be consulted about the impacts of oil employees on these short-term facilities.

data set would become available. Unfortunately, published SEMP data do not follow a consistent format across time, making it difficult to assemble a consistent data set.⁴⁸ This obviously impedes any effort to compare actualities with EIR projections (which themselves are not always consistent in time points and measurements used). Moreover, the EIR projections are invariably made on a firm-specific, project-specific basis, and SEMP data are always released only in a relatively aggregated form.

The SEMP data do, however, allow us to evaluate EIR estimates of total employment and it is clear, just as the oil companies suspected, that they were overstated. In no period has the SEMP estimated total employment reached the peak-year EIR estimates envisioned for just one project alone (Chevron Arguello). Oil development activities never involved the volume of activities foreseen at the outset of the 1980's.

Beyond the issue of gross employment levels, SEMP data also shed some light on the local hiring issue--whether or not OCS related projects help secure jobs for indigenous workers--and the degree that past EIRs accurately predicted local hiring to non-local hiring ratios. The EIRs prepared for the major oil projects differed by substantial magnitudes in their estimates of local hiring (see Fulton-Bennett, 1986). Depending on the construction phase, the range of local employment anticipated ranged from a low of 0.0 percent to a high of 100 percent local hires (ibid: 10-12). In platform construction, for example, the EIRs' estimates ranged from 0 to 80 percent local hiring--with the highest estimates associated with the Chevron Arguello project. From the SEMP results (Table 3), in-migrants made up well over 35 percent of workers in the early rounds, and approached 50 percent for some projects (e.g., Chevron). Put differently, local hires comprised between 50 and 65 percent according to SEMP data. However, these figures are likely overstate local hires, given the type of conceptual concerns and technical flaws, in part already described, in the construction of the in-migration data. Moreover, the question asked employees (whether they lived outside the region the year prior) biases results toward overstating local hires. Workers attracted to the region by the prospects of oil employment, for example, could engage in other activities for a year prior to gaining an OCS related job. The year's residency would qualify them as a local hire and is perhaps part of the explanation for the steady decline in in-migrant proportions over time. More workers gained "residency status" by virtue of time passing.

Some such flaws could be remedied, as previously suggested, by substituting a scientific study of Tri-County migration patterns for the SEMP employment survey. Short of that, a possible remedy is for the SEMP survey to include a more complete residential and employment history so that migration and employment could be more precisely tracked. The goal of gathering such data would be to gain running tallies of local vs. non-local hires. The survey could also include a question asking whether the respondent was motivated to move into the Tri-Counties to be employed by the oil industry. Without better data, SEMP can not adequately serve the purpose of precisely determining proportions of local hires. Gaining a good handle on local hires is important not only because this is what drives mitigation, but also because accurate reporting methods might encourage the industry to hire locally, so as to lessen impact payments. One of SEMP's design advantages is that it automatically encourages local hires by making in-migration the basis of impact payments. This incentive works best if in-migrants are accurately counted.

We caution that we come to our overall observations about monitoring with strong limitations based in the absence of data that could validate the basic figures used within the REMI model; with the revised method of monitoring population changes, as with the prior version, there are many reasons for concern regarding the figures that emerge. But hardly anyone we spoke with believed that the numbers produced by REMI are "true." Rather, they are regarded as at least reasonable, and that belief--as we will later show--is the necessary ingredient for other aspects of SEMP to function.

⁴⁸. In the 1989 report, SEMP reported as it had in several preceding reports (Table 11, p. 41 of the SEMP document) average quarterly direct employment by work-site, which would allow a diligent planner to approximate the relationship of interest--while requiring some further estimating of indirect employment. However, for 1990, SEMP reports only the expected employment by work-site for 1991, not the actual 1990 employment.

POSSIBLE REVISIONS IN THE CURRENT SYSTEMS OF ESTIMATING POPULATION IMPACTS

To lessen problems associated with estimating population impacts and allocating them among county jurisdictions, we suggest examining the following revisions: First, following the logic spelled out previously, assume that all oil employees (including employees of subcontractors) and their families are in-migrants--and that these are all of the in-migrants. This would eliminate all the uncertainties and expenses associated with complicated models like REMI. The resulting total in-migrant estimates are, in any event, reasonably similar to the totals coming from the REMI model. As we noted above, the similarity to the REMI total may be accidental or special to the circumstances of the Tri-Counties. However, we think a good case can be made that everybody would have been better off both financially and in terms of understanding what they were doing by making such a simplifying assumption--even though it involves ignoring induced populations of employees.

How would we arrive at an estimate of the total number of oil employees and their family members? Base this estimate on numbers of employees according to company records as is currently done with the use of Employer survey forms (1990 employment would have been 805--see our Table 2, line 3).

How far can we go in eliminating the troublesome employee survey? This depends on how much value is placed on the results of these surveys so far. We have doubts about the survey results on grounds of both internal and external validity, suggesting good reasons for reform.

How then do we arrive at estimates of the necessary demographic characteristics of oil employees, if not by direct employee survey? One possibility is to assume that family size is equivalent to the census-derived household size for the state as a whole.⁴⁹ Further assume that there is a single oil-industry worker per household (as is assumed in SEMP practice).⁵⁰ The 1990 Census showed a state-wide family size of 2.79. SEMP survey data showed 1989-1990 all-employee family size at a slightly larger 2.9, with no data we are aware of for any year showing larger family sizes. Using our suggested procedure for 1990, number of employees (805) would be multiplied by 2.79 to produce an overall in-migrant population estimate of 2246 for the Tri-County region overall. This figure is roughly midway between the 1173 persons estimated through the old REMI procedure and 3959 under the new REMI procedure. Note, however, this would have produced much larger in-migrant totals in the early years than resulted from REMI.

Allocations among the three counties would be based on company employee records (as indeed is envisioned under the revised REMI procedures). Allocation among jurisdictions within counties could be based on residential zip codes as found in company payroll records, although some special inquiries might be required in some cases.⁵¹ Numbers of children in school, another element of employee surveys, could be taken as a reflection of state averages per household (perhaps adjusted for age-specificity of industry employees).⁵²

⁴⁹. Note that we specify household size, not family size.

⁵⁰. This is inconsistent with SEMP survey data, but not with actual SEMP practice.

⁵¹. We have been advised that some employees have a mailing address that is different from their residential address, and that company records might not record the latter. The degree to which this is a problem can be empirically determined; if the proportion of cases is small, the problem could be ignored. Otherwise, the company could be asked to record actual local residential addresses as well as mailing addresses. There might be cases where very large zip codes cover numbers of local jurisdictions, in which case it might be necessary to assign local residential addresses to jurisdictions--an operation probably no more cumbersome than processing survey responses.

⁵². It may be possible to completely dispense with additional residential data gathering of any sort by using already accumulated SEMP employee survey data on residential choices to develop a general predictive model on where employees choose to reside. This model would be based, for

Finally, we reiterate once again, if we really want to know about oil-specific in-migration to the county and the factors that generate it, there should be a commitment to scientific survey samples of the entire Tri-County population. This would provide truly valuable information, valid for many purposes, and would greatly enhance the current level of information available through SEMP.

IV. MITIGATION

SEMP's mitigations primarily were designed to offset fiscal costs to local governments. Other types of impacts (e.g. damage to recreation opportunities) and even some additional fiscal consequences, were redressed through non-SEMP related programs--for example the oil-funded Coastal Resources Enhancement Fund (whose payments have exceeded those made under SEMP). The scenario most feared was a boom-bust cycle, in which public infrastructure investments are followed, once the resource is extracted, by a loss of the supporting tax base with which to pay off incurred debt (see Markusen and Glasmeier, 1984; Gulliford, 1989). There was also concern that in cases where development does enhance revenue, there might be a lag between the increased demand for public services and the flow of revenue, thereby lessening quality of life for all users in the interim. Some revenues come only after a population is in place, like state and federal subventions. Finally, a project may be built in a jurisdiction different from where most of its workers reside, so that relatively few additional tax benefits flow to the most affected government units.

The SEMP mitigation principles, also arrived at after lengthy and sometimes intense negotiations between government and industry officials, were designed to alleviate these various difficulties. The guidelines are designed to provide "assurances that...existing taxpayers do not subsidize any financial impacts to the county, municipalities, and public service-providers...as a result of oil and gas development." (Tri-County Socioeconomic Monitoring and Mitigation Program, 1988: iii). Jurisdictions are to be compensated for costs "not entirely offset by user taxes or fees."⁵³ The guidelines also contain provisos that protect industry against arbitrary charges. Mitigation occurs only if impacts go beyond certain thresholds for each type of service provider; temporary impacts are not to require permanent mitigations; mitigations will not be made for impacts on facilities that have unused capacities. None of these principles, however, were to be applied arbitrarily; there is repeated reference to "flexibility and case-by-case assessment"⁵⁴ of what is to be mitigated and how it is to be done.

To facilitate jurisdictions' participation, Santa Barbara County refined its principles into more concrete guidelines and offered examples for how to proceed under different categories of impact. To make a claim for public services, for example, a jurisdiction must first establish usual service standards and then be able to show that usual service levels are substantially impacted by oil development. Thus, in an example offered, the service ratio for police in the city of Santa Barbara is one officer to 1200 people. According to the negotiated arrangement, mitigation is not triggered until the in-migrants total 601, then the City can claim for money to hire another officer and provide for equipment.

For public facility impacts, the guidelines specify that facility claims are divided into two types, incremental expansion or major capital investment for a new facility. In the case of simple expansion, the

example, on a combination of housing cost and travel time from point of employment. With these data, population could be allocated among jurisdictions using a formula rather than either the costly survey process or employer records of workers' housing addresses. Our preliminary estimates show a correlation of .63 between residential rent and oil-employee residential choice for the largest 10 jurisdictions in Santa Barbara County. Figures for median contract rent were drawn from 1990 Census data and were measured as the ratio of local rent to the county-wide median. Population figures are the ratio of the percent of SEMP survey respondents in rounds 5 through 10 identifying each locale to the percent of the baseline population assigned to each locale in the SEMP monitoring report for 1990 (see our Table 2).

⁵³. p. iv, Santa Barbara County, 1988, Doc. A

⁵⁴. p. v, Santa Barbara County, 1988, Doc. A

oil companies are charged a per capita cost estimate, multiplied by the number of in-migrants. When there is a "lumpy cost," mitigation is justified if forecasts show the number of in-migrants exceeding existing capacities. For example, waste water treatment facilities have a long lead time for planning. Although the situation is described in the guidelines as "rare" (and indeed did not happen--see below), SEMP allows charges to a project for some up-front costs (a figure of 30 percent is used in some contexts) to finance a new facility with future operators sharing in the costs as they become users.

The guidelines consider housing to be impacted when a vacancy rate threshold of under two percent has been met (the usual condition found in the Santa Barbara South Coast during the life of SEMP thus far). The County has estimated that there is a 40 percent shortfall in terms of the availability of new housing units that can serve moderate and low income families compared to the stock of housing available. Based on the County's ongoing housing program, the total payment is figured by charging an oil company \$25,000 for 40 percent of the total number of its in-migrants, a dollar amount the County uses as the standard subsidy to generate affordable housing. For school impacts, there can be no charges for operating funds since the state reimburses districts on a per child basis. Only impacts on facilities can be mitigated and because the impacts are seen as temporary, the guidelines recommend claiming for relocatable classrooms.

THE MITIGATION PROCEDURES

The steps of the mitigation process for Santa Barbara County (Ventura County's are somewhat different, see below) are here adapted from various SEMP publications⁵⁵ by way of summary:

1. Data from oil and gas companies is analyzed and annual SEMP impact reports are issued by the County; jurisdictions have one year to submit claims based on the population impact figures contained in the report.
2. Each jurisdiction must collect and use baseline information to determine capacity thresholds which trigger mitigation; if there is unused capacity, no mitigation may be warranted. Jurisdictions must also show that there is no "doubling-up," that the impacts are not already mitigated by some other permit condition.
3. Counties provide jurisdictions general guidelines to assist them in developing their mitigation claims. Jurisdictions can claim for three areas: public services, facilities, and housing impacts.
4. Negotiation occurs between service providers and industry to develop mitigation. The program Coordinator advises and serves, as appropriate, as an advocate for the jurisdictions during these negotiations.
5. County Planning Commission is informed of mitigation requests, and both the County Planning Commission and Board of Supervisors are kept advised of the progress of claims.
6. County Board of Supervisors votes on a case-by-case basis on issues that have not been resolved through negotiation.
7. After successful negotiations, payments are made directly to jurisdictions by industry. The guidelines provide for "alternative" methods to cash payments such as bond financing or loan guarantees.
8. Compliance is ensured through the Santa Barbara County Permit Compliance Program--established as part of the general permit conditions for all oil projects in the County. The County also has a "living permit" provision which allows for on-going modification to permits and can be used to insure compliance to SEMP through actions of the County Planning Commission.

⁵⁵. See listing in references under Tri-Counties Socioeconomic Monitoring Program.

Each jurisdiction (the counties and their constituent government units) were responsible for developing a methodology and justification for a claim. This allowed individual jurisdictions to tailor their mitigation methodologies to their own specific circumstances, including the types of procedures they already might have in place. There was also some flexibility in the timing of claims. While jurisdictions were supposed to submit within a year after being informed of impacts, there had to be adjustment given that the relevant mitigation formulas were still being developed at the time the first jurisdictions were supposed to submit their claims. Over a period of months, individual jurisdictions developed their methodologies, often with assistance from the SEMP Coordinator.

The jurisdictions submit their claims with relevant justification to industry--through the auspices of the SEMP Coordinator. The industry is represented by the regional oil industry group (CCOG--later as the Western States Petroleum Association) which distributes the claims to the appropriate oil operators for payment. Individual claims were usually discussed by the Tri-County Technical Advisory Committee (TAC). The sometimes rough calculations used in the earliest claims influenced the negotiations then in process and the mitigation formulas that were eventually approved. The actual negotiations consisted of a back and forth between government officials and the oil industry, asking for further information, clarification or disputing a certain point or methodological assumption, with the Coordinator often, in his words, "advocating for a solution." In the first filing periods particularly, the Coordinator encouraged jurisdictions to file claims, organized informational meetings, and followed up to monitor progress. The negotiations occurred through correspondence, phone conversations, and meetings.

Attendance at the meetings was not limited to formally designated TAC members or designated jurisdiction representatives; those with interest or appropriate input attended as needed, with some of the meetings resembling, according to an informant, "open forums." The procedures for implementing SEMP mitigations emerged "from the bottom up"; the general mitigation guidelines and the actual mitigation practices were shaped by the ongoing negotiations of specific jurisdictions over particular impacts as the lengthy process of generating program guidelines continued. The time necessary to develop guidelines and methodologies, negotiate initial claims and gain oil industry approval meant that three years worth of claims accumulated before the first mitigation payments took place in 1989. These payments were generally made as a lump sum for the years 1986 through 1988.⁵⁶ The process was subsequently speeded up; payments came to be made in an average of six months from date of filing.

Although the SEMP program is infused with the notion that payments received will be used to mitigate impacts from oil development, there is little restriction as to what localities can do with the funds they receive. There is no auditing mechanism in SEMP to determine how the jurisdictions actually spend the money. The funds arrive as if an unrestricted general revenue grant.

ISSUES OF CONTENTION

One key issue to be resolved in the negotiating process was whether the industry would pay the full cost for new public facilities needed to service the growth it created. Under a boom-bust scenario, there is a case for industry paying full costs; the unused capacities after the bust will be worthless and the tax base will be too small to pay for them. Industry rejected this analysis--not only would there be no large bust, but any facilities put in place to serve oil could easily be used by an otherwise-expanding Tri-County population. This was a region, after all, of robust and diversified economic activity with a history of steady growth quite apart from oil development.

On certain points, the industry did prevail. The oil companies insisted that SEMP could not be used to fulfill "wish lists" for public facilities and indeed this sort of prohibition is implicit in the SEMP guideline documents. The first claim made by a small city in north Santa Barbara County was for a new civic auditorium, made without specific justification as to any oil impacts that caused it to be needed. The civic center example was invoked by industry informants as an example of an "outrageous" claim, the kind of "wish list" item that was the first thing that "had to go" during the negotiations.

⁵⁶. This schedule was approximately the same for jurisdictions in both counties.

A more subtle bone of contention was the principle of amortization and its precise application. Both the County and City of Santa Barbara, for example, requested funds to subsidize construction of affordable housing, according to policies then in place. But the oil industry countered that because the life of its project was limited (unlike, say, the development of an office building or other permanent addition to the employment-base), its payments should be amortized on the basis of the person-years of the impacts. The Santa Barbara County parks department filed for reimbursement for campsite development. Here the facility is not exactly "permanent" under any conditions, but once again the industry took the position that it should pay only a pro rata share. In the guidelines as they came to be refined, jurisdictions determine the amount of money it would take to develop a new campsite and amortize it over 15 years and submit a claim for only the amount of annual payment (plus interest) multiplied by the number of in-migrants.

In an illustration of just how thoroughgoing the industry was in its application of the pro rata concept, it opposed school districts' requests that it pay up front for installation (and then the lease payments) for temporary relocatable classrooms. The oil companies successfully negotiated amortization of the cost of even *installation* given that the classrooms could continue to be used after the oil impact period had passed. Thus if the life span of the relocatable is 10 years and the impact occurs in only one, the oil companies argued they should pay one-tenth of the cost to install the facility, plus the lease payment for one year.

As a general principle, amortization can lead to dilemmas; if the temporary classroom is not, in fact, needed beyond the one year period, the entire installation costs should have been paid by oil. In other instances it may not be easy to "rent" temporary facilities (e.g. a fire truck) or add a temporary civil servant (who may gain tenure rights) to a police force or small bureaucracy. The concept of amortization, reasonable to most jurisdictions from the outset, was accepted by all negotiators in the end. But there was still room for maneuver; it had to be decided, for example, over how long a period amortization should be stretched for a given type of improvement. This meant that acceptance of the amortization principle still did not decide the amount of payments. In instances of dispute, the parties in effect compromised settlement amounts by setting amortization schedules that yielded payments somewhere between the figures requested and the amounts that the industry held to be proper. The criterion was as much an outcome of bargaining as it was based on any accepted technical procedure.

There was an instance in which the industry refused to go along with even a pro rata request. Santa Barbara County requested \$5,100 as the industry's pro rata share of the cost of updating the General Plan for the Buellton area. The County's grounds were that the need and complexity of the planning effort had been increased by oil development. But oil took the position that such planning is a basic county responsibility and would have to have been carried out, by law, regardless of oil's presence or absence. In the end, the County dropped the request. Still another oil company gain was a lack of up-front payment for any of the impacts. While such requests were part of some claims, and had been part of the Chevron permit conditions and SEMP guidelines, it was an element that was not pressed by government negotiators.

For whatever reason, it is clear that the result of negotiation was to substantially reduce the amount of claims that were paid, at least for Santa Barbara County--the place that most of the negotiation was about. As of May 1991, total Santa Barbara County claims (which cover the years 1986-1988) had been reduced by approximately 75 percent (although several claims were still pending). Expressed in absolute numbers, the amount of settlement was close to \$1.5 million, compared to original claims amounting to \$6.3 million.⁵⁷ For Ventura County, which used a different method (see below), the amount claimed (\$1.18 million) was close to the amount of settlement (\$1.06 million). There is a very clear pattern in which Santa Barbara County jurisdictions' early claims (usually in the first year of the program) are wildly higher than the eventual settlement for that year. In subsequent years the divergence's between claims and settlements tend to disappear, as claims come into line with prior settlements. This

⁵⁷. Source: unnumbered tables, "Santa Barbara County SEMP Mitigation Claims" (dated May 20, 1991) and "Ventura County SEMP Mitigation Claims," UNOCAL Corporation.

pattern varies somewhat across Santa Barbara County in that some of the school districts, as well as the City of Santa Maria, never showed much of a spread between claims and settlements.

THE APPEALS PROCESS

The oil companies on one occasion went before the Board of Supervisors to contest one of the early claims. Permit conditions for onshore projects generally "encouraged" the oil firm to house workers in northern Santa Barbara County near project sites, in part to take advantage of a comparatively high housing vacancy rate. But the County nevertheless filed a housing claim which included the impact on a North-County community. The oil companies objected that they had already complied with the permit condition by having workers locate in the preferred area. The Board voted down their objection and the company paid the housing claim.

This was one of the few instances when either party moved outside the negotiations themselves to appeal a position. In case of irreconcilable disputes, SEMP provides for a "workshop" process (as part of the "Permit Compliance Program") in which staff, oil representatives and the County Planning Commission make "an effort to resolve problems prior to consideration and final action by the Board of Supervisors."⁵⁸ Our industry informants did not have much faith in this untested workshop process; in the one instance when they went before the Board of Supervisors, the decision (see above) had gone against them. One oil representative said the industry was reluctant to negotiate in front of the Santa Barbara County Board of Supervisors because "you always lose on that."

The negotiations were continuously shaped and encouraged by a number of ongoing factors. Participation in SEMP had been a condition of the permitting process and ongoing compliance by the industry was necessary to keep the "living permit" alive. For the industry, too much resistance could endanger the whole project and might also risk "bad press" within a region where the primary government body was in the hands of a majority deeply suspicious of its activities. For the government negotiators, oil company resistance would demand more of their time in negotiations and further delay payments. The oil companies could come in with more experts, lawyers, or take their case to the courts if severely frustrated.

The one time that government negotiators "went public" and took their case to the Board of Supervisors was caused by the perception of the SEMP Coordinator that "the companies were not negotiating in good faith and needed some prodding."⁵⁹ It had taken three years to generate any payments and by 1990 numbers of claims for 1986 had still not been settled.⁶⁰ That three years of monitoring reports had accumulated with payments still not made meant that SEMP, as a system of delivering mitigation, was not functioning. It was to "turn up the political heat" that the SEMP Coordinator asked the Board of Supervisors to "reiterate their position" on commitment to SEMP (which they did).

Our industry informants consider the suggestion that they were intransigent as being without merit. They attribute the delays to the jurisdictions' problems, including incomplete justification for claims, as well as to the inherent complexity of the whole SEMP task. The program Coordinator also considered part of the delay due to the program's complexities as well as some of the districts being "pretty slow in responding." A few industry informants expressed disapproval of the Coordinator's actions before the Board of Supervisors, treating it as evidence of his improper role more generally. He was criticized for not rejecting, out of hand, "unreasonable" claims as well as for actively encouraging and assisting jurisdictions to file. Some thought his position should have been defined as more neutral, but pro-active in terms of "instructing" the jurisdictions as to the kinds of claims that were clearly inappropriate.

⁵⁸ p. 5, "Mitigation of Socioeconomic Impacts in Santa Barbara County" Tri-County Socioeconomic Monitoring and Mitigation Program, September 1988

⁵⁹ Joseph Harry, "Oil Impacts Slow" *Santa Barbara News-Press*, March 6, 1990, p. B 1.

⁶⁰ See "Status Report, Socioeconomic Monitoring and Mitigation Program" Santa Barbara County Agenda Report, February 20, 1990.

Oil officials also attributed delay to what they perceived as some government participants' poor knowledge of the monitoring process and the sometimes difficult negotiations that had been necessary to develop it. Most of the oil representatives had themselves been involved in the monitoring negotiations (as part of TAC); the jurisdiction officials had not. Since the monitoring process generated the essential inputs to the mitigation phase, lack of understanding about the way monitoring resulted in impacts was seen as slowing down agreements.

VENTURA COUNTY'S VARIANT

The Ventura County Socioeconomic Mitigation Program (VCSEMP) guidelines are similar to those of Santa Barbara County with the following differences. Since the major onshore processing facilities are located in Santa Barbara County, there are no industry-paid property tax revenues for Ventura County or any of its constituent jurisdictions from this source. This opens up the possibility for county claims for generic impacts on public services, otherwise uncompensated. Either of two methodologies can be used. The first is a service demand method, similar to the Santa Barbara County guidelines: the jurisdiction documents service baselines, identifies oil impacts that lower service standards, and negotiates a payment that would restore 1985 service levels. Specific types of services singled out for mention include police and fire, as well as libraries, recreation, criminal justice, and public health care.⁶¹ The alternative is to use a per capita formula developed, through protracted negotiation, by the Ventura County Technical Advisory Committee (VCTAC). This method provides an "off the shelf" formula that can be used by any effected jurisdiction without special justification based on impacts, unused capacities, and so forth.

The formula includes offsetting several types of rather subtle costs to localities. Although in-migrants will eventually pay revenues such as property tax, various registration or licensing fees, etc., these are not collected when the service is provided because, for example, migrants have not yet had to re-register their vehicles. Hence there is a "lag" between the time service is provided and when revenue starts coming in. The formula allows jurisdictions to capture lost revenue due to lag (including interest on funds spent before reimbursement arrives). Other lost sources of revenue are of the sort that will never go up in response to higher populations; some federal and state grants, for example, do not rise with increases in population. In-migrants thus cause these revenues to be spread over a wider base. This dilution in benefit, due to what are termed by VCSEMP as "unaccrued revenues," is also captured from the oil industry through the formula. These lagged and unaccrued revenue figures (plus interest) are multiplied by the numbers of in-migrants to yield the basic mitigation amounts. The relevant formulas were developed in conjunction with Price Waterhouse, Inc., hired at the request of industry participants (the Price Waterhouse role was regarded as negligible by government participants).

The VCSEMP, in its written guidelines, signals housing displacement impacts as a special category for which mitigation may be requested. The principles are the same as in the Santa Barbara County program, notably the proviso that claims must be based on general housing impact and mitigation programs in place within each jurisdiction. Places without such programs already in existence can create them, but for the purpose of mitigating all development impacts, not just oil. There is provision that any city can file a housing claim retroactively within two years of developing such a program.

WHO GOT WHAT FROM SEMP?

As of late summer 1992, the oil industry had made \$2,817,941 in SEMP mitigation payments to jurisdictions. The figures (and their basis) are summarized in Tables 4, 5 and 6. They represent claims settled in 1986 and 1989 (the latest report, for the 1990 impacts, was released in March 1992). The first allocation question concerns the two participating counties.

The allocation of payments to the counties parallels the gross expenditures made by the oil companies within each--an outcome consistent with the logic of the REMI model. The amount of

⁶¹ p. 13, "Ventura County OCS/Tidelands Socioeconomic Monitoring and litigation Program, Mitigation Program for Ventura County " May 9, 1989.

\$1,599,444⁶² has gone to jurisdictions in Santa Barbara County, with Ventura County jurisdictions receiving \$1,220,535 (expenditures in the two counties were \$285m and \$229m respectively).

The total dollar amounts that went to each County are fairly close, but the distribution of money into types of claims is quite different. Payments for water and sewer treatment were almost equal among the two counties (see Tables 5 and 6), but very different amounts were paid for schools, housing and public services. The differences in school payments (Santa Barbara, \$227,586; Ventura \$68,974) simply reflect differences in the numbers of in-migrants; the two counties use the same methodology for calculating school claims. But the specifics of claims-making and mitigation negotiations have created their own variations. Because Ventura County does not have an established housing mitigation program, it has submitted no housing claims and only a token housing dollar amount (\$3,003) has gone to any of its constituent cities--and this latter payment, according to one informant, was only made because the requested amount was so small. The Santa Barbara figure is large because of mitigation programs in place (pre-dating SEMP) designed to deal with chronic shortages of affordable housing,

The difference between the counties in public service claims is also large, with Ventura gaining \$863,475 and Santa Barbara jurisdictions \$321,227. This reflects Santa Barbara County's collection of property taxes from the industry's major capital investments; SEMP's prohibition of "double dipping" inhibits County government from collecting mitigations for impacts which are paid for through property and other tax payments. Payments made in Santa Barbara County were thus primarily for other costs than public services, although its' cities of Lompoc and Santa Maria have filed claims for public services. Ventura County, and its cities of Ventura and Oxnard have all claimed for public services.

The scale of SEMP payments made by individual oil industry firms varies substantially--as low as \$2.34, paid by All American Pipeline for 1987 impacts on the Santa Barbara College District; the largest cumulative amount, \$499,831, was paid by Chevron/Texaco to Ventura County for public services. Industry participants worked out among themselves the contributions of each company, based on (in the words of an oil informant), "a kind of a sliding scale."

The total amount of SEMP payments needs to be compared to the costs of generating those payments. The documented costs of creating and administering SEMP are high, with oil company payments for the purpose amounting to almost \$1.7 million up to July 25, 1990.⁶³ This includes amounts paid to SEMP's consultants (Pacific Research, Inc.), as well as for a special study by Price Waterhouse requested by the industry, and for the administrative costs of the two counties needed to participate in the program. This is a highly conservative estimate of total costs because it does not include the administrative costs of the oil companies, including the time spent by their representatives, the amounts paid to their lawyers, and other administrative costs. Nor does it include the staff time and expenses of participating local jurisdictions (apart from the counties).

By summer of 1990, the \$1.7 million documented to have been spent had yielded \$2.8 million that had accumulated as payment two years later. This is a very high administrative cost burden for a program. But it needs to be considered in light of the fact that administrative costs, as a proportion of settlements, should continue to decline because consultants' fees are highest in the early program phase and because even routine administrative costs tend to decline over time. As a number of the SEMP participants themselves make evident, there are still other reasons to evaluate the meaning of these administrative burdens carefully.

V. PARTICIPANTS' EVALUATIONS OF SEMP

⁶². Slight differences between these figures and those reported in summary form by SEMP are due to an apparent inadvertent omission of a school pay-out in the SEMP report total.

⁶³. See cumulative administrative cost totals from table (unnumbered and undated), "SEMP Development/Administration Cost Allocations" California Coastal Operators Group.

Here we review the retrospective judgments of those most deeply involved in the program and the reasons behind those judgments. Some of those reasons may be of use to future planners of similar programs; others are important for demonstrating how program- and situation-specific factors contribute in unexpected ways to SEMP's potential (interviewing details are in Appendix A).

The main surprise for participants was that less money came in than was expected, primarily because oil development was less than anticipated. This meant that the efforts put in up front yielded fewer benefits per unit of effort than would otherwise have been the case. With the benefit of hindsight, everybody might have been better off with a simple cash payment. Although some jurisdiction participants worried that this made the value of their time investment marginal at best, most were satisfied that their effort was worthwhile, even for the modest mitigations that sometimes were the result. Hindsight tempts evaluation of SEMP in different terms from those used by participants in the mid-1980's. Those participants were interested in avoiding the worst possible outcomes; SEMP contributed a sense that the worst possible outcomes would be avoided. Indeed, virtually all participants had an appreciation for the "insurance policy" principle that led to SEMP's creation. For local officials, it was necessary protection against impacts from a vast in-migration of workers and the services they would demand, as forecast in the EIRs. Oil companies were submitting development plans and offshore support industries were visibly in an expansion mode. Some informants worried that rapid industrialization of the Tri-Counties would radically change the region's character. One who had been active in a citizens planning group, later to become an aide to a County Supervisor, recalled:

... the numbers of tankers, and the numbers of trucks full of natural gas that would be going up and down the freeway--all the projections were really dire. It made it sound like this place was just going to be an industrial sewer.

From the oil industry side, SEMP was also a kind of insurance policy. If production came in at levels lower than those anticipated in EIRs, or even levels lower than the industry itself expected (both of which came to pass), the industry would not be stuck with paying for costs that would never materialize. The oil companies had always maintained the impacts would be less than many had thought; if they were right, they would pay little, only if wrong would they pay more.

WHAT THEY LIKED AND DISLIKED

For a good number of participants, SEMP was a burdensome drain on their time. This was especially the case for those who were involved in the long TAC negotiations--developing the monitoring principles and formulae. The whole process took much longer than expected. Similarly, those making the initial mitigation claims often had to invest more than those who came later and who could rely on established guidelines and precedents. The more time put in, the larger the returns needed to justify the effort. Thus one school official (whose district was to gain \$30,000 in mitigation), while mindful of the "personal growth and enrichment" provided by the experience, had this concern:

For all the many hours for those years that I sat in meetings, and they went half a day at a time, early on two or three times a month, I suspect I would have been well paid by virtue of these numbers, ten cents an hour...

A sense of the time commitment can be gauged by the report of a Santa Barbara city representative on the Tri-County TAC (who was also involved in making several specific claims for her city). She estimated that for a period of four months, she was in meetings "every couple of weeks" and that during a six week period in the middle of this time, she was in three or four meetings a week with other City and County officials. This is an expensive use of staff, but compensated in this case with over \$800,000 in housing payments to the City and the County (up through 1989). This official pointed out that during the period she was preparing the first claim she had the "luxury" to commit time to SEMP because she was assigned full-time to work on energy issues; the City of Santa Barbara took a keen interest in oil development, as it did development in general. An oil representative's recollection of time spent is of the

same magnitude, estimating he spent the equivalent of "three or four months" over the 1984 through 1986 period on SEMP.

But even those wary of the time investment, at least among government people, much appreciated the insurance aspect. That the impacts did not occur to the extent feared does not, from this perspective, lessen the value of the time put in to "cover" the jurisdictions. The value of SEMP, from the standpoint of the localities, is thus higher than the actual pay-outs at the end, a fact that enhances many of the participants' satisfaction with the program's outcomes.

Some government staff people expressed frustration with the personnel turnover on the industry side (one industry person complained about turnover on the government side). In addition to re-establishing rapport, any new representative would have to be "educated" from the beginning and would often come in and question assumptions already worked out. Industry officials do not come into proceedings with an understanding of local government and public finance; education would have to start anew with fresh faces.

However burdensome the process, the money was of the type that jurisdictions most value. An advantage of SEMP's decentralized method for generating claims was that localities could shape claims to fit their own priorities (an advantage also noted by Powers, 1991: 3770). Individual jurisdictions, in the words of a government official,

can really tailor what they want, if something is a really big issue in the community, even if it's only because it's a political issue in that community...

Because of the lag between impact and mitigation payment, the money that arrives as reimbursement is for costs already absorbed. By the time it arrives, whatever "pain" it caused has already been faced. Jurisdictions could treat this money as almost completely without strings and this kind of money helps the most. Although jurisdictions usually put the money in a fund to mitigate the impacts their claims were based on (e.g. housing money went to build housing), they were not forced to do so.

For some jurisdictions, like the school districts, it became discretionary cash, or "green money"⁶⁴ in a school representative's term, and "these kinds of dollars are hard to come by." The City of Ventura used its money for dealing with the kind of environmental concerns that otherwise would lack a funding source. One industry informant criticized what he took to be a "noncompliance" with the principle that payments should be used to mitigate actual impacts. Regardless of the validity of this view, our point is that money that arrives without earmarks is, for the recipient, more valuable than other kinds of money--a fact that increases jurisdictions' satisfaction with even modest returns from SEMP.

Satisfaction seems to have varied by the ease with which given jurisdictions were able to establish bases for filing claims, due in part to their own organizational set-up. Part of the reason all school representatives interviewed were satisfied with the program was that they managed an efficient organizational response for filing claims. The first three impacted districts appointed one individual to devise a standard "user friendly" formula that could be given to other districts. The initial meetings, usually bimonthly over a period of about six months, were necessary to agree on a common approach. Although this represents a high degree of effort, it was accomplished in a relatively smooth way. Some of the school officials had low expectations at the outset, thus boosting favorable attitudes toward the results. A school business officer said:

Well, you get sort of a jaded viewpoint when it comes to developers and developer fees because school districts [in this part of the County-*aus.*] have not done well in those areas. And so to have it actually work out and not be an unbearable burden to file a claim, you know -- I think we really surprised people with the fact that money actually came to the districts.

⁶⁴. For elaboration of the point that money comes in different types and is not completely fungible, see Zelizer, 1988.

Although welcome, the money was not received with baited breath; the nature of oil impacts in this region were, with a few exceptions, too low to be noticed by those administering jurisdictions. Nevertheless SEMP was appreciated precisely for its capacity to mitigate even small impacts, thus providing a way to gain control over cumulative consequences of development. In this light, the VCTAC per capita methodology (applied to public service impacts) was especially useful because it required no threshold to be met in any given jurisdiction before a payment could be made. Theoretically, even very small impacts could result in mitigation and with low administrative costs.

Although hardly ever arising among our informants, one potential source of dissatisfaction from a decentralized program like SEMP might be a resentment that some jurisdictions could end up with mitigations that others did not receive. In one instance, a city was able to gain mitigation payment for traffic impacts through early and persistent urgings, despite the fact that traffic was not one of the impacts agreed upon in the guidelines as a basis for mitigation. No other city received payment or even filed for traffic mitigation. Despite the obvious potential for inter-local resentments, there was virtually no complaining among our respondents on this score.

SEMP does not cover all possible impacts of development, in part because of other special mitigation conditions attached to the construction permits for onshore facilities. Our informants had little to suggest by way of additions to SEMP's mitigation categories, although there was mention made of a need to somehow address "social issues" such as mental health, as well as aesthetic effects, and oil spill risks (other mitigation programs, do indeed respond to some of these needs). One of our informants raised the issue of "local hires" as an ingredient missing in SEMP, with the suggestion that the industry be required to fund training programs for local workers so as to avoid importing labor from outside. This was an issue addressed--but not followed up--in SEMP guidelines, except, we again note, that basing payments on in-migrants is an automatic incentive to use local labor.

The oil industry participants were, on the whole, more negative than any other group in their appraisal of SEMP--perhaps not an unexpected outcome given that the jurisdictions participated voluntarily, but the oil companies faced it as a condition for doing business. Industry informants saw SEMP (and the other special permitting conditions developed by Santa Barbara County) as discriminatory since other types of development proceeded with less elaborate forms of regulation. Some participants believed their industry was being singled out as a way to discourage oil development, and for reasons that were fundamentally "emotional" rather than objective. Industry saw the program as "blackmail," "extortion," or a "money grab," all terms used either by oil informants or others who reported oil representatives as using them. One TAC oil representative said it felt like they were regarded as "aliens from another planet," but one with deep pockets. One industry informant told us that in his "personal and unofficial view" the problem with SEMP was its precedent-setting potential, one which increases the risk of exploration and development in a business that is already risky. He said he had heard that Louisiana was interested in adopting a similar program, and was afraid that SEMP was a "monster" they had helped create and would now have to live with.

A pervasive industry complaint, one parallel to remarks made by some government informants, was that the whole process (from initial negotiations to paying the first claims) "took too long." The program was "too cumbersome" with "too many individuals involved," some as only a small part of their overall job responsibilities. Several oil informants (and a few on the public side) felt strongly that the counties (particularly Santa Barbara County) needed to act as a "clearinghouse" to screen claims before forwarding them to the industry.⁶⁵ They clearly felt put upon those first few years because the jurisdictions were inexperienced and "nobody really knew what was going on except the director."

Industry informants did not volunteer that they found the process creative or satisfying in the way that some of the government-side participants did. Some of this attitude may be rooted in an overall frustration with oil development regulations of which SEMP is only a part. Industry informants feel

⁶⁵. Although staff advise jurisdictions about what they think "will fly" with the oil companies, they do not intervene or reject claims because they have believed that each jurisdiction deserves autonomy and the opportunity to enter into negotiations with a starting position that they have determined.

over-regulated and routinely talked about "the high cost of doing business." Several commented that "SEMP stands for Shamefully Excessive Mitigation Process." On top of all this, the oil companies' contributions under SEMP receive minimal public attention, a fact noted by an industry spokesperson. This contrasts, for example, with programs like corporate "adoption" of a school, an alternative form of mitigation raised by several informants (preferred, in fact, by one). Under SEMP, public visibility is reduced to just a few minutes on the Board of Supervisors agenda when reports and proposed mitigations are submitted for routine approval.

Again, the fact that our industry informants had participated in negotiating the monitoring components of SEMP (which the majority of our other informants had been spared) may also contribute to their more negative views. One participant characterized the expenditure data, used in the earlier expenditure-based REMI application as "a bitch to collect" (and indeed the complexity of the forms is evident--see Appendix C). The oil companies objected to this intrusion. When oil participants did draw a distinction between the monitoring and mitigation phases, the mitigation procedures were more favorably viewed. Thus an informant who agreed with his colleagues that "SEMP is a four letter word" also said that his company would go into the program again, and that the mitigation "was the fun part." In particular, the negotiations with individual jurisdictions "were not that bad." Although our industry informants were still "philosophically opposed," they had managed to work out an acceptable process which was preferable to paying up front mitigation based on faulty EIRs. The general attitude was best summed up by one informant who said "the industry agreed to agree" with SEMP but "it left a bad taste in our mouth."

WHY IT WORKED

Especially given the history of contentiousness between oil and a number of the local governments, it is remarkable that SEMP managed to deliver mitigation with reasonably high levels of satisfaction. We here outline some of the factors identified in our interviews of what made SEMP work.

Consensus on "The Numbers"

One of the outcomes of the long negotiations was a way to generate "the numbers," which however flawed, provided a basis for framing the "real" impacts. None of the participants we have spoken with profess to really understand the workings of the REMI model, although some have a sophisticated understanding of the logic of the modeling exercise. In the word of one government-TAC member:

It was important to make sure that we all agreed on the assumptions up front so we couldn't argue over the results... The theory behind it was everyone agrees on the facts, and then there's no argument over the mitigation.

In another jurisdiction informants' words:

What the County presented us with was, you know, it's a done deal. This is the model, these are the numbers, if you wish to claim, you can claim based on these numbers.

Several informants said that in accepting the numbers they were "taking a leap of faith," treating "the numbers as gospel." In the words of one informant:

It seemed it was the best model in terms of what we should use for our needs. For a long time I worried that we could do better and I finally decided I'm not sure we have the tools to do it better. We've all decided we are going to live by the numbers .

The REMI model was far too complex for staffs and officials to understand, but they decided to trust what one termed the "black box."

The fact that the REMI model could generate acceptable numbers and the jurisdictions had developed formulas based on them allowed routine filing and processing of claims. The inefficiencies of having to "reinvent the wheel" year after year were eliminated. As one informant put it, "it becomes a three hour mathematical exercise, that's all it amounts to now." As another government official told us, now we can just "plug in the numbers" and "turn it over to the bean counters (accountants)." One of the key intentions of the original negotiating team was realized; the impact numbers were not questioned or subject to further negotiation, providing stability as well to the formulas based on them that were approved for each of the filing jurisdictions.

Adequate Local Resources

Many of the eligible local jurisdictions possessed sufficient organizational infrastructure of staff time, expertise, and pre-existing data and analytic tools to participate in the program. Some of these jurisdictions are atypical in the high level of planning knowledge and staff resources present, due in part--but only in part--to past experience with oil projects. Even among them, however, the capacity to respond should not be taken for granted. As one participant told us: "I can tell you there are things that come across my desk that I probably should pay attention to and if I'm not familiar with it, there's some of them that just get lost."

Each jurisdiction drew on existing priorities and methods in shaping their claims for specific mitigations; already-existing techniques could be applied to SEMP. The reliance on already existing programs and modes of calculating mitigation also minimized the degree that oil would be treated arbitrarily compared to other developers. Local priorities, existing methods, along with expertise on hand influenced the kinds of claims localities made. For example, the City of Santa Barbara filed only for housing and water supply mitigations, in part because it already had procedures for charging developers for water and housing (especially exacerbated in the case of water due to a six year draught). As a Santa Barbara City official said:

It was easier... because I knew we had good data bases on what our existing resources were [for housing and water-*aus*]. We had defined significant thresholds in other applications... where some of these other things, like the number of police officers or adequacy of recreation facilities or any of the other services that the City provides, I really felt like how am I going to define what the significant impact is and how am I going to define what is appropriate mitigation?

Utility infrastructure was a frequent basis for claims; they tended to require only short negotiations between the jurisdiction and the industry, usually consisting of either side asking for clarification on detail. These negotiations may have gone smoothly because pricing mechanisms were already well worked out and, as thought a number of our utility informants, the oil companies "could relate to" physical plant facility costs.

When the local claims-making infrastructure is weak, there is a possibility that no claim might be filed. In the case of one city we contacted, there appeared to be little staff knowledge of potential SEMP mitigations. The city's planning consultant explained, "we have not been on top of things," pointing to the city's budget problems as well as its lack of any development mitigation programs previously in place (although one is currently being developed). This implies that without proactive outreach and support, cities that have not been in the business of mitigating will fail to exploit programs like SEMP.

If they were confronted by the prospect of SEMP today, some government officials doubted they would be able to devote the necessary staff time because of budget cuts. As a participant from the City of Oxnard (which received \$42,339 in public service mitigation payments) bluntly put it, "If SEMP came along today, it would be dead in the water for us." Under current conditions, the more a jurisdiction needs money, the less it may be able to invest to get it. While under SEMP arrangements county administrative costs are offset by industry, local jurisdictions are not paid for the time their staffs need to generate claims.

Many informants were assigned responsibility for the SEMP claim because they had some relevant expertise; a good number took the initiative to become involved. Many informants either credited themselves or others with performing "above and beyond the call of duty" to make SEMP happen. The school representative who played a key role in developing his county's formula for dealing with education impacts said:

I felt an obligation--they're not going to have a person to do this in the County Education office. I knew that already. They didn't have anybody with facility expertise and that's part of my background. So I said I really want to see this through.

And:

They missed one year's claims. So this deadline was here and I said 'this is crazy, I'll do it on weekends, or evenings or something.' I didn't want to see it disappear, if you don't file a claim, you lose out you know. To me it's real important that the program be successful.

This person, warmly praised by other informants for his data management skills as well as commitment, held training sessions with business staff of other school districts to help them file their claims. He continued performing this service, even after taking a different job outside of education in county government.

The person most frequently singled out by informants as working beyond the call of duty was the Coordinator of SEMP. The government members of the TAC recognized that some jurisdictions might be intimidated by "big oil" and designed SEMP so that the Coordinator position was not limited to a "neutral" role, but would provide advice and advocacy for jurisdictions (a point not lost on the oil companies which had criticisms on this count). With the exception of one jurisdiction representative, who said he would have liked more guidance, informants praised the Coordinator for his efforts, dedication, and in one bureaucrat's words, efforts to "keep the bureaucracy to a minimum."

Sufficient Coordination

In part through the Coordinators' role, the region developed a capacity for jurisdictions to cooperate. One of the most important accomplishments of SEMP, according to some informants, was as a precedent for inter-government and regional cooperation. A Ventura County planner characterized the typical pre-SEMP attitude as one of treating county lines as "almost sacred." The Tri-Counties did not have a history of regional cooperation, in part because Santa Barbara and Ventura counties have had different orientations towards the oil industry, Santa Barbara being the more "anti-oil" of the two. But in this case, Ventura County officials were worried about spillover impacts, and pressured Santa Barbara County to make them a part of the mitigation programs.⁶⁶ Including Ventura (and giving San Luis Obispo County the option) represented a milestone in regional planning. In effect, as a condition for letting oil installations be built in their County, the Santa Barbara Board of Supervisors required benefits for *another* county--an uncommon behavior among U.S. local governments.

Other forms of coordination took place, both within and across counties. Although there is no provision in the mitigation guidelines specifying that jurisdictions adopt similar methods (indeed the spirit of decentralization implies the contrary), this is in effect what happened. One TAC member said,

each jurisdiction had their own reasons for wanting to have as much local control over how that mitigation claim would be filed, but what we ended up with was a functional equivalent of what would be almost a joint mitigation program.

⁶⁶ According to several Ventura County informants, Santa Barbara County took action "somewhat begrudgingly," perhaps in response to a Ventura County potential for litigation.

Almost all jurisdictions either worked together or "borrowed heavily" in developing their formulas. An example of standardization achieved by formal procedure was Ventura County's per capita public service formula used county-wide. One VCTAC member explained that the group recognized that this approach would require more time "up front" but, "once we had the formula, and we all bought off on the formula, then they were comfortable." Developed through negotiation, it had also gained legitimacy by the fact that Price Waterhouse recommended the same method--a needless duplication of effort, in the view of some government participants, but useful for gaining general acceptance. Every jurisdiction filing for public service mitigation in Ventura County uses this formula, as well as one city in Santa Barbara County. Several industry informants much preferred the per capita approach of the VCTAC for this reason of consistency.

An example of a less structured coordination effort is provided by the three Santa Barbara County School districts that developed a standard methodology through their own meetings, a short-term consultant (at a cost held to \$2,500) and a dedicated staff member with strong data skills. The standardization was important so that, in the words of a school staffer, we "don't have to go through this all again next year," or spend extended amounts of time negotiating, one by one, with the oil companies. There was also a desire to avoid competition with one another. If districts came up with different methods yielding different numbers, the oil companies might hold all claimants to the lowest numbers.

A still more informal force for standardization consisted of lateral communication, usually informal, among jurisdictions. Staff contacted one another for assistance or just to see if they were "on target." They looked at each others' claims, sometimes adjusted their own, and occasionally urged the other jurisdiction to change theirs (e.g. that they were asking for too much or too little). There was a collective concern to avoid claims that would set precedents that were too low. At the same time, claims that are too big "could just make them [the oil companies] laugh."

There was a self-enforcing dynamic at work in which "mavericks," portrayed as a threat to the whole program, were informally discouraged. As one informant told us:

Normally if someone gets too far astray from the pack, they're going to get yanked back by somebody, either by the rest of the pack, or someone of higher authority...

When a government participant appeared to "get really aggressive," there were ways to "keep people in line." For example, somebody would

maybe make some calls and get somebody else to tell them no, because of their loyalty to the program as a whole and their sense that they could blow it up. You know, you're going to spoil the game for all of us if you get outrageous.

As part of a kind of public service culture, an informant told us

there is no room for egos. . . It might be nice to have a big feather in your hat, and to say that you've achieved this grand negotiation and that you really screwed the other party, you know, but that's not the way that government agencies work.

Part of the common understanding is that cooperation saves time and money:

If an agency did go renegade and it's something that can't be ignored, it's going to slow the works up, and these days, slowing up the works costs a lot of money.

During the initial negotiations, the oil companies had what one informant characterized as "trepidation" about negotiating claims with so many jurisdictions and about possible "opportunists" or "gougers" among them. When there were "outlier" claims, they were interpreted alternatively as a jurisdiction that got "a little greedy" or more often just chalked up to inexperience. The Northern Santa

Barbara County city's unsuccessful claim for a civic center, for example, did not have the support of other government participants. This maverick claim was withdrawn with the city switching to the Ventura-style per capita formula in subsequent requests.

Another maverick case is a cumulative housing claim submitted by the City of Oxnard (in Ventura County) for the years 1986-1989. Besides its high amount--at \$2 million it is the largest single claim to date--it drew objections from industry as betraying Ventura County's agreement not to file for housing impacts unless a general housing mitigation program was in place for all forms of development. For this reason, we were told by a Ventura County official, the County "is not going to support them." The industry also opposes the methodology Oxnard used in calculating the mitigation, because it is inconsistent with the City of Santa Barbara's method which is, in effect, now taken as precedent on housing issues.

Compared to the jurisdictions, the oil companies were better organized and coordinated. They had, according to one of our industry informants, discussed SEMP principles informally before the first oil company (Chevron) agreed to the program as a permitting condition. After SEMP was initiated, one person among them was selected to act as a representative for all the companies with regard to each type of mitigation claim. For example, one company would appoint an industry-wide representative to deal with schools, another would be responsible for housing. This made sense, in part, because some of the projects were joint efforts. Many of the jurisdiction representatives thought this arrangement enhanced efficiency, since they only had to deal with one person, rather than one from each oil company.

An Enriching Challenge: Inventing the Wheel

All along the challenge for those participating in SEMP was to create something concrete out of something amorphous--the "inventing the wheel" problem so frequently referred to by informants. Given the newness of the territory and the need by all parties to get something done, participants came into the negotiations without hard and fast positions. A government participant told us:

The fact that the problem was intellectually complicated and ambiguous made it easier to enter into some notion of a collective enterprise... there really wasn't any law, and so the approach to it was, 'well let's get into this and see what it really is'...

One informant remarked on

the novelty of the subject matter and the opportunity to forge some new territory that wasn't all cluttered up with the history of dealing with a certain problem in a certain way... this was a potentially serious problem, and so it wasn't trivial or abstract.

Participants were also impressed by what they took to be the consultants' strong interest in the project:

The mentality was, 'wow, what an opportunity... we can better understand not only the issue of how dollars stick, but really the economic model at play here and all of its dynamics.'

One participant called it "the most rewarding experience of my career." One sort of evidence cited by several informants that something indeed of general use had been invented is the fact some of SEMP's procedures have been put to use in dealing with projects outside the program's range. Thus, although they did not participate in SEMP, San Luis Obispo County has adapted certain of its procedures to monitor the impacts of improvements to an existing refinery. They have also applied the SEMP monitoring technology to a County local hire provision.

Some informants contrasted the SEMP negotiations with those still under way on air quality and oil transportation between Santa Barbara County and the oil companies (an acrimonious pipeline vs. tankering debate). SEMP was done by staff, largely insulated both from the County Board of Supervisors as well as local activists:

It didn't get political. We didn't have environmental groups there yelling and screaming... It was a real sincere, honest effort to find out what the impacts were.

A number of informants reported they were motivated to make mitigation into a bureaucratic routine, separated as much as possible from "the whims of politicians." The desire for routinization was also fueled by both industry and government participants' wish to turn SEMP over to the bookkeepers and go on to other tasks. There is little evidence from our informants that either corporate or public employees are unmindful of the time they spend at their tasks; they want to use their work time efficiently and that means, at minimum, avoiding acrimony when there is no clear reason to engage in it.

Trust and Mutual Education

At least in retrospect, there appears to have been a lot of positive behavior among the "adversaries" despite some rough going at times. The TAC negotiations laying out the principles and design of the monitoring program were on occasion, in the words of informants, "tense," "testy," and even "shrill." These negotiations occurred against the backdrop of the oil companies still at loggerheads with County officials over other aspects of permit conditions. In the words of an informant, "they're still struggling [at that time] literally to try and get their projects going, feeling embattled on both fronts, and naturally that's going to lead to some tension."

In the course of the lengthy negotiations, both the industry and some of the jurisdictions were to alter some initial perspectives and both sides learned much about the other. There was the issue of whether there was any legitimate basis for treating oil differently from any other form of development. If not, how was SEMP different from a bribe or blackmail? At a practical level, the subtleties of California local government finance were, according to some government participants, a mystery to the oil company developers. And, similarly, the practices involved in oil industry contractor/subcontractor relations (relevant to constructing monitoring procedures) were only dimly apprehended by the government officials, according to our oil informants. Most important, in terms of the kind of mitigation settlements that were reached in Santa Barbara County compared to the far higher initial claims, the jurisdictions learned to accept the principle that claims had to be documented with actual impacts and that payments would be made strictly on the basis of amortization.

In terms of oil industry learning, some government representatives felt the industry genuinely did not understand how public finance worked, as in this informants' view:

They honestly believed, I think... that ordinary tax mechanisms would be able to deal with a slug of growth in a way that would make them perfectly equivalent to everybody else. It had to be explained to them how the rules have changed over time, and Proposition 13, and the limitations of facility fees really handcuffs the local government in dealing with the effects of growth, and they didn't know any of those things.

Another TAC member recalled,

...public and private budgeting is very different. And they didn't understand that the city makes expenditures, and then depends on the funds to be received later... Also they were not aware that we have residential growth control measures and we limit the amount of population.

It was, in the words of more than one informant, a process of "mutual education."

A number of government informants praised the oil participants, in one case speaking of them as people "who knew how to work with committees of this kind" and who "basically contributed well to the process." Other government staff people agreed that their SEMP colleagues, including oil representatives, were "temperate," had "a good attitude," all realizing "we all had something to lose" if negotiations broke down. We were told public servants take pride in being honest and fair. One school superintendent pointed out that it was not appropriate to "gouge" since schools are supposed to model

exemplary behavior. An oil informant told us that "generally, most of the people (from government) were great to work with."

Because the SEMP process continued over so long a period, there was an opportunity for the building of trust among the participants; informants told us they began to see members of the "other side" as individuals, rather than as simply the interest they represented. Informants did distinguish among firms and among oil officials in terms of relative trustworthiness. One company, in particular, known as the "bad guys," was accused of having a "Texas mentality." But the same company's main representative was praised for his "professionalism" (a term used repeatedly to describe oil negotiators as well as others). In the words of an oil representative "When you have to look them in their baby blues day after day... you have far more empathy for their problems and their concerns." Gradually, it appears, the group took the form of a team working through complex issues and less as bargaining adversaries. There was, apparently, an attitude of satisficing rather than optimizing.

Government people understood that industry representatives would have to "sell this (their agreements) back at headquarters" and learned which of the oil officials had the least local autonomy. The public side had a similar need to arrive at settlements that would "sell." An informant told us:

...the public people would say kind of the same thing. You know, at a political level this has to be explained to certain constituencies... And so part of the collaborative effort is kind of letting your guard down about what your needs really are... As long as people are just guessing about what each other's needs really are, it's hard to get to it. After awhile people started talking pretty frankly about who they have to deal with back home and what their interests really are, as opposed to what their professed positions are.

This kind of honesty could occur because participants thought they were in a "safe place" where no individual would "go public."

Although jurisdiction representatives talked about exceptional people, forming friendships, and even giving one oil representative a going away party when she was transferred, it would be a mistake to exaggerate the trust element or imply that all tensions disappeared. The foundation for such trust in individuals was a well understood context in which both sides had something to gain and something to lose if the process were to fail. The industry needed its projects to move forward in a county where a clear majority of the relevant elected officials had environmentalist politics and in which large numbers of mobilized citizens were hostile. The jurisdictions wanted to offset the costs of development but knew from the past that oil companies would litigate or use other resources if they considered it necessary or feasible. There was an external envelope disciplining participants to work through their differences. No matter how friendly and cooperative individuals may have become, their interpersonal success can not be explained without reference to the surrounding conditions that nurtured the meetings of minds.

VI. IMPACTS BEYOND THE MODELS: The Oil Support Industry and Unanticipated Growth

The range of issues addressed by SEMP are primarily driven by the EIRs previously completed to deal with oil development impacts in the Santa Barbara Channel. Those EIRs follow the conventions now in place for such work. There are a number of impacts not captured by such practice which are thus also not part of the scope of SEMP. In the spirit of innovation and pushing the boundaries of current practice, we carried out one substantial inquiry into ways that development may impact a locality that are not usually considered.

Traditional methods to determine industrial expansion's growth impact on a local area centers on measuring direct consequence: how many workers will be induced to migrate, how will local payrolls be expanded, how will the local economy grow through increased expenditures. Employment to population multipliers are calculated, as they were in the REMI model. Our research leads us to think that there are

other consequences, not captured in any impact analysis method with which we are familiar. These consequences have to do with the local dynamics of industries themselves, the way entrepreneurial skillfulness and adaptability can lead to unanticipated economic growth.

Once a business is born, locates or expands in a given area, it can take on "a life of its own" leading to additional impacts. Companies in a given place to serve the local oil industry may then have impacts beyond those related to the oil projects themselves. A set of such companies in interaction with one another may establish organizational benefits ("agglomeration effects") that help each grow or stimulate still other firms' development. These impacts may not have taken place were it not for the initial stimulus of the local oil projects.

Two types of unanticipated economic growth are possible:

1. Replication. A firm may locate or grow within the Tri-County area to service oil development, and then be able to market its oil-related product or service elsewhere. The locality becomes a site not just for serving local oil production, but non-local oil production as well. It replicates itself geographically; it expands by gaining business in other regions.

2. Diversification. A firm may move into products or services unrelated to oil. Perhaps adapting an oil-related technology to some other type of industrial need, a company comes up with a product or service previously outside its business scope. The presence of the local oil industry operates as a catalyst for economic expansion in that the new product would not have been developed, at least not within the locality, had it not been for the presence of oil. Our criterion for diversification is that the company comes up with a way to market a product or service to a non-oil business sector. As the product is marketed elsewhere, the local economic base expands.

An implication is that even a declining industry (which extractive operations eventually tend to be) can leave behind a "residue" of thriving enterprises not anticipated by conventional analytic models, especially of the boomtown variety which presume desolation as the inevitable end-state (Markusen and Glasmeier, 1984; Gulliford, 1989). When businesses established to service an extractive industry replicate themselves geographically or diversify into other industrial sectors, they sustain growth in the local economic base and yield impacts (positive or negative) that persist beyond the time frame anticipated in conventional environmental analysis. Some firms may both replicate and diversify, in effect transforming themselves to a substantial degree. Table 7 specifies the alternatives.

Our goal was to learn whether oil in the Tri-County area has stimulated such events and illustrate just how this economic growth occurs through actual case studies. In so doing, we also can make a contribution to the larger, and highly salient issue of precisely how the coming of a large industry can lead to "spin off" that boosts a local economy.

METHODS

The research reported here relied on two primary strategies, described in greater detail in Appendix B. The first was a form mailed to all firms involved in oil business located in the Tri-County area--firms involved in supply and service functions.⁶⁷ The aim was to determine the degree that oil businesses had expanded their operations geographically or had diversified into new products or services as a result of OCS activity. Of the 113 firms in our universe, 60 responded (a 53 percent response rate). Responses were completely anonymous, but a large proportion of respondents voluntarily identified themselves. Also among our interviewees were informants recommended by those who responded to our mailing, as well as several others who come to our attention through stories about their businesses in the media. From the various leads, we identified 33 firms as possibly relevant for follow-up interviews; of this subset, we completed 18 lengthy interviews, almost always at the respondent's business location. In three cases, permission to interview was denied. In the other instances, we concluded after initial phone calls that the firms were likely not relevant to our research issues because they had not replicated or

⁶⁷ This operation was financed by separate funding provided by the Ocean and Coastal Policy Center, Marine Science Institute, UCSB. The mailed instrument is reproduced in Appendix B.

diversified their operations to a significant degree. The interviews were conducted in a semi-structured format. They do not (and were not designed to) represent a representative sample of a known population, but to provide exemplars of particular kinds of business adaptations that are possible in a context like OCS oil development.

We also gathered information about firms by examining company-produced promotional brochures, executive biographies, corporate reports, and news clippings (some provided by our informants). In addition, we searched out articles in *The Wall Street Journal*, *New York Times*, *Los Angeles Times*, *Washington Post*, and *Christian Science Monitor*, to find all stories in which the corporation's name was in a headline over the period 1988 to February, 1992 (made possible by the University of California's Melvyl computerized newspaper data base). Additional information was found through on-line business information sources.

FINDINGS

The mailed responses from all OCS related companies showed that the vast majority (93 percent) of the responding firms established their operations in the Tri-Counties because of the presence of offshore oil operations.⁶⁸ This means we successfully targeted the appropriate firms. Our respondents do not, in the main, represent firms already located in the Tri-Counties carrying out business for other purposes which then got involved in oil. Instead, these firms are either transplants (45 percent of our respondents represent branches of national or international firms) or were fresh start-ups responding to oil-related opportunities.

A significant proportion of the surveyed firms have extended their geographic reach beyond the Tri-County area--i.e. they were replicators. Over 60 percent of all firms report having at least some business activity outside the Tri-County area. For 40 percent of all firms this out-of-region business amounts to more than a fourth of their revenues.⁶⁹ For 10 percent of our companies, more than 90 percent of their business is non-local. Larger companies are more likely than smaller ones to have expanded geographically, thus increasing the significance of this form of expansion for the Tri-County economic base.⁷⁰ Of firms which have expanded beyond the Tri-Counties, 70 percent have annual gross revenues over \$1 million,⁷¹ compared to only 30 percent of the companies which have not expanded geographically. Using the 25 percent threshold for geographic replication, 63 percent of the replicators have revenues above \$1 million.

In terms of diversification into non-oil business sectors, almost half (48 percent) of all firms indicated they had done this to some degree.⁷² More of the "big" firms (those with over \$1 million in annual revenues) have moved to non-oil sectors--52.5 percent of them--compared to the smaller firms, only 40 percent of which have made such a move. Combining types of company change (geographic expansion and diversification), the pattern is sustained: of the one-third of our firms that have both expanded geographically and diversified--i.e. been transformed--72 percent have revenues of over \$1 million.

It also appears there is a difference between firms that are branch operations of corporations located elsewhere and companies that are "home grown" in regard to the type of expansion they have

⁶⁸. Respondents were asked (question 3) whether their company was "established" or "located" in the region "to deliver products or services related to Santa Barbara Channel offshore oil development."

⁶⁹. Respondents were asked (question 7) to indicate the "proportion of current sales... generated" locally compared to other locales.

⁷⁰. Respondents were asked (question 8) to indicate categories of gross revenues derived from Tri-County operations.

⁷¹. \$1 Million is not large by standards of the Fortune 500, but it proved to be a useful benchmark for our work. By REMI 1986 estimates, such a firm in Santa Barbara County would have around 34 employees and would account for 23 new entrants to Santa Barbara County.

⁷². Respondents were asked (question 3c) whether they had "diversified into products, services, or applications that are not directly related to offshore oil development."

carried out from their Tri-County base.⁷³ The branch operations are more likely than other companies to have replicated operations into other geographic zones (31.6 percent did so); there was a correlation of .45 between being a branch location of a larger firm and such replication. But only 13.3 percent of branch firms diversified, much less than the 48 percent of firms in general which diversified. The tendency for branch operations to be used as a base for geographic replication is confirmed by the fact that it is these firms that make up 63 percent of all firms that receive significant proportions of their revenues (above 25 percent) from outside the Tri-Counties. Large outside corporations seem the most able to replicate their operations from the Tri-County base (the relevant correlation is .63). Businesses evidently locate their regional base in the Tri-Counties, from which they then expand across a wider geographic zone.

Our data also suggest that both geographic expansion and diversification have increased over time, presumably due to the decline in Santa Barbara offshore oil.⁷⁴ Thus for the period 1985-1988, approximately half our respondents reported that over 50 percent of gross revenues came from local offshore oil operations. This contrasts with the period after 1988, in which only 31.6 percent of respondents reported receiving this proportion of gross revenues from local offshore oil businesses.

Given the decline in Channel oil activities, in some instances anticipated well before it actually began, firms which came to the Tri-Counties or started-up to serve OCS activities there faced a challenge if they were to continue growing, or even survive. The adaptation of these firms, both in terms of the range of their efforts and degree of success, varied greatly.

We now provide some examples of oil-related firms that have expanded their operations geographically and/or have diversified into non-oil related products and services. We detail how biographic and economic twists and turns shape a business, and by extension, affect the region in which it is located.

Transformed Firms

In response to declining fortunes of the local oil industry, some companies both expanded operations outside the Tri-County area as well as diversified into other types of products and business sectors. They have, in our terminology, been transformed.

Diving Systems International (DSI). This company grew out of the experience of two underwater construction divers, Robert Kirby and Bev Morgan, working on state oil installations in the Santa Barbara Channel. Responding to what they believed to be inadequacies in the masks and helmets they were using, they designed and produced their own, leading to equipment used worldwide today.

The initial helmets were constructed in Morgan's home garage in 1965. Clients were underwater construction, inspection, and instruction divers working on Santa Barbara Channel oil projects. A considerably smaller portion of their business came from salvage companies and underwater archaeologists working elsewhere. Although the two partners were well known in scuba diving circles (Morgan developed the first underwater instructor's program and wrote the first scuba textbook), they required oil sales to make their business viable.

Spurred especially by initial success at selling to some oil industry support firms, they continued improving their product until they developed the first commercially successful fiberglass diving mask, a mask which became the industry standard. It used an adjustable demand breathing regulator that allows air flow specific to each diver's needs. "Virtually all deep commercial diving was done with the Kirby Morgan equipment," according to our company informant. This helmet/mask was followed by a successor lightweight model (the "Superlite 17") which again became the industry standard.

Prior to the diminution of Channel oil activities (1976-1982), the client base was primarily the oil industry, although now greatly expanded to a worldwide market (replication). The firm moved beyond

⁷³. Branch status is self-designated by firms (question 3).

⁷⁴. Respondents were asked (question 5) to indicate the proportion of business coming from the Tri-Counties at different time points.

helmets and created a "manifold box" that facilitated divers' underwater communication. The firm also created their super-lightweight mask for divers working on dams or in rescue units. Then came substantial growth with large contracts from the U.S. and Australian navies, as well as new markets from archaeologists all over the world (and Disneyland). DSI offers a full line of masks/helmets, dive control systems and related equipment (e.g. "bail-out" systems). The company grew from two employees in 1966 to 50 by 1991 (with a cutback to 40) in 1992 (sales at approximately \$3 million in that year).⁷⁵

If we view DSI's origins as two men using masks and helmets to carry out underwater operations for the local oil industry, it is a company that has undergone complete transformation. It now is the country's major producer of certain underwater equipment, attracting customers worldwide and primarily outside the oil industry. Offshore oil has increased the local economic base due to an unanticipated diversification and replication of activity.

HEMEC Communications. Originally established to service local oil, HEMEC has become a world leader in Satellite Communications systems and technical support services for other modes of electronic communication. With headquarters still in Santa Barbara, the firm operates across the globe.

The company's origin lies in the occupation of the current president's father, who was a commercial abalone diver in the early 1950's through the 1960's. HEMEC itself was founded in 1964 by the father and a partner as a marine electronics firm, servicing radio, radar, navigational aids and microwave components (the company's initials stand for "Harbor Electronics Marine Equipment Company"), primarily for the local offshore oil industry. When Channel oil operations were relocated after the 1969 spill to the more receptive Port Hueneme area, Santa Barbara companies like HEMEC were severely disadvantaged. The company entered decline and negative profitability.

The firm continued to maintain its electronics capabilities, however. It developed an underwater conference telephone system that remains, according to the company's literature, "the industry standard."⁷⁶ A "fortuitous" fact was that the firm's principals enjoyed operating HAM radios and had begun offering HAM radio classes and retailing the equipment. Their offices became the local "hang out" for HAM operators and a source of advice that was later to prove important. After the current sole proprietor bought out his father and brother-in-law in 1979, one of his HAM radio cronies advised "getting into" satellites, a focus the firm has since never left.

By 1980, HEMEC was expanding into a range of satellite communication activities and now describes itself as "your Worldwide Resource for Satellite Network Engineering in Video, Voice, and Data." Its services include engineering, consulting, interference suppression and site construction for various communication networking systems. As part of its international work, it still is involved in the oil industry, having designed and installed a communication system for a Soviet oil exploration company in Sakhalin Island. It has a distinguished client list which includes Fox, ABC, and CBS television networks, TV cable systems, General Telephone, US Sprint, United Press, NOB-Netherlands Broadcasting and the U.S. White House. It designed and installed the satellite uplink system for The Gaming Network (TGN) that provides gaming and entertainment programming to cable TV systems around the country from its Las Vegas facility. HEMEC played an important role in establishing communications for Gulf War news coverage across Europe.⁷⁷ Its President reports that because of the Gulf War having put his firm "on the map," 80 percent of its current business is outside the United States, the vast majority of it involving non-oil related activities. Besides Santa Barbara, the company has associate offices in Washington D.C., Amsterdam, and Kuwait. It employs 8 in its Santa Barbara office (down from a recent high of 12); annual revenues are approximately \$2 million, but expected to expand substantially given the firm's niche in a burgeoning industry.

In this success story, diversification and geographical expansion was certainly stimulated by the decline in the prospects of offshore oil; in a company officials' words, "a drilling moratorium in the Santa

⁷⁵. Source: Company interview and American Business Information, Inc. Omaha, Nebraska.

⁷⁶. "George Richardson", biographical statement, HEMEC, Inc.

⁷⁷. Dawn Yoshitake, "Work a Worldly Adventure" Santa Barbara News Press, June 9, 1991: F-1.

Barbara Channel... caused HEMEC to diversify into other communications fields..."⁷⁸ While this is a company that has continued to be involved in oil activities (the Soviet project), it has transformed itself from a local firm focused on a local industry into an international firm with activities largely divorced from oil.

Measurement and Control Engineering, Inc. After an initial two years of operating out of Los Angeles, Measurement and Control Engineering relocated its headquarters to the city of Ventura in 1974. The great bulk of its business involved servicing onshore and offshore oil installations, including analysis of the quality of wells. The Los Angeles office was maintained and a third operation begun in Bakersfield (with still more operational locations opening over the 1979-1983 period). The firm's geographic range is now vast; besides the California locations beyond the Tri-Counties, the firm has been active in Kuwait, Columbia, and Russia.

Besides its geographic expansion, the company has diversified into non-oil sectors. Concerned with the vicissitudes of exploration and discovery, the company's management specialized in the production phase (processing, refining) where stable operations are most prevalent. But management was aware, virtually from the start, that the cyclical nature of the oil industry made diversification important. The company now provides measurement equipment (through sales or rental arrangements), and trains personnel in equipment use and in meeting environmental and safety standards. Among those trained have been officials of the U.S. Minerals Management Service, along with inspectors from the Tri-Counties and other localities. This training function is the fastest growing part of the business.

Also rapidly increasing is participation in "Fugitive Emission Testing," not just for oil rig operations but for industries unrelated to oil development. The company has the capacity to monitor and test any type of air emission from any industry. At present, one-third of revenue is from non-oil sources with two-thirds of all revenue expected eventually to be non-oil related.

An Anchorage corporation (Production Testing Services) recently acquired the company, which will maintain local operations as a center for technological development and servicing some established markets. Other functions will go to Bakersfield and a Houston operations center, the latter because of its stronger international linkages. At the time of our interview, approximately 20 employees operated from the Ventura office.

International Diving Service (IDS) (not to be confused with Diving Systems International - a different firm earlier described). IDS began in 1978 as three divers working "out of the back of a Dodge Dart," servicing oil activities from Port Hueneme in Ventura County. Although from the outset oriented toward industries besides oil, local petroleum was the crucial element in its formative period. Now located in the city of Oxnard (near its original location), the firm engages in commercial diving, equipment hydroblasting, underwater survey inspections, as well as general underwater construction and repair. Using ultrasonic and sonar search, among other techniques, IDS engages in sensing and repairing fissures in municipal outfall lines, underwater electrical cable, dams, tanks, aqueducts, and tunnels. Its client list includes public utilities and government agencies, such as the State of California Department of Water Resources, the federal EPA, and the military.

Although most of its business is still in oil and still in the Tri-Counties, the firm has significant operations in other California locations, such as Eureka, Los Angeles, and San Diego, as well as Alaska. Annual gross revenues are approximately \$5 million.⁷⁹

Ecomar.⁸⁰ This firm uses suction hoses to harvest mussels from the base of oil platforms, turning the product into a foodstuff used locally and exported on a wide scale. The use of the platforms

⁷⁸. "HEMEC Communications, Inc. - 27 Years of Excellence," HEMEC Communications, Inc.

⁷⁹. This is the firm's reported gross; the amount given for total sales by American Business Information, Inc. is \$1.272 million, with number of employees listed as 20.

⁸⁰. Despite numerous attempts, we were unable to overcome logistical problems that inhibited an interview with this firm's principal. Our information comes from the press (see Lankford, 1991).

as a mariculture setting came only after prior attempts at sea farming in the Channel had met with less success. Reaching the capacity to harvest 400,000 pounds of mussels per year from Channel platforms, the company has grown to a payroll of 12. It may expand still farther with the possible introduction of scallops and oysters at still lower depths of the platforms. Ecomar is a business whose activities depend, in ways unanticipated either by the industry or analysts, on offshore oil.

Fugro-McClelland (West), Inc. An example of how a firm has adapted to changing business conditions, in part through its acquisition by another company and a later merger with still another, is Fugro-McClelland (West), Inc. In the late 1960's, Houston-based McClelland corporation acquired the Ventura firm of BBN Geomarine (BBN). BBN served the offshore oil industry exclusively, conducting geophysical surveys offshore California and Alaska to evaluate oil resources, their recovery potential, and possible geohazards (e.g. earthquakes) associated with development.

Founded in 1946, McClelland Engineers, Inc. specialized in offshore geotechnical studies and platform foundation design. With its acquisition of BBN, McClelland could expand its marine geological capabilities and establish a west coast presence. With the escalation of California environmental regulations in the early 1980's, McClelland established an environmental practice to service its existing, principally offshore oil, client base. With the oil downturn, McClelland transitioned its earth sciences and environmental expertise from offshore studies to similar scope onshore studies. Many of the offshore technologies and methodologies were easily adapted to address shoreline and onshore issues. The company maintained and continues to perform considerable work for oil companies, but much of its work is on environmental compliance, facility abandonment studies, and waste management.

In 1987, McClelland Engineers, Inc. merged with Dutch-based Fugro Consultants, B.V. and Fugro-McClelland B.V. was formed (2200 employees, \$250 million in annual revenues), with Fugro-McClelland (West) Inc. becoming the California-based operation for the international corporation. From this Ventura base, the company offers a broad range of technical consulting services, including geotechnical and environmental studies, water resources development analyses, environmental impact reports, land use planning, biological assessment, waste management studies, underground storage tank evaluations, hazardous waste site remediation, and air quality studies. The client base now includes local, state and federal agencies, water districts, as well as manufacturing industries, port districts, and real estate developers.

The California operation, still headquartered in Ventura, has offices in San Luis Obispo, Sacramento, Monterey, Glendale, and San Francisco. Total California staff grew from the approximately 30 employees of the former BBN organization to 130. The firm operates locally-based projects throughout the western U.S., as well as abroad, including in Russia and South America.

H & H Tool Co., Inc. Founded in the city of Santa Paula in Ventura County, H & H was from its beginnings in 1953 involved in oil drilling, first on land and then offshore. The company rents blow-out prevention equipment to oil companies. It has also long been engaged in non-oil activities, in the late 1960's turning to natural gas and geothermal recovery operations in the Sacramento and, somewhat later, Bakersfield areas. In the 1980's, additional operations began in Long Beach and Salem, Oregon, with further expansion into Colorado, Wyoming, Utah, and New Mexico. The firm also expanded its geographic reach through the acquisition, in 1989, of Midway Fishing Tool Co. (also an oil service firm), itself having branch operations in seven California locations. By the end of the decade, annual revenues were approaching \$20 million.

Although somewhat diversified at present, this company's special significance is in a diversification effort for which it has expended major resources. The program aimed to make use of the sludge that company personnel had to clean from returned rental equipment. The accumulating waste gave rise to experiments in separating the constituent water, oil, and dirt for recycling into re-usable resources. The resulting Enhancement Oil Recycling Project, Inc. (EORI) involved cleaning out bottoms of crude oil tanks owned by major oil companies. This sludge R & D effort was in process for over two and a half years, involving an investment of \$4.2 million (a small industry in itself). Still having difficulty marketing the resulting materials, the company has ceased subsidizing the development process, although its president is hopeful appropriate markets will be found. If that were to happen, what began as

an oil-tool rental company would be become a major industrial recycler and we would be dealing with a company that transformed from a regional firm into a national or even international operation. We classify H & H Tool as a Transformed Firm primarily to call attention to a future potential, rather than an achieved fact.

Replicator Firms

Some oil-induced companies continue producing the same type of goods and services for the industry, but branch out to localities beyond the Tri-Counties; they replicate their Santa Barbara Channel activities in other locations (our earlier discussion pointed out they tend to be branch operations of larger companies).

Tidewater Marine Supply. A large multi-national corporation heavily involved in oil, Tidewater Marine maintains a Santa Barbara city location from which it carries out oil-support activities over a much larger region. Tidewater, Inc., the parent firm, has become the largest commercial operator of vessels in the world with global revenues of \$475 million (fiscal 1993).

The Santa Barbara unit was established in 1961 in response to the word of a "big find" off the coast of Santa Barbara.⁸¹ Although modest by standards of the parent corporation, the Santa Barbara office came to play a prominent role over the decades in exploration and production operations from San Diego to Alaska. The number of vessels has been as high as 30, but has declined to a low of seven during the least active periods. The Santa Barbara office handled the company's extensive participation in the Alaskan Valdez clean-up.

The Tidewater Case is thus a sub-category of replication. The firm was not a start-up in response to Channel oil; nor did it expand from a local beginning because of the advent of offshore oil activity. But it was offshore oil activity (or its prospect) that caused the company to locate a branch within the Tri-County area. The company's use of the Santa Barbara location to coordinate activities over a much wider region increases the local economy. Tidewater does not use Santa Barbara as a base to diversify into other industrial sectors; from Santa Barbara it services the local oil industry and other West Coast oil operations.

Petroleum Helicopters, Inc. (PHI) Also a part of a large corporation (\$200 million annual gross revenues), the regional headquarters of Petroleum Helicopters at Santa Barbara airport was created in 1982 to service the local offshore oil industry, an activity that has been the mainstay of the parent corporation since its founding in 1949. It helped launch offshore oil production in the Gulf of Mexico. Today the parent firm, headquartered in Lafayette, Louisiana, holds the largest private helicopter fleet in the world and is active around the globe.

While most of the Santa Barbara-based activities are local, about one fourth (in revenue terms) involve activities outside the Tri-County area--such as in Huntington Beach (south of Los Angeles) and, to a lesser extent, Alaska. Once substantially larger, the Santa Barbara operation now has a total of six helicopters and approximately 30 employees, devoted primarily to servicing on-going local production activities.

At the level of the parent firm, there has been some significant diversification; PHI now provides emergency medical transport services for more than 120 hospitals nationwide. As well as running training programs for pilots, mechanics, and support personnel, it is also a primary provider of helicopter maintenance and refurbishing services for other helicopter operators.⁸² While the Santa Barbara operations have somewhat replicated themselves in other locales, the local office has not yet significantly diversified (it has been involved in fire-fighting and provides, as a public service, medical evacuation services). At the local level, diversification remains primarily a prospect, not yet accomplished.

⁸¹. Interview, Peter Laborde, Area Manager, Tidewater Marine, February 21, 1992.

⁸². President's Letter, Annual Report to Stockholders, Petroleum Helicopters, Inc.

Port Hueneme Marine Supply Co. This firm came into existence in 1978 to provide supplies and services for offshore oil vessels and their operations and began the unique practice of remaining open 12 hours a day, and on call seven days a week. In part because of conservative business practices (no debt-financed inventory), the company prospered as competitors folded in the downturn. Another reason for continued prosperity was expansion beyond the limits of the local region and diversification of the customer base.

The "never closed" policy made the firm especially appropriate as an emergency supplier. It played a significant role in the 1990 Huntington Beach oil spill, having "set-up their command center, making it a mobile and accessible vantage point." The company takes part in simulated emergency exercises, with the role of determining exactly what supplies are available and how fast they can be delivered to the emergency or spill site.

The company also participated in the Valdez clean-up; it supplied and equipped a derrick barge to aid Exxon's remedial effort. The company shipped to Valdez on a weekly basis. As to why Exxon used a supplier located at so great a distance, the firm's co-owner indicates that, "The guy who is in charge of the Valdez Escort Vessels previously worked here (in the Channel area) and knows our warehouse as well as we do." The initial work in the Channel now helps sustain this local firm as a factor in a distant region.

The case of Port Hueneme Marine involves replication of local supply services to outside areas; it also involved some innovation as the firm shifted part of its efforts to emergency services and part towards other types of customers. Notwithstanding this diversification, offshore oil remains an "absolute needed strength" of the company causing us to classify its adaptation as primarily one of geographic replication.

Oceaneering International, Inc. This is a large international firm (1993 revenue at \$215.6 million) which moved its headquarters from Santa Barbara to Houston, Texas in 1980. The Santa Barbara region's oil industry thus helped build a very large local firm, but one whose local economic role was later dampened through relocation. Nevertheless, there remains a Santa Barbara office, albeit a small part of the larger firms' operations. The Santa Barbara activities have involved underwater inspection of offshore installations using remotely operated vehicles (ROVs) for projects that require deep sea inspections. The Santa Barbara office now employs approximately 50 people.

Although the parent firm has engaged in interesting diversification (e.g. application of robotics technology to space stations), Oceaneering's local operation is still Channel oil. Some diversification has included contract work for the Navy at various locations beyond the Tri-Counties (San Diego, Huntington Beach and Long Beach). Approximately one-fourth of revenues generated by the Santa Barbara office come from activities outside the Tri-Counties, but again primarily oil-related.

Diversifier Firms

Firms that showed strong histories of diversification out of oil-support activities also tended to be companies that expanded their geographic reach; we could have used the term "activist" to describe them generally. The seven cases described as Transformed Firms thus includes our best examples of diversification.

Almost one-third of our firms did, however, indicate on the survey that they had diversified into non-oil activities, but did not expand geographically. We suspect that some of these firms moved into service roles that duplicate existing business operations, taking business away from other local firms. Because this kind of diversification does not increase the basic regional economy, it is less important for our analysis (for discussion of the classic basic versus non basic distinction, see Mayer, 1969; Alexander, 1954). We provide an example to indicate the ambiguous nature of these diversification instances.

Cal-Maria Engines and Equipment, Inc. Created in 1973 to service the oil industry (onshore and offshore), Santa Barbara County based Cal-Maria offers machine shop services (e.g. crankshaft grinding), pump and compressor maintenance and sales, as well as a range of industrial parts and

supplies. The firm, located in the city of Santa Maria, had as many as 50 employees during the mid 1980's but has declined since to a work force of 35 (1992 sales were at \$1 million).⁸³

The firm has diversified into other business sectors primarily by applying the tools and technologies developed in the oil industry to other spheres. For example, it is promoting natural gas pump and engine systems for agricultural users as more efficient and cheaper to run than the electrically driven equipment now in use. The company is also developing clients among hospitals and other businesses needing the kind of mobile power units they supply. Today about half their business is non-oil, and that proportion is increasing. It is impossible to know the extent to which a firm like this is adding to the aggregate industrial base by, for example, substituting local service for an "imported" one or merely substituting one local company's service for that of another. We must leave the matter unsettled, except to point out that replication of this sort likely leads to some aggregate expansion of the economic base, although to what degree is unclear.

Static Firms

As an outcome of the methods we used to select firms for interview, we did come across numbers of companies that had been unable to either diversify or expand their geographic reach. We inadvertently interviewed at a few such firms, later eliminating them from both our case study base, after we learned they were not relevant to our focus.

But from our conversations at such companies (sometimes only by phone), we were reminded that it is obviously more difficult for some firms to adapt than it is for others. A Ventura-based crane and storage company could not easily replicate in other locations because of the high costs of moving fixed capital and the presence of firms like itself in areas likely to need the equipment. In some cases, however, there appears to be a more voluntary, even psychological force at work. For example, a firm that had experienced sharply reduced revenues was, in the words of its owner, less likely than ever to risk diversification given the squeeze of declining profits--a strategy contrary to that followed by a number of our transformed firms and replicators. This firm's decline represented a 90 percent loss in its equity value, according to our informant.

Pool Energy Services Company is an example of an essentially static local operation that is a branch of a much larger Texas-based multinational (1992 sales of \$213 million with 5,000 employees). It has maintained a Ventura County presence since 1962, stimulated by Channel oil activity. The local operation's principal business "is the repair and maintenance of existing oil and gas wells," as well as some contract drilling.⁸⁴ The biggest drilling contractor on the West Coast from 1962 to 1984, California operations now account for only about two percent of corporate sales. Revenue from the Channel operations took an especially sharp drop of 53 percent from 1990 to 1991 with an even steeper decline in the next year.⁸⁵ While the company carries out operations in the Huntington Beach area as well as the Channel, it is now largely limited to servicing existing operations. The Tri-County operation is essentially static in the sense that it remains linked to oil operations and has not expanded its geographic reach. Little by way of unanticipated local impact occurs in regard to a firm in this category. Customary EIR logic does capture the impacts of such companies' operations.

SECTION SUMMARY

Following the dictum to approach oil development with a "longitudinal perspective" (Freudenburg and Gramling, 1992), we can see there are unanticipated growth impacts because firms and their workers do not necessarily disappear as their function vis-a-vis local oil tapers off. Indeed, some experience growth much beyond their originally anticipated volume of local business activity; others' "extra" development is more modest, less perhaps than the totals of their anticipated oil-related activity, but still an amount additional to that total. All of this conflicts, once again, with the images of boom-bust

⁸³. Source: American Business Information, Inc. Omaha, Nebraska.

⁸⁴. 1991 Annual Report, Pool Energy Services Co., p. 1.

⁸⁵. 1991 Annual Report, Pool Energy Services CO, p. 11. 1992 Annual Report.

associated with oil. We have demonstrated that migrations, start-ups, and expansions to support the oil industry can lead to firm diversification, replication, or complete transformation. The net declines are certainly less than the boomtown thinkers and EIR writers anticipate.

Generalization from this particular industry and this Southern California locale may, however, be dangerous. These outcomes of firm expansion in the face of decline might not be the result in other places. Southern California has distinctive attributes:

- a. Good place to be. Some of these entrepreneurs were attracted to the area for its amenities; people may strive to come up with an adaptation that will allow them to remain, rather than following the industry to other regions.
- b. Rich infrastructure for start-ups, diversification, and sustenance. The region has venture capital sources and support services in the form of graphics studios, marketing consultants, and industrial suppliers.
- c. Strong regulatory environment. Although this attribute is often perceived as anathema to business development (the prevalent view of our informants in non-diversifying firms), high levels of local regulation means that products and services developed in such settings can be applied to other regions as regulations spread (see Porter, 1990). Indeed, some firms' growth was directly tied to regulation, such as Measurement and Control Engineering, Inc. Some firms either gained business because of standards they help enforce (e.g. inspection, etc.) or they become the inspectors and equipment developers to carry out regulation activities elsewhere.

Again, appropriate caution needs to be exercised in concluding that oil development, or extractive industries in general, contain the makings of the kind of profitable adaptations we have found in the Tri-Counties. A polar opposite case, for example, is the Arctic where extraction occurs in a completely inhospitable setting, leading to minimum investment and eagerness to exit. An area like the U.S. Gulf may be an intermediate case where both replication and diversification occur, but at levels more modest than those we have observed for the Tri-Counties (see Gramling and Freudenburg, 1990). A comparative research project on this topic would shed light on the specific conditions under which positive adaptations are more or less likely. Where growth is thought valuable and a net fiscal plus, EIRs would be adjusted to reflect the extra benefit of a sustained economic base. In places like Santa Barbara, where it is considered a net negative, the spin-off impacts need to be factored in as costs to be mitigated.

VII. STUDY CONCLUSIONS AND RECOMMENDATIONS

We conclude that the Santa Barbara Channel Socioeconomic Monitoring and Mitigation Project (SEMP) has met its primary goal of providing an insurance policy: for the jurisdictions against unanticipated consequences of development, for the oil companies against mitigations for impacts that do not occur. SEMP's administrative costs were high compared to total pay-out, but even combined with aggregate mitigation payments, these costs were lower than the companies would have been expected to pay based on the initial Environmental Impact Report estimates. Because of the major errors of EIRs (as well as the wide variation among them), SEMP was a more efficient solution despite its high overhead.

That SEMP could function in a highly ambiguous context and with so little precedent is no small accomplishment given the failure of even more modest programs applied in other regions and the extraordinarily politicized and adversarial relation between some local governments and the oil companies in the Tri-County area. These tensions were transcended, in this case, by a mutual understanding of the necessity of moving forward so that projects could be built and mitigation payments actually take place.

Those who had the job of "pioneering" through negotiations and first claim settlements paid the highest price in time and effort. While still skeptical about SEMP's fundamental premise, even oil

representatives judged it superior to the alternative of mitigating on the basis of the EIR projections. From the jurisdictions' viewpoint, SEMP provided a new way to deal with cumulative impacts, even those below visibility thresholds. These procedures are already being applied within the Tri-County region for projects that are not oil-related. They now can provide a precedent for similar applications in other regions of the country, but at lower development and administrative costs.

A. Ingredients of SEMP's Effectiveness

The following factors helped sustain the project:

1. Given the fact that industry paid for the counties' administrative costs as well as for consultants' studies, the amount of money involved in mitigation was sufficiently large (albeit, sometimes only barely so) to justify the time and effort needed to gain it. The fact that the money was not stringently earmarked made it more still more valuable to jurisdictions than the dollar amounts imply.
2. All parties agreed to a single procedure for estimating population impacts and allocating those impacts to local jurisdictions. The parties largely managed to avoid subsequent bickering over the monitoring methodology and its output. As long as the numbers were not grossly inconsistent with other readily available indicators, it was less important that the numbers be correct than that they be accepted as reasonable.
3. Local government jurisdictions had enough slack resources in terms of staff time, expertise, and planning instruments to take advantage of the program.
4. There were opportunities, formal and informal, for the jurisdictions to coordinate their methods and standardize their requests and for the oil companies to coordinate and simplify their responses.
5. The creativity of the problem, while costly in staff time, provided an additional source of motivation for government participants and a vehicle for developing sufficient trust and good will among negotiators.

B. Suggestions for Future Negotiating in Programs Like SEMP

In future applications of SEMP in other regions or in reference to other industries, the following guidelines are suggested:

1. Avoid turnover among negotiators (perhaps with penalties for excessive turnover);
2. Given fiscal cutbacks in many locales, provide funding to cover jurisdictions' staffing and consulting costs.
3. Jurisdictions should be informed, using the experience in the Santa Barbara Channel as the explicit point of precedent, that claims need to respect concepts such as amortization and a demonstrated link between impact and mitigation. Operating firms would be informed that they are held responsible for all impacts within such frameworks.

Cutting the length of the negotiating process and costs of administration would diminish the primary liabilities of the program.

C. Suggestions to improve procedures for estimating and allocating population impacts.

1. In developing gross estimates of population impacts, efficiencies can be gained from the use of company employment data rather than expenditure data as the primary inputs (this became SEMP practice after 1992, and is also recommended in Powers, 1991).

2. In allocating impacts to local jurisdictions, use the distribution of total oil respondents, not just in-migrant respondents, and, indeed, cumulate the proportions over time. This will reduce the problems of basing decisions about population distribution on highly unstable and unreliable small samples.

3. Place responsibility for any employee surveys in an independent survey contractor charged to develop valid samples on each company's employee base and with sufficient data (e.g., from company employment records) to verify that respondents represent the overall work-force.

4. Develop more complete employment histories (including the origin of each worker) to accurately determine the total cumulative volume of in-migration relative to a pre-defined baseline.

5. Consider using scientific surveys of county-wide population to determine migration, employment, and residence patterns.

6. Rely on per capita service costing (of the VCTAC-type) as much as possible; although time consuming to develop, it is now available "off the shelf" as a generic tool.

D. Suggestions to radically simplify the SEMP estimating processes.

Hindsight indicates ways to significantly reduce administrative costs of the program by adopting procedures that rely less on REMI modeling and SEMP surveys. The core of the proposal is to assume that all oil employees and their families are in-migrants, then determine employment levels from company payroll records, and assume that family size is equivalent to state-wide household size or some other reasonable proxy. Allocation of in-migrant population to counties and jurisdictions within them could likely be based on employees' residential zip codes.

These recommendations are designed to simplify SEMP and reduce its high overhead costs. Given the difficulties with so many aspects of the data gathering, the current procedure is inappropriately precise. The use of cruder or more standardized assumptions would likely yield results similar to those provided by the REMI model (and probably be more, rather than less, reliable), but at lower cost and with less intrusion into the lives of workers and companies. Even if application of the REMI model were to yield more accurate numbers than our cruder approach (and we doubt it would), the high financial cost offsets any marginal gain in accuracy. Recall that the overall goal (and achievement) of SEMP is to insure both localities and industry against large-scale miscalculations and unforeseen developments, not to minutely calculate precise costs and benefits.

E. Consider Long-Term Impacts of the Oil-Support Economy.

Estimation of longer-term impacts should take into account the ability of some oil-support industries to adapt and survive local resource exhaustion, rather than presuming impacts (including jobs and associated revenues) to end when initial exploration and production have been completed. The oil industry's contribution to the local economic base can persist in ways not anticipated in conventional analyses.

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APPENDIX A: METHODS FOR INTERVIEW OF SEMP PARTICIPANTS

Interviews were primarily in-depth, supplemented by inspection of SEMP documents and related literature and correspondence. Our informants were drawn from SEMP participants, including government and oil company officials. Five initial interview informants were recommended by the program's project manager. Other informants were contacted because their names appeared in SEMP reports as participants or "contact people." We also sought out those who did not participate, as a way to learn what might have discouraged jurisdictions from making claims. We also gathered informants by snowball sampling; during each interview, we asked who else we should contact. From seventy such leads we conducted forty-three interviews. Fourteen of these were by telephone and lasted 20 minutes or less; twenty-nine were in-depth, lasting from forty-five minutes to over two hours. Almost all of the longer interviews were conducted in person and tape recorded, and resulted in nearly four hundred pages of typed transcripts. Six corporations have participated in SEMP and over one hundred eligible jurisdictions received SEMP reports. We interviewed seven oil representatives and thirty-six officials of local government units, including county officials, members of school district and utility district staffs (e.g. sewer and water), and budget analysts. Several of the phone interviews were held with participants who had left the region.

We began each interview by encouraging each informant to describe their experience participating in SEMP. The original instrument consisted of a brief list of general questions, to be asked if informants initial responses did not address the following topics:

- a) Program expectations. What kind of benefits/costs was SEMP anticipated to provide;
- b) To what degree were these expectations met;
- c) What improvements could be made to SEMP to make it function more efficiently, more fairly, or more effectively;
- d) Were there any impacts that SEMP did not cover;
- e) How did their particular jurisdiction develop its mitigation methodology,
- f) What was their experience negotiating mitigation claims.

We organized common themes into conceptual categories as they emerged from interviews, testing them against the views of other informants as the interviewing proceeded. As one example of this "grounded theory" method, early in the interviewing process several informants characterized their negotiating role as "educating the oil companies"; another repeated theme was that SEMP required that negotiators "invent the wheel." In subsequent interviews, if such themes did not arise spontaneously, we probed informants for analogous experiences. This strategy required us to re-contact some early informants to confirm emerging themes and provide fuller elaboration.

APPENDIX B. METHODS FOR STUDYING OIL-SUPPORT INDUSTRY

We carried out two interrelated research operations.

1. A General Mailing. We contacted by mail the firms active in offshore oil industry within the Tri-County area. The primary source of names was the membership roster of the California Coastal Operators Group (CCOG), an association made up of nearly 200 businesses that service and supply the oil industry. We mailed to all 122 companies that listed a Tri-County address. Of these, 12 were evidently out of business as our mailings were returned undeliverable. We also sent mailings to three additional firms not on the list, but which were recommended to us during interviews with business informants (see below). A total of 113 businesses were thus contacted, 60 of which filled in questionnaires we sent (for a response rate of 53 percent). We asked respondents to indicate whether their firms had diversified into non-oil related products or services and whether or not their Tri-County location had become a base for serving non-local areas. Respondents were also asked to indicate the proportion of their firm's revenues that derived from such non-local and/or diversified operations.

We had two uses for these completed documents. We used them to discover firms that would likely be profitable to interview in-depth. Although the responses were anonymous (a policy we honored by not even using an identity coding on the forms), many (43 percent) of the respondents voluntarily identified themselves with a signature or return address. From this self-identified group, we were able to select especially promising prospects for in-depth interview.

Our second use of these documents was to estimate the frequency and circumstances of diversification and expansion into non-local markets. This was done through frequency counts (and simple statistical manipulations).

2. Interviews. Our interview informants were gathered through a variety of mechanisms. Some were self-identified from their responses to our mailing. Others came to us from news reports, primarily from the local business press. Still others were recommended to us by previous informants ("snowball" sampling). In selecting informants, we were not striving for a representative sample of oil-related businesses. Our method was unusual in this regard. We were trying to uncover a type of business phenomenon that we were not certain was there. In other words, we were looking for a certain "species" of business adaptation, and we used whatever leads were possible that could bring us to the location of that species. Once we located a prospective relevant case, we interviewed an owner or high-ranking executive (at least of the rank vice-president or equivalent) long enough to discover whether or not their firm's experience was relevant to our search. Because of this the length of our interviews varied greatly. In some instances, we were able to learn after a short phone interview that the contacted firm was not of a relevant sort (e.g. they had started in local oil production and remained in local oil production). In a few cases, we only came to realize the firm was not relevant to our study after a considerably greater effort had been expended.

In all, we contacted, either by phone or in-person, 33 persons. Of these, 18 involved face-to-face, lengthy interviews, usually lasting one hour or more. Interviews were loosely structured; respondents were asked to "tell the story" of their company from point of its founding, how it first connected to the oil industry, and the possible changes in product and service areas it had experienced over the years. Although our primary focus was offshore drilling in federal waters, we included in the scope of our study other types of oil activities, particularly pre-OCS operations involving production in state waters. Interviewers probed for evidence of diversification or geographic expansion away from local oil operations and the precipitating factors behind such changes. We also probed for current efforts underway to diversify and/or expand. Even if not yet proven successful, such activities would at least suggest possible additional ways that oil development can facilitate local economic growth. We also used our contacts, whether by phone or in-person, to gather up company literature that described their histories, personnel, and current operations.

APPENDIX C: QUESTIONNAIRES

"Expenditure and Employment Questionnaire, Operating Companies"

"Expenditure and Employment Questionnaire, Contractors, Subcontractors and Vendors"

"Questionnaire: Employee Questionnaire"

"Tri-County Socioeconomic Monitoring Program Employment Questionnaire -
Round X"

APPENDIX D

"Table 2" (page 15) from SEMP Monitoring Report

APPENDIX E: THE REMI EXPENDITURE-BASED MULTIPLIER SYSTEM
(Detailed Observations)

We here examine how translation of expenditure data into population impacts was carried out under the expenditure-based REMI system. A multiplier derived from the REMI model for each of the Tri-Counties was used to estimate the total number of in-migrant persons associated with a given volume of oil expenditures. These county-specific multipliers provided a simple one-step procedure to estimate the number of in-migrants.

Where did the county-specific multipliers come from? The multipliers were the product of complex REMI estimates that produced two other intermediate multipliers. One intermediate multiplier related oil company expenditures to oil company employment; the other intermediate multiplier related oil company employment to in-migrants.

The input for the first intermediate multiplier was the county-level estimates of "sticking" expenditures discussed in the text. REMI then related those expenditures to levels of county employment. These relationships were based on average results estimated within the REMI structure on prior data for oil expenditure and employment within each county. Thus, REMI generated estimates of the relationship between expenditure and county employment, including direct industry employment, indirect employment and induced employment. These were put at 36.14 employees per \$1 million expenditures in Santa Barbara, 20.48 in Ventura, and 25.6 in San Luis Obispo. That means, for example, that for \$1 million dollars of oil company spending in Santa Barbara County, there would be 36 county employees--including both oil industry employees and others related to the industry.

The second intermediate multiplier produced by REMI related total employment (generated by oil industry expenditure) to total in-migration for each county. This was done using historical data for the 1967-83 period to model, in separate processes, the dynamics of county employment and county population growth. The results of these estimates were used to show the relationship for each of the Tri-Counties between employment and county in-migration. The resulting intermediate multiplier estimates relating employment and in-migration were different for each county: 0.675 for Santa Barbara, 0.949 for Ventura; 0.921 for San Luis Obispo. These coefficients have not been documented and available data do not make possible an outsider's confirmation of them.⁸⁶

By way of illustration, the multiplier of 0.675 for Santa Barbara translates to 675 new residents for every 1000 employees.⁸⁷ Some of the 1000 employees will be direct employees of the oil industry; some will be indirectly employed in supply and service industry; some will come because of the additional economic activity caused by the first two sources of employment. The 675 new residents will include employees (of all sorts) and their families. Thus, if there were 1.7 employees per family, and if families averaged 2.9 people, then the 675 new county residents would (on average) represent 232.8 families (or 675/2.9) and 396 new employees--some undetermined number of which would be oil workers.

The final REMI expenditure-population multiplier was derived arithmetically by "substituting" the first intermediate multiplier (expenditure to employees) into the formula for the second intermediate multiplier (employees to in-migrants).⁸⁸ The final overall multiplier for each county, used to estimate the

86. As noted in the SEMP User's Manual, "REMI has not documented the in-migrant coefficients that their model generates" (Centaur, 1986 p. A-12); and "there is no way to ascertain how statistically significant [i.e. precisely estimated] the REMI model results are since the coefficients were developed internally by the model. . . . These regressions are more of an identity than a measure of correlation between the two variables" (ibid., p. A-13).

87. Of course, if the proportion of oil employees that are in-migrants changes significantly over time, the use of fixed proportion multipliers will imply the logically odd result that the fewer the oil industry in-migrants, the more other employees are induced to migrate to the region.

88. For Santa Barbara, this works as follows:

total number of in-migrants produced by a given level of oil company expenditures, was calculated by REMI as 24.4 people per \$1 million of sticking expenditures for Santa Barbara; 19.4 for Ventura, and 23.6 for San Luis Obispo.

We believe that the results of SEMP employer surveys, although intended for another purpose, can be used to help evaluate the plausibility of these REMI multipliers.⁸⁹ The REMI expenditure-employment multipliers imply an overall Tri-County expenditure-to-employment ratio of about 28.5 employees per \$1 million of Tri-County expenditures, and an in-migrant rate of about 0.829 per employee.⁹⁰ In 1987 the total "sticking" Tri-County oil expenditures were reported by SEMP to be \$142 million (see Table 1). Multiplied times 28.5 employees per \$1M, this suggests about 4047 total Tri-County employees (direct, indirect and induced) as a result of oil development ($\$142M * 28.5 = 4047$).

Expenditure-employment: $EMPLOYMENT = 36.136 * EXPENDITURE - 184.491$

Employment-population: $POPULATION = 0.675 * EMPLOYMENT - 10.860$

Substituting: $0.675 * (36.136 EXPENDITURE - 184.491) - 10.860 =$

$24.39 * EXPENDITURE - 124.53 - 10.860 =$

$24.39 * EXPENDITURE - 135.39$

The large negative intercept (the figure 184.419 in the employment-expenditure equation) deserves further mention here, however. The data plotted in the SEMP User's Manual (Centaur 1986, pp. A-25 - A-27), show clearly that with a different (nonlinear) specification the intercept in the expenditure-employment equation would have been zero--or nearly zero.

We have been advised that the intercept term caused controversy in the SEMP TAC. It was initially ignored, and the multiplier was simply taken to be 24.39 in the case of Santa Barbara County. However, the industry apparently protested that the overall in-migrant estimate should be reduced by the magnitude of the estimated intercept.

As specified, the model says that county employment actually falls by 135 jobs per year when oil industry expenditures are equal to zero (relative to a baseline). The intercept has reduced the Santa Barbara population impact estimate by more than 10 percent in three of the most recent years.⁸⁹ Such a use of the survey reports is clearly anticipated in the 1986 SEMP User Manual (pp. A-14-A-18). It should nonetheless be absolutely clear that some critics consider the use of SEMP surveys for this purpose to be ill-advised. PRI's Charles MacLean stated flatly in a written commentary on an earlier draft of this report that "this simply cannot be done because the survey does not collect the data which would allow a valid comparison." On the contrary, if the survey data on the number of employees is not a valid and reliable estimate of the total number of employees, then there is little justification for placing confidence in the survey exercise for the other purposes for which it is used in SEMP. In fact, in a lengthy interview in July 1992 discussing this and other technical aspects of SEMP, MacLean himself suggested using SEMP survey data as a way of trying to roughly validate the REMI model. The SEMP Users Manual notes that "the C/COG survey data may yield better direct in-migration estimates than the REMI model once the survey questionnaires are refined" (Centaur, 1986, p. A-17).

⁹⁰ We arrive at the overall figure by combining county data, making the assumption that virtually all oil expenditures are in Santa Barbara and Ventura counties (which is approximately true from SEMP data), and that expenditures are roughly evenly divided between the two counties (when in fact they were higher in Santa Barbara County; the latter fact would suggest a *larger* multiplier than 0.829 which means we are erring in a conservative direction).

Multiplied times 0.8 in-migrants per employee⁹¹ we arrive at a number of Tri-County in-migrants of about 3238 ($4047 \times .8 = 3238$). Given the broad simplifications involved in averaging the relevant multipliers, this is not too far off from the actual REMI estimate for the year of 2940 Tri-County in-migrants.

One estimate of the actual total 1987 Tri-County oil project-related employment calculated from SEMP employer surveys is 2883 oil employees.⁹² At .829 in-migrants per employee, just counting the 2883 oil employees, we get an estimate of 2390 in-migrants accounted for by direct oil employment ($2883 \times .829 = 2390$; or 81 percent of the REMI-predicted in-migrant population of 2940 in-migrants). This leaves 550 other in-migrants to be accounted for ($2940 - 2390 = 550$). At 2.9 people per household, these 550 imply 190 households ($550 / 2.9 = 190$) and 323 in-migrant (induced) employees (at 1.7 employees per household; $190 \times 1.7 = 323$). This leaves an additional 841 Tri-County employees ($4047 - 2883 - 323 = 841$) indirectly supported by the oil industry ($841 / 1.7 = 495$ households; $495 \times 2.9 = 1435$ people). If the 323 "other" in-migrants are regarded as "induced" employees, these 841 additional non-inmigrant Tri-Counties employees must be are "indirect." Whatever the assumption we make about other indirect employees among the oil-related in-migrants,⁹³ it is clear that this set of calculations leads to the conclusion that the ratio of indirect to direct oil employees would be substantially below the 50-95 percent indirect employment identified by various EIRs reviewed by Kim Fulton-Bennett in 1986 (Santa Barbara County, 1986; $850 / 2883 = 0.29$). In other words, REMI estimates of the magnitude of employment effects and immigration were probably too low.⁹⁴

Approaching from a slightly different perspective, starting with an assumption held by the SEMP TAC itself, if there is only one oil-worker per household,⁹⁵ and each oil-worker is part of a household, then multiplying times 1.7 workers per household provides an estimate of the total number of Tri-County employees in project-related households of 4901 ($2883 \times 1.7 = 4901$). This is a number substantially greater than the number of Tri-County employees suggested by REMI's internal multiplier (that number, estimated above, was 4047). Counting all 4901 employees in oil-related households and multiplying by .829 in-migrants per employee, we arrive at an estimate of 3920.8 in-migrants--well in excess of the 2940 estimated by REMI and the 3238 ballpark number estimated above. This does not account at all for any indirect or induced employment. If indirect and induced employment were only 30 percent of the direct

⁹¹. Again, this is the average of the employment to population multipliers for Ventura and Santa Barbara Counties, and thus not precisely correct since it is not weighted according to "sticking" expenditures.

⁹². Sticking factors and multipliers are estimated for separate counties, but the survey results are typically presented only on a Tri-County aggregated basis.

⁹³. For example, some of the 2390 inmigrants accounted for by oil employment might be due to indirect employment. That 2390 implies that around 49 percent of oil employees are inmigrants; consistent with early SEMP survey findings.

⁹⁴. This conclusion only be reinforced by using our rough estimate of 3238 inmigrants rather than the lower SEMP estimates. Even if all of the 4047 REMI-estimated employees in excess of 2883 oil employees are "indirect," the proportion of indirect employment to direct is only 40 percent; still below the lower range of the EIR estimates.

⁹⁵. Charles MacLean assures us that "SEMP TAC assumes one household for each project-related worker" and that SEMP surveys confirms that this is a reasonable conclusion. There could be, of course, some households with two employees in the oil industry. If both employees in oil-related households with more than one employee are employed in the oil industry, then the number of county employees accounted for directly by oil would be equal to the surveyed number. The relevant question on the employee questionnaire reads as follows: "Does anyone else living at your residence work on one of the oil and gas projects listed in Question 3? If so, please write the name of the project _____. Number of individuals living with you who work on the project _____." In SEMP annual reports, the total number listed in the second blank is divided by the number of respondents to produce a ratio, "employees per in-migrant household." There is no other question on the employee questionnaire that solicits information about the employment status of other people living in the respondent's residence.

employment (2883), then it is possible that the REMI estimate of the in-migrant population should have been 60 to 80 percent *higher*.⁹⁶

Both of these exercises suggest that the "old" REMI was substantially underestimating the population impacts of oil development. But this holds only by accepting the plausibility of using expenditure:worker ratios (and multipliers) fixed over time, based on the assumption of each project and project phase having employment effects independent of one another--an unlikely assumption. Workers brought in for one project, may for example, stay on to work on another. Yet the REMI model, because it does not take into account dynamics among projects, would treat each job as representing a separate worker.

As another example, it may be that over time the industry becomes more efficient in its use of labor, either because the natural progression in the cycle of oil development is toward more capital intensive processes (i.e., construction vs. production) or because employees' increasing mastery over their tasks increases labor productivity relative to capital expense. But because REMI presumes the same ratios of expenditures to employment over time and also continues with the same multiplier coefficients, the number of in-migrants per actual expenditure dollar may rise as an artifact of the method. This is what appears to have happened, because according to the SEMP data, the number of in-migrants per dollar of expenditure has been rising--a pattern that makes little sense. Given the countervailing problems, we are not in a position to say unambiguously whether one side or the other has benefited on balance from flaws in procedures that have been used.

⁹⁶. As follows: 2883 direct employees plus 30% indirect and induced yields 3748 employees due to oil expenditures. Assume as with SEMP TAC that each oil employee represents one household. Multiply the number of direct and indirect oil employees (households) times 1.7 employees per household to get 6371 total employees. Multiply that times .829 to get the number of in-migrants. The result is 5282 which is 63 percent greater than our ballpark estimate of 3238 in-migrants based on the initial volume of expenditures as described in the text. It is 80 percent greater than the REMI estimate of 2940 in-migrants..