AN ATTITUDINAL SURVEY OF
CITIZENS IN A POTENTIAL GULF COAST
GEOPRESSURED-GEOTHERMAL TEST-WELL LOCALITY

Final Report, May, 1977

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INTRODUCTION

Technological innovations are encouraged and supported for the benefits they produce. In the case of geothermal energy development, the primary goal is to help ensure a steady and sufficient supply of energy to the nation. Arguments have recently become highly vocal, however, in support of understanding "benefits" in a more comprehensive manner than has heretofore been the case. It has been noted, for example, that the social effects and costs of certain technical processes should be considered in adjudging the benefits to be derived from those processes. It is also necessary to look at benefits and costs on several levels: national, regional, state, and local.

The effects of technological developments on the communities in or near which they occur, in particular, should not be ignored. Adverse reactions to an innovation or expansion can spread far beyond the directly affected citizenry. Projects in fact can be delayed or blocked by public response to some undesired local consequence. In order to understand "benefits" within the local setting, it is necessary to supplement technical research, from the early planning and development stages to commercial production, with socioeconomic analyses and policy research. A multifaceted research approach can help assure that a given technology is researched, developed, and implemented with minimal costs and maximum benefits to all affected parties and users.

A crucial component of such an approach is analysis of citizen attitudes and expectations in the locality of a proposed development. This study reports results from the collection of attitudinal data, both from the general public and from representatives of various community sectors such as government and finance, in a potential Gulf Coast geopressured-geothermal test-well locality.

The University of Texas at Austin, under funding from the U.S. Energy Research and Development Administration, has made resource evaluations of geopressured-geothermal zones in the Texas Gulf Coast, and several potential sites for test-well facilities have been identified (see Bebout et al. 1976). One of the most probable site areas involved is in Brazoria County, in the vicinity of the small communities of Danbury and Liverpool, shown in figure 1. The present research was initiated (before any firm commitment to a site was announced) in order to identify citizen reactions to the proposed development of the resource at the local level.

Brazoria County is a 1,423-square-mile area of flat, coastal soils. Population in 1973 was estimated at 114,400 with a projection for 1975 of 124,357 (Office of the Governor 1974). Agricultural products--chiefly rice, cotton, soybeans, grain, livestock, and poultry--net \$45 million in average annual income for the county. The production of oil, gas, magnesium, salt, and lime brings in \$260 million annually. Lake Jackson is the largest community in the county with a 1970 population of 16,000.

Neighboring Galveston County is partly island and partly coastal, with several of its inland communities within a 20-mile radius of the test site in Brazoria County. The county economy is dominated by port activities, but has substantial mineral production as well (\$54 million annually). The 1973 population estimate was 177,600 in a 399-square-mile area. The 1975 projection was 182,905 (Office of the Governor 1974). Both counties are closely tied to neighboring Houston, with Brazoria included in the Houston standard metropolitan statistical area (SMSA). Galveston County constitutes a separate SMSA. Brazoria County

THREE LEAGUE LINE

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and the few close communities in Galveston County comprise the study area for this research.

ORGANIZATION OF THE REPORT

This report is divided into three major sections. The first part describes the results of a mail survey used to tap the opinions of the public at large in the study area. Attention in that section is focused on awareness of the resource, favorability toward the impending development, concerns about the development, attitudes regarding how the development should take place, levels of community satisfaction, and perceived future problems due to community growth.

The second part of the report gives an analysis of the 33 interviews conducted with local representatives of the financial and commercial sectors, government, industry, agriculture, and environmental groups. The main foci here are perceived problems and benefits associated with geothermal development and the local capacity for coping with strains on community services resulting from any population growth which may be generated by resource development.

The final part of the report includes a comparison and synthesis of the results from the general survey and the sector interviews. In conclusion, policy recommendations are made for means through which to consolidate goals and to achieve resource development objectives with minimal antagonism of and problems for local citizens and community sectors.

PART I: OPINIONS OF LOCAL CITIZENS CONCERNING GEOTHERMAL DEVELOPMENT

INTRODUCTION

The interrelationships among technological innovation, industrial development, and social change have been the recipients of both popular and scholarly attention, but, unfortunately, most observations have been made from an a posteriori perspective. In the area of energy resource development, the few sociological studies previously conducted have been case studies based on after-the-fact data collection. Bauer's (1966:49) early admonition still rings true:

The phrase "too little and too late," especially too late, applies to much research done on expectations of, behavior during, and reactions to important events. It is typical that after something happens . . . it is recognized as important. There is then a lag while researchers organize themselves and apply for funds, and still another lag before funds are available. By this time, researchers are put in the hindsight position of having to question people retrospectively as to whether they had expected the event to happen, how they felt about it when it was only a project, . . . and what effects the event has had on them.

The possible development of geothermal resources in the coastal zone has provided a rare opportunity to collect relevant data before the proposed resource exploitation even begins. The research conducted here will hopefully aid in understanding the dynamics of community change and individual response to important energy resource exploration. More immediately, it will help in planning for adaptation to the changes which can be anticipated at the local level.

BACKGROUND OF THE PROBLEM

Most studies on the social impacts of resource development concentrate on demographics, especially in the form of population projections. When Booz et al. (1974) speak of sociological impacts, for instance, they are referring to changes in population characteristics (size, labor force distribution, etc.). For many researchers social impact means merely the impact of increasing population on social services. Rarely have the reactions of the people involved, oldtimers and newcomers alike, to changes brought about by resource development been studied. One reason may be that less tangible considerations--for example, social integration of the community or subjective reactions of its inhabitants--are more difficult to examine than are population migration and growth, or other demographic trends. The lack of attention to attitudinal and social-psychological dimensions has been remarked to be the greatest single weakness of available literature on social impacts (e.g., Freudenburg, 1976).

The present survey is an attempt to examine the attitudes of residents in a potential geopressured-geothermal test-well area toward the possible development of that resource. The data presented here can be used in the future to help identify what the impacts of geothermal development were on the community. For instance, respondents were asked to evaluate their community in terms of such variables as cohesiveness, friendliness, and community atmosphere. Their responses can be used in comparison with data collected in the future to evaluate changes in levels of community satisfaction following resource development.

In addition to providing baseline data for future comparisons, the survey data allow early identification of opposition to the proposed wells and the reasons for that opposition. Local citizens were asked to give their own perceptions of the geothermal exploration in their area. Knowing early in the process of development what the local reaction is likely to be is of great importance. On the one hand, it helps avoid development problems and delays (Singh and Wilkinson 1974). On the other hand, it promotes the public awareness of the issues and participation in decision making which are important in the maintenance of institutional accountability and in the protection of the public interest (Caldwell et al. 1976).

SURVEY METHODS

The questionnaire instrument used (see appendix A) was developed to assess citizen attitudes in the following areas:

- Awareness of geothermal energy
- Favorability toward resource development
- Community satisfaction
- Perceived problems and advantages to geothermal development
- Local political involvement
- Attitudes toward local planning
- Background characteristics (e. g., length of residence, income, age, occupation)

The questionnaire was reviewed in preliminary form by several social scientists.* The instrument was pretested on one hundred randomly selected individuals from the study area.

The sample was drawn using a probability design of systematic selection (see Lazerwitz 1968). Selection was done from the telephone books of Brazoria County and six communities in Galveston County which lie within a 20-mile radius of the potential site. Telephone saturation rates in 1970 were 86 percent of all occupied housing units in Brazoria County and 85 percent in Galveston County (U.S. Bureau of the Census 1972a). While this method of sample selection eliminates those individuals without a telephone listing, it is the only feasible way to cover the multicomunity study area. Telephone saturation rates, however, are undoubtedly higher in 1976 than the 1970 figures reflect.

The number of respondents selected from each directory was based on the population of the community as a proportion of the total population of the test-well area. For example, League City has a population of 16,000,[†] which is 11.8 percent of the combined population of the sample area communities. This percentage was multiplied by 2500, the size of the proposed sample to be mailed. The latter figure was chosen on the assumption that a minimal response rate of 25 percent would still yield the desired analytical sample size of 625. A sample size of 625 is sufficient at the 95 percent confidence level for reliability of

*We wish to thank the following individuals for their comments on the questionnaire: Professor Joseph Lopreato, The University of Texas at Austin; Professor Charles M. Bonjean, The University of Texas at Austin; Dr. Marvin Olsen, Battelle Human Affairs Research Center, Seattle; and Professor Parker Frisbie, The University of Texas at Austin.

[†]All population numbers used were 1973 estimates taken from the 1976-77 Texas Almanac.

± 4 percent. Actual returns numbered 612 for a reliability of ± 5 percent (see Lazerwitz 1968). To continue with the example of League City, the number of questionnaires mailed was 295.

The number of lines in each directory was counted, and a 10 percent estimate of commercial numbers was deducted. The remaining number was divided by the desired number of respondents to be drawn (295 for League City), which gave a skip pattern for selection. In the case of League City, this number was 1/15, which meant that 1 out of every 15 persons was selected. A random number from 1 to 15 was chosen from which to start the counting.

Other factors in the sample selection were:

1. The name was not used if a "children's" telephone number was selected.
2. The name was used only if the residence of a physician or other person with both an office and residence phone was selected.
3. If the person's listing consisted of two lines, it was used only if the line consisting of the name was selected.
4. If the first skip pattern did not yield the desired number of people, the number of individuals left to be selected was used in calculating another skip pattern, and the process was repeated.

This sampling technique yielded a sample size of 2542 persons. It is assumed that approximately 7 percent of the questionnaires were not delivered, based on the returned mail from the pretest. The effective sample size was thus reduced to 2364, which, with 612 usable returns, gives a response rate of 26 percent.

SAMPLE CHARACTERISTICS

The sample is not representative of the study area, as comparisons with 1970 census statistics indicate. An inherent bias exists in any mail survey toward respondents with higher income and occupational levels (see Weiss and Hatry 1971), since more individuals at those levels complete and return questionnaires. The data reported in table 1 reflect the major sample differences from population characteristics. Returns were heavily representative of the professional, managerial, and crafts occupations. Median family income was considerably higher than the 1970 median. The number of returns from self-reported minorities (Blacks and Spanish heritage) were too small to allow separate analysis. The subgroups on the demographic variables were sufficiently large, however, to check for major differences of attitudes and opinions among the respondents. It should be noted, too, that the 1970 census data are inaccurate to an unknown degree because of changes taking place during the nearly eight years since those data were collected. The sample reported on here is almost exclusively male (87 percent), largely because, since telephone listings are most frequently in the man's name, the questionnaires were so addressed.

SURVEY FINDINGS

Citizen Awareness and Favorability

More than half (56 percent) of the respondents had not heard about the geothermal resource before receiving the questionnaire. What is somewhat surprising, however, is the 44 percent who reported that they were aware of the resource, since publicity concerning the potential

Table 1

POPULATION DEMOGRAPHIC CHARACTERISTICS AND SAMPLE CHARACTERISTICS

	Geothermal Study Sample	1970 Census Data ^a	
		Brazoria	Galveston
Median Family Income	\$ 21,193	\$ 15,442 ^b	\$ 14,470 ^b
(Percent)			
Occupation			
Professional	25.4	13.6	17.3
Managerial	17.2	7.7	7.4
Sales	5.2	4.8	6.3
Clerical	4.6	12.3	16.7
Craftsmen/foremen	25.0	21.5	17.1
Operatives	10.7	13.4	10.4
Transportation	1.1	3.5	3.1
Laborers	2.8	5.8	6.4
Farmers	1.2	1.1	0.2
Farm laborers	0.2	1.1	0.3
Service	3.9	10.5	12.8
Private household Homemaker, student, military	- 2.7	2.2 -	2.0 -
Unemployed	3.9	4.4 ^c	3.2 ^c
Anglo	92.4		
Black	3.6	9.9	19.6
Spanish heritage	3.3	9.9	12.0
Other	0.7		
Over 65 years of age	8.5	5.4	7.6

^aU.S. Bureau of the Census, 1972b^bComputed in 1976 constant dollars^cAs of July, 1975 (Texas Employment Commission)

development has been minimal and sporadic. Of those who were aware of the resource, most had received their information through the mass media (73.5 percent), followed by friends and co-workers (20.3 percent), and technical literature (5.5 percent).

Awareness of the geothermal resource was slightly higher at middle-age levels than in older and younger groups; it increased dramatically with education and income (see table 2). These findings are not surprising since individuals at higher socioeconomic levels ordinarily have more information than persons at lower levels.

From a policy and planning standpoint, it is perhaps most interesting that differences exist in awareness among residents of various sections of the study area. Persons living closest to the proposed well site were most aware of the resource. This area, termed "middle-rural" here, consists of the communities of Angleton, Danbury, Iowa Colony, Liverpool, Richwood, and Rosharon (see table 3). The industrialized Brazosport area showed almost equal awareness (Lake Jackson, Freeport, Clute, Jones Creek, Churchill, Oyster Creek, and Surfside). The eastern Brazoria County/Galveston County communities reported least awareness of the resource. (See appendix B for a complete listing of the communities in the sample.)

Even more important, the middle-rural respondents who were most aware of the resource were also least favorable toward its development (table 4). It should be emphasized that a large majority of people from all sections of the study area were favorable towards the drilling of a test well and agreed that they would lease land, if they owned or were to own any, for geothermal development. Responses to both

Table 2

AWARENESS OF GULF COAST GEOTHERMAL RESOURCE BY
AGE, EDUCATION, AND INCOME
(Percent)

Heard about
geothermal prior
to receiving this
questionnaire?

Age:

	18-29	30-39	40-49	50-59	60-69	70+
Yes	36.7	39.8	44.2	54.9	50.0	41.7
No	<u>63.3</u>	<u>60.2</u>	<u>55.8</u>	<u>45.1</u>	<u>50.0</u>	<u>58.3</u>
	100.0 (N=98)	100.0 (N=133)	100.0 (N=129)	100.0 (N=122)	100.0 (N=72)	100.0 (N=24)

$$\chi^2 = 9.85; \text{ sig} = .08$$

Education Completed:

	Grade School	Some High School	Completed High School	Some College	Finished College	Graduate or Prof. Degree
Yes	25.0	37.5	40.7	47.1	51.4	46.7
No	<u>75.0</u>	<u>62.5</u>	<u>59.3</u>	<u>52.9</u>	<u>48.6</u>	<u>53.3</u>
	100.0 (N=32)	100.0 (N=48)	100.0 (N=123)	100.0 (N=210)	100.0 (N=111)	100.0 (N=60)

$$\chi^2 = 10.24; \text{ sig} = .12$$

Total Family Income:

	<\$15,000	\$15-29,999	\$30,000+
Yes	37	45	55
No	<u>63</u>	<u>55</u>	<u>45</u>
	100 (N=123)	100 (N=346)	100 (N=101)

$$\chi^2 = 7.36; \text{ sig} = .02$$

Table 3

AWARENESS OF GULF COAST GEOTHERMAL
RESOURCE BY PLACE OF RESIDENCE
(Percent)

Heard about geothermal prior to receiving this questionnaire?	Section of Study Area:			
	Eastern Brazoria/ Galveston Co.	Middle Rural	Upper Brazoport	Brazosport
Yes	37.8	54.5	40.3	53.7
No	<u>62.2</u>	<u>45.5</u>	<u>59.7</u>	<u>46.3</u>
	100.0 (N=294)	100.0 (N=66)	100.0 (N=67)	100.0 (N=164)

$$\chi^2 = 14.16; \text{ sig} = .002$$

Table 4

FAVORABILITY TOWARD GEOTHERMAL RESOURCE
DEVELOPMENT BY PLACE OF RESIDENCE
(Percent)

	Section of Study Area:			
	Eastern Brazoria/ Galveston Co.	Middle Rural	Upper Brazosport	Brazosport
Permit drilling of test well:				
Yes	88.7	86.7	89.5	95.8
Wouldn't care one way or the other	8.2	3.3	7.0	2.8
No	3.1	10.0	3.5	1.4
	<u>100.0</u> (N=256)	<u>100.0</u> (N=60)	<u>100.0</u> (N=57)	<u>100.0</u> (N=143)

$$\chi^2 = 15.14; \text{ sig.} = .02$$

Lease land for
geothermal development:

Yes	83.4	79.7	83.3	86.9
No	16.6	20.3	16.7	13.3
	<u>100.0</u> (N=283)	<u>100.0</u> (N=64)	<u>100.0</u> (N=66)	<u>100.0</u> (N=153)

$$\chi^2 = 1.95; \text{ sig.} = .5$$

questions do show, however, the highest degree of favorability among the Brazosport residents and the least among the middle-rural residents.

Length of residence in the area was directly related to willingness to permit test well drilling (table 5). Prior surveys show conflicting results on this point. Singh and Wilkinson (1974) report that length of community residence was not a significant factor in explaining favorability toward a pending watershed development project. Other studies have found that ranchers--long-term residents for the most part--are inclined to be opposed to resource development (Montana State Department of Natural Resources and Conservation 1974; Blevins et al. 1974; Schuller et al. 1975). French (1974) reports, to the contrary, that ranchers were more favorably inclined toward strip-mining than any other group in that study. It may be that community-specific factors intervene to make generalizations about length of residence and favorability toward a given project impossible. In the present case, it seems that the newcomers have less concern over developments in their area, as evidenced by the higher proportions of "wouldn't care one way or the other" responses.

Few differences in length of residence among the subareas were found, except for the eastern Brazoria/Galveston County section which had fewer long-term residents (60 percent with residences of six years or more) compared to the other sections (middle-rural, 73 percent; upper Brazosport, 76.5 percent; Brazosport, 74 percent).

Favorability toward the resource development is measured here by two questions, "If it were up to you, would you permit the drilling of a geothermal test well in the community where you live?" and "If you own land, would you lease that land for geothermal development?" The

Table 5

WILLINGNESS TO PERMIT DRILLING OF TEST WELL BY
LENGTH OF RESIDENCY IN STUDY AREA
(Percent)

	Length of Residency in Area:			
	<1 yr.	1-5 yrs.	6-10 yrs.	>10 yrs.
Permit drilling of test well:				
Yes	84.6	85.4	92.1	92.7
Wouldn't care one way or the other	15.4	10.6	5.6	3.3
No	0.0	4.0	2.2	4.0
	<u>100.0</u> (N=13)	<u>100.0</u> (N=151)	<u>100.0</u> (N=89)	<u>100.0</u> (N=275)

$$\chi^2 = 12.30; \text{ sig.} = .05$$

two questions appear to be measuring attitudes toward the resource about equally, since responses are consistent. Awareness of the resource (in terms of having heard about the resource) is significantly related to favorable attitudes, as can be seen in table 6. On both of the favorability questions, persons who were aware of the resource were significantly more likely to view it positively.

This finding is particularly interesting in light of a history of not involving citizens in energy-related developments early in the process. The assumption seems to have been that keeping people unaware of what was going on would thereby cut down on opposition. That strategy was, perhaps, not only unnecessary, but has in many cases backfired. When development plans are kept under wraps too long, local citizens may become irate at not being consulted. With prodding from regional or national environmental groups and other parties at interest, discontent can quickly develop into a force sufficient to delay or block the development. This point has been brought out several times as a factor impeding development of nuclear power plants (Jacks 1974; Jopling 1970). Before making too much of this finding here, it should be reiterated that a majority of citizens is favorable in any case, and that the difference may merely indicate possible trends to be considered in studying other areas of the country.

The data in table 7 also show a possible trend. Of those persons who were aware of the resource, those who gained their information through the mass media were slightly less likely to be favorable toward the development than were persons gaining their information through personal contact (friends, co-workers, neighbors, community clubs) or technical literature. The point should not be overlooked in future

Table 6

FAVORABILITY TOWARD GEOTHERMAL RESOURCE DEVELOPMENT
BY AWARENESS OF THE RESOURCE
(Percent)

	Heard about Geothermal:	
	Yes	No
Permit drilling of test well:		
Yes	95.1	86.7
Wouldn't care one way or the other	2.8	8.2
No	2.0	5.0
	<u>99.9</u> (N=246)	<u>99.9</u> (N=279)

$$\chi^2 = 10.8997; \text{ sig.} = .004$$

Lease land for
geothermal development:

Own land and would lease	34.1	27.7
Own land, would not lease	8.8	12.6
Don't own land, but would lease	54.4	52.2
Don't own land, would not lease	2.7	7.5
	<u>100.0</u> (N=261)	<u>100.0</u> (N=318)

$$\chi^2 = 10.27; \text{ sig.} = .01$$

Table 7
FAVORABILITY TOWARD GEOTHERMAL RESOURCE
DEVELOPMENT BY INFORMATION SOURCE
(Percent)

	Information Source:		
	Mass Media	Personal Contacts	Technical Literature
Permit drilling of test well:			
Yes	91.8	96.4	100.0
Wouldn't care one way or the other	4.9	1.8	0.0
No	3.3	1.8	0.0
	<u>100.0</u> (N=183)	<u>100.0</u> (N=55)	<u>100.0</u> (N=15)

$$\chi^2 = 2.597; \text{ sig.} = .6$$

Lease land for geothermal development:			
Yes	84.2	91.4	100.0
No	15.8	8.6	0.0
	<u>100.0</u> (N=202)	<u>100.0</u> (N=58)	<u>100.0</u> (N=15)

$$\chi^2 = 4.45; \text{ sig.} = .1$$

information-dissemination projects. That personal contact is a more successful way of informing citizens, as well as potentially more persuasive, is a point well documented in communications research (e.g., Havelock 1969).

Favorability as measured by both questions is highest in middle-age groups, roughly forty to sixty years (table 8). It should be remembered that awareness was also highest in roughly the same age groups. Similarly, on education it is the lowest category (grade school) that is both least aware and least favorable (table 9), although the number of individuals in that cell is too small to place high confidence in the finding. The direction of responses, however, is consistent with other findings reported here on the association between awareness and favorability.

Differences by income level buttress that position: persons at higher income levels are not only more aware of the pending development, but are significantly more favorable toward it (table 10). In sum, individuals were more favorably inclined toward the development of the geothermal resource if they were long-term residents, if they were aware of the resource, and if they were at higher income and educational levels.

Respondents were hesitant in predicting how others in the community would feel about geothermal development. When asked, "In your opinion, would other people in your community be in favor of the development of geothermal energy?" 45 percent of the sample responded "yes, most would," but 38 percent answered "don't know." Thirteen percent said "yes, a few would," and only 4 percent responded "no, most would not."

Table 8

FAVORABILITY TOWARD GEOTHERMAL RESOURCE
DEVELOPMENT BY AGE OF RESPONDENT
(Percent)

	Age:					
	18-29	30-39	40-49	50-59	60-69	70+
Permit drilling of test well:						
Yes	89.6	87.9	93.4	96.4	88.2	85.0
Wouldn't care one way or the other	7.8	8.4	3.3	1.8	10.3	0.0
No	2.6	3.7	3.3	1.8	1.5	15.0
	100.0 (N=77)	100.0 (N=107)	100.0 (N=122)	100.0 (N=110)	100.0 (N=68)	100.0 (N=20)

$$\chi^2 = 20.97999; \text{ sig.} = .02$$

Lease land for geothermal development:						
Yes	81.1	79.0	85.7	88.3	87.0	73.9
No	18.9	21.0	14.3	11.7	13.0	26.1
	100.0 (N=95)	100.0 (N=124)	100.0 (N=126)	100.0 (N=120)	100.0 (N=69)	100.0 (N=23)

$$\chi^2 = 6.87; \text{ sig.} = .2$$

Table 9

FAVORABILITY TOWARD GEOTHERMAL RESOURCE DEVELOPMENT
BY EDUCATION OF RESPONDENT
(Percent)

	Education Completed:					
	Grade School	Some High	High School	Some College	College Graduate	Grad. or Prof. Degree
Permit drilling of test well:						
Yes	64.3	93.0	94.1	91.4	92.9	88.5
Wouldn't care one way or the other	21.4	4.7	5.9	5.3	3.0	5.8
No	14.3	2.3	0.0	3.2	4.0	5.8
	<u>100.0</u> (N=28)	<u>100.0</u> (N=43)	<u>100.0</u> (N=102)	<u>100.0</u> (N=187)	<u>99.9</u> (N=99)	<u>100.1</u> (N=52)

$$\chi^2 = 29.36; \text{ sig.} = .001$$

Lease land for geothermal development:						
Yes	69.7	87.2	79.3	87.2	84.9	80.7
No	30.3	12.8	20.7	12.8	15.1	19.3
	<u>100.0</u> (N=33)	<u>100.0</u> (N=47)	<u>100.0</u> (N=116)	<u>100.0</u> (N=203)	<u>100.0</u> (N=106)	<u>100.0</u> (N=57)

$$\chi^2 = 13.91; \text{ sig.} = .03$$

Table 10
FAVORABILITY TOWARD GEOTHERMAL RESOURCE
DEVELOPMENT BY TOTAL FAMILY INCOME
(Percent)

	Income Category:		
	<\$15,000	\$15-29,999	\$30,000+
Permit drilling of test well:			
Yes	86.1	91.7	95.7
Wouldn't care one way or the other	8.9	5.3	2.2
No	5.0	3.0	2.2
	<u>100.0</u> (N=101)	<u>100.0</u> (N=303)	<u>100.1</u> (N=93)

$$\chi^2 = 5.93; \text{ sig.} = .2$$

Lease land for
geothermal
development:

Yes	76.9	84.5	88.5
No	23.1	15.5	11.5
	<u>100.0</u> (N=117)	<u>100.0</u> (N=336)	<u>100.0</u> (N=96)

$$\chi^2 = 5.73; \text{ sig.} = .05$$

In short, the findings here show that, although a large number of area residents were not aware of the geothermal energy potential, attitudes toward development of the resource appear to be highly favorable. In no group could strong opposition be identified. The data suggest, further, that increasing awareness of the resource will not lower levels of favorability. That last extrapolation must be considered together with the responses described below concerning environmental and other factors associated with the geothermal resource.

Advantages and Disadvantages of Geothermal Development

A majority of the respondents (63 percent) agreed that "The U.S. is running out of energy resources," with only 26 percent disagreeing and 11 percent responding "can't say." Sixty percent of the area citizens also agreed that "The nationwide need for energy must take priority over the desires of local residents in areas where energy resources are plentiful." Such a high level of agreement on that question may be due to the generally altruistic wording of the statement, and it may be doubted whether area residents would feel the same if specific disadvantages to their communities were at stake.

The apparent willingness to exploit local energy resources is probably related to the fact that a large majority (85 percent) of the respondents felt that oil and gas production had greatly benefited their communities. Brazoria County is highly dependent economically on its mineral resource base. As of the 1970 census, the county ranked fifth out of 254 Texas counties in median family income and two-hundred fortieth in terms of families below the poverty level. It was first in median earnings of males sixteen years of age and over. At the same time

the county ranked tenth in crude oil production and seventh in natural gas production. It was sixteenth in assessed value per acre. The data reported here indicate that area residents are aware of the energy-based infrastructure of their communities and are optimistic about continued developments. Almost three-fourths agreed that "Geothermal development would be a good thing for this part of Texas." This optimism is not restricted to geothermal development. More than 80 percent said they favored the proposed off-shore oil terminal (Seadock) to be built southeast of Freeport.

Belief that the general public would benefit from geothermal development was reflected in the 66 percent disagreement with the statement, "Only a few people, not the general public, will benefit from geothermal development." Still, a substantial number (22 percent) responded to this question with "can't say." The more specific the question with regard to geothermal, the greater the amount of uncertainty evidenced. While half of the respondents agree that "Economic and other benefits of geothermal development probably will outweigh undesirable environmental effects," 37 percent were unsure. Almost half were similarly unsure whether "The development of geothermal and other resources may lead to air and water pollution in this area," with the remaining responses fairly evenly divided between "agree" (22 percent) and "disagree" (29 percent). The uncertainty regarding environmental consequences of geothermal is not surprising since no wells have yet been drilled, and even the experts are unsure what the consequences will be.

When asked to respond to the statement, "If there were a shortage of water in this area, agricultural irrigation should have priority over

energy production and other industrial uses," responses were 36 percent agreement, 33 percent disagreement, and 30 percent undecided. Where trade-offs are involved, the respondents are not overwhelmingly on the side of energy production. These answers at first appear somewhat surprising given the declining agricultural base in Brazoria County. As of 1970, only 2.4 percent of the total labor force in Brazoria County was agricultural workers and in Galveston, 1 percent. Still, in cash receipts from agriculture Brazoria ranked thirty-second among Texas counties in 1973. Brazoria was thirty-fifth in percent of farmland under irrigation in 1970 and used 21.8 thousand acre-feet of water (much of the canal system is visible as straight lines in figure 1). This county has a long history of agriculture, and that sector has persisted as a major economic base in the county, waning only in the last decade. Employment forecasts show the agricultural sector continuing to decline to 823 workers in the year 2000 out of a total labor force of 76,266 (Barnstone et al. 1974).

Although the responses often reflected some degree of confusion and misinformation, a sizeable portion of the sample wrote in answers to two open-ended questions. Only about one-fourth gave no response to the questions, "What advantages (disadvantages), if any, do you think would result from geothermal development?" Ten percent of the responses to the advantages question and 16 percent of those regarding disadvantages were comments similar to "don't know enough about it." The advantages most frequently listed were that geothermal was another much-needed resource to help alleviate energy shortages (42 percent of the sample), that it would bring economic growth to the area (14 percent),

that it was a cheaper source which might lower utility bills or consumer prices (15 percent), and that it was less polluting than other energy sources (8 percent).

With regard to disadvantages, 18 percent anticipated air, water, noise, or land pollution as a result of geothermal development. Fourteen percent feared subsidence or earthquakes. Five percent saw overcrowding or too much rapid growth as negative aspects. These responses, together with the earlier reported uncertainty regarding environmental consequences, lead to the conclusion that it will be important to disseminate information to area residents about environmental possibilities as soon as reliable information is available. The over-all favorability toward the resource leads to the expectation that area residents will be amenable to working out solutions to environmental problems that may arise. The danger lies in not informing the local citizenry about potential problems, which tactic could well lead to hostility and delays in the development of the resource. Solutions worked out concurrently with or prior to development will be more satisfactory to all concerned than often insufficient remedial actions.

The majority of the respondents (59 percent) felt that private enterprise should have the responsibility for the development of the resource, with the remaining responses divided among county, state, and federal officials (table 11). This type of response is consistent with a long-standing tradition in this part of the country of opposition to "federal intervention" or bureaucratic control in general. An equally large majority (62 percent) agreed that their community should "receive outside funding and advice from state or federal governments to aid in

Table 11

PREFERENCES REGARDING RESPONSIBILITY
FOR GEOTHERMAL DEVELOPMENT
(Percent)

Whom would you prefer to have major responsibility for the
development of this resource?

Private enterprise	58.7
County officials	3.0
State officials	19.5
Federal officials	11.8
Combination of state, federal, and county officials/ other	<hr/> 6.9
	99.9
	(N=565)

developing the geothermal site." This conjunction of responses clearly implies that the Energy Research and Development Administration, as well as other federal and state agencies, will be most efficacious in promoting resource exploitation by working in a support role in cooperation with private industry and local governmental and planning entities.

Citizen Political Participation

Related to the above, a strong feeling exists among the residents surveyed that citizens should participate in community affairs and decision making (table 12). Eighty-six percent of the respondents said that they would be very or somewhat likely to try to do something about a regulation being considered unjust, even though they were not as optimistic about how much success they would have (see table 13). When asked how they would go about trying to influence decisions concerning the future of their community, 45 checked "work through informal groups, such as neighbors or friends," and 27 percent checked "work through an interest organization such as a business or environmental group." Only 11 percent left the question blank or said they would not try to influence decisions. With specific reference to the decision to build a geothermal test well in the area, respondents thought political leaders would have the most influence (73 percent responding "great deal" of influence), followed by environmental groups (53 percent), business associations (34 percent), local industries (53 percent), and themselves (6.4 percent).

Respondents appeared satisfied with the representativeness of their local leadership, if not with its adequacy and expertise. The data in table 14 indicate that the majority of respondents believed their community governmental leaders generally understood and respected their needs and

Table 12

ATTITUDES TOWARD CITIZEN PARTICIPATION
IN COMMUNITY AFFAIRS

	Agree	Disagree	Can't Say
It is really not necessary that most citizens participate actively in making important community decisions.	10.4%	83.6%	6.0%
If people took more active part in community life, the community would be a better place in which to live.	92.6%	2.3%	5.0%

Table 13

LIKELIHOOD OF PARTICIPATING AND
SUCCEEDING IN A COMMUNITY DECISION

Suppose a regulation were being considered by local
government officials that you considered unjust.

	Very likely	Somewhat likely	Not very likely
How likely is it that you would try to do something about it?	43.5%	42.4%	14.1%
How likely is it that your would succeed if you made an effort to change this regulation?	7.3%	46.2%	46.5%

Table 14
SATISFACTION WITH LOCAL LEADERS

	Agree	Disagree	Can't Say
Our local leaders generally understand and respect the needs and desires of the people who live here.	62.4%	24.7%	12.9%
Most of the decisions about the future of this community are made without considering the interests of the people who live here	26.4%	58.9%	14.6%
Administrators in this community have the training and expertise to cope with current problems.	36.6%	31.4%	32.0%

desires, and considered their interests in decision making. When asked, however, whether administrators in their community had the training and expertise to cope with current problems, responses were almost evenly divided among "yes" (37 percent), "no" (31 percent), and "can't say" (32 percent). When asked specifically about geothermal energy, 57 percent agreed that city and county governmental officials did not know enough about it to plan for development, with 37 percent undecided. In general, however, 27 percent rated local governmental planning as good, with the majority rating it as fair (60 percent), and 13 percent saying it was poor. Forty-nine percent felt that city and county governments did not have adequate financial resources to cope with sudden growth, with the remaining responses divided between disagreement (22 percent) and undecided (29 percent). These responses support the earlier conclusion that "advice and funding" from outside governmental levels would be accepted and even seen as necessary, but only to support community efforts to solve their own problems.

Community Satisfaction

On the whole, community satisfaction is exceedingly high in the study area. When asked how they felt, overall, about their community as a place to live, 36 percent said "excellent," 44 percent "good," 18 percent "average," and only 3 percent responded "below average" or "poor." The communities were viewed as changing, but still characterized by a small town atmosphere (table 15). Respondents considered their communities to be safe, uncrowded, quiet, pleasant, and relatively unpolluted. People in the communities, while not thought to be particularly close-knit, were considered helpful, friendly, and fairly homogeneous.

Table 15
PERCEIVED COMMUNITY CHARACTERISTICS
(Percent)

Points along a Continuum:						
	1	2	3	4	5	
Stable	7.2	10.7	25.3	26.0	30.8	Changing
People similar to me	14.2	27.6	39.7	13.7	4.7	People unlike me
Safe	26.6	31.8	22.6	12.9	6.1	Unsafe
Close-knit	8.9	15.0	42.7	19.5	13.9	Not close-knit
Uncrowded	22.1	23.9	34.3	13.3	6.4	Crowded
Friendly	24.5	36.3	26.9	8.5	3.8	Unfriendly
Helpful	21.8	34.9	28.8	10.6	3.8	People don't care about others
Small town Atmosphere	34.3	33.0	22.2	6.6	3.8	City atmosphere
Quiet	30.6	38.5	22.0	5.2	3.6	Noisy
Pleasant	33.4	38.3	19.9	5.9	2.4	Unpleasant
Unpolluted	19.6	27.6	25.5	19.2	8.0	Polluted

Satisfaction with specific services in the community is indicated in table 16. Although the majority of responses to each service were "satisfied" or "very satisfied," the greatest dissatisfaction was with recreational facilities, streets and highways, availability of housing, and telephone service. Personal experience in the area on the part of the investigators, together with the interviews of local leaders (see Part II), reveals that the respondents were correctly perceiving the major problems in their areas.

When asked which of the community services would be a problem if there were a sudden increase in population in the community, the majority of the sample felt that all services would be at least a minor problem (table 17). Fifty-nine percent noted that availability of housing would be a severe problem should such a population increase occur, and about half thought problems related to streets and highways and sewage treatment would be severe.

At the same time, little fear of rapid growth was evident, although respondents realized certain changes might be necessary to deal with potential problems. Only 27 percent of the sample agreed with the statement, "I would not like to see a lot of newcomers move into my community." The majority (48 percent) did not agree that, "The growth of this community as a result of geothermal development would produce too much congestion--too many cars, too many houses, and too many people." There was, however, substantial agreement (51 percent) with the statement, "In order to deal with rapid development, this community would probably need to study and perhaps change its tax structure."

Table 16
 SATISFACTION WITH COMMUNITY SERVICES
 (Percent)

	Very Satisfied	Satisfied	Dis- satisfied	Very Dis- satisfied
Fire protection	32.3	61.7	4.8	1.2
Telephone service	15.1	51.2	24.9	8.8
Medical care	21.1	51.3	21.3	6.4
Sewage treatment	14.7	61.3	17.1	7.0
Water supply	19.5	62.5	12.8	5.1
Zoning laws	10.1	60.0	22.6	7.3
Availability of housing	7.4	54.7	28.1	9.8
Garbage pickup/disposal	20.6	64.5	10.5	4.4
School system	35.9	50.6	9.7	3.7
Streets and highways	9.0	48.4	32.2	10.4
Police protection	19.7	66.5	10.6	3.2
Electric power service	22.8	66.6	8.9	1.7
Shopping facilities	16.5	60.3	19.3	3.8
Recreational facilities	11.1	44.4	31.8	12.8

Table 17
 PERCEIVED PROBLEMS IN COMMUNITY SERVICES
 WITH RAPID POPULATION GROWTH
 (Percent)

	No Problem	Minor Problem	Severe Problem
Fire protection	24.0	53.6	22.3
Telephone service	32.8	40.1	27.1
Medical care	23.6	41.0	35.4
Sewage treatment	14.7	42.8	42.4
Water supply	28.3	46.0	25.7
Zoning laws	27.2	48.5	24.3
Availability of housing	9.9	31.6	58.7
Garbage pickup/disposal	27.1	52.5	20.4
School system	30.3	45.2	24.5
Streets and highways	17.3	38.3	44.4
Police protection	29.7	50.9	19.4
Electric power service	45.1	47.2	7.6
Shopping facilities	42.4	38.1	19.5
Recreational facilities	21.8	39.4	38.9

The geographical area under study here already has experienced, and continues to experience, rapid growth and change. At present no one knows how much additional growth can be anticipated as a consequence of geothermal development. There will probably be no population influx associated with development of the test well, and only if auxiliary industry can expand to utilize geothermal by-products such as waste heat will growth directly related to this resource ever be significant. A new source of energy which, by its nature, is somewhat restricted to local use will be indirectly conducive to industrial and commercial expansion, however.

SUMMARY OF FINDINGS IN THE CITIZEN SURVEY

The results of the data presented in this part of the report can be fairly easily summarized. Local citizens appear to be highly favorable toward the development of geothermal energy in their area. Those attitudes may be somewhat contingent upon environmental effects since many of the respondents simply did not know what such effects might be. Vollintine and Weres (1976) reported similarly that in Lake County, California, residents were progeothermal provided that environmental impacts would be minimized. As information is disseminated in the Brazoria County area concerning possible environmental effects, favorability may weaken--depending, of course, on what the foreseeable effects are. On the other hand, it is safe to assume that for the most part local citizens will continue to be amenable to resource development if they feel that the environmental concerns are being taken care of. And, they are most likely to feel that way if they are well informed and involved in the planning process.

The dissemination of early, accurate information is probably the most important variable in promoting the development of the geothermal resource. The most effective way to proceed with that dissemination is to utilize local groups, local administrators, and local newspapers. More specific recommendations along these lines are outlined in Part III of this report. Residents should be informed about both the disadvantages (primarily environmental, but including a projection of incoming population as well) and the advantages. Misperceptions should be corrected; it is, for instance, unlikely that the exploitation of geothermal energy will contribute to lowered utility bills in the area, as some of the respondents anticipated.

The fact that satisfaction with community services is presently high means that it will be difficult to plan well enough and far enough in advance to maintain equally high satisfaction levels should population growth continue even at present rates. The area is on the verge--if not over in terms of housing and roads--of substantial difficulties with some services. The communities involved are, for the most part, small (the Brazoria County seat of Angleton was 10,000 in 1970, and many of the settlements close to the test-well site contain only 300 to 400 people) and particularly subject to difficulties in expanding services to meet expanding needs. Many area citizens favor additional growth and the economic prosperity that they perceive as accompanying that growth. At some point, however, growth can overwhelm the capacity of an area to absorb it, with highly negative consequences for the quality of community life. It will be important to help area planners identify "the point beyond which economic growth

becomes a negative rather than a supportive influence upon the attainment of other social goals" (Singh and Wilkinson 1974:423).

The respondents clearly indicated that they prefer planning and decision making be done at the local level, without federal or state interference. They do agree that funding and advice from such entities should be available, but at the request and discretion of area representatives. The counties are divided into several municipal governments, which are frequently in competition with each other, as is seen more clearly from the discussion in Part II. The establishment of an area-wide entity to deal as one with higher-level governments may not be possible.

PART II: SECTOR INTERVIEWS CONCERNING GEOTHERMAL DEVELOPMENT

INTRODUCTION

Previous studies have shown that the development of energy resources is characterized by different stages of public awareness and the emergence of conflicting interests (Jopling and Gage 1971; Nelkin 1971; and Gilmore 1976). This phenomenon is due in part to the long-range nature of resource development projects and the inattention that community groups are likely to give to delayed or future impacts. In the planning phases, for example, little information is given to sectors of the community not immediately involved. There is almost no discussion about competing resource uses, short-term costs versus long-term benefits, or preserving future options in the face of high initial commitments of capital. The result is a development process that is frequently brought to a halt, pending resolution of adversely affected interests.

The sector interviews in Brazoria County were designed to provide in-depth information about perceived risks and benefits associated with geothermal development. Eight major sectors--agricultural, financial, commercial, labor, industrial, governmental, environmental, and professional--were identified, encompassing parties at interest that would be affected either directly or indirectly as a result of producing geopressured geothermal energy. Of particular concern to the research team was sectoral awareness of geothermal power and attitudes toward coping with community growth problems that its development would entail.

SAMPLE SELECTION AND METHOD OF INTERVIEWING

Representatives from the eight sectors were selected on the basis of prominence or visibility. Local newspapers, political organizations, and state agencies with coastal zone responsibilities provided initial information on whom to interview. Later the field experience itself--including responses to a newspaper story about the project (see appendix C) served to identify additional interviewees.

The majority of interviews were conducted in actual work settings, with the occasional interruptions that one might anticipate. The interview sessions lasted from a half hour to two hours, depending on previous commitments and the interest developed in the topics discussed. Thirty-three individuals consented to be interviewed (see table 18); their comments were taped and later transcribed (see appendix D).

Each interviewee was told that his/her observations would be used in the final report to ERDA but that his identity would be concealed. A commitment was made to give each respondent a transcript of the interview.

SECTOR INTERVIEWS

Although no interview schedule was developed, the topics of conversation did conform to the six attitude dimensions of the survey questionnaire:

1. Awareness of geothermal energy
2. Favorability toward resource development
3. Community satisfaction
4. Perceived problems/benefits of geothermal development
5. Local political involvement
6. Attitudes toward local planning

Table 18

PROFILE OF SECTOR INTERVIEWS

Interview Number	Agricultural	Financial	Commercial	Labor	Industrial	Governmental	Environmental	Professional
1		X						
2						X		
3						X		
4								X
5	X		X					
6	X							
7								X
8	X		X					
9			X					
10			X					
11						X		
12	X		X					
13			X					
14						X		
15						X		
16		X	X					
17		X						
18			X					
19		X						
20	X							
21								X
22					X	X		
23		X						
24								X
25								X
26							X	
27							X	X
28				X				
29	X	X						
30					X			
31							X	X
32						X		
33					X	X		

Awareness of and Favorability toward Geothermal Development

In general, geothermal development is not distinguished from other forms of energy production. Almost everyone favors efforts to expand and diversify the energy resource base.

While there is an acute awareness in all sectors that the economy of Brazoria County is energy dependent, only the agricultural sector perceives itself as being directly and adversely threatened (see table 19). This attitude, however, should not be interpreted to mean that representatives of the agricultural sector are opposed to energy development. Quite the contrary, farmers and ranchers view all types of energy and mineral utilization as the wave of the future. Competing demands for land use will eventually displace agriculture, but except for the marginal farmer or rancher, the result will not be economically disadvantageous. Although rural life-styles and value systems will be strained, the prevailing attitude is one of resignation.

Environmental groups also favor the use of land for energy-producing purposes. While sensitive to the pollution of beaches, wetlands, and wooded areas, they genuinely feel that good environmental planning can be phased into the resource development process. Professionals--especially those in their thirties and forties--have an interest in better land use planning. But both younger and older professionals believe that technology and management can prevent or control the undesirable effects of an energy-intensive economy.

Representatives of the financial, commercial, labor, and governmental sectors are optimistic about exploiting the energy resource base of the country. Only the labor and governmental sectors show

Table 19
PERCEIVED RELATION TO GEOTHERMAL ENERGY DEVELOPMENT

Sectors/ Interests	Affected by Development			
	Directly		Indirectly	
	Beneficial	Adverse	Beneficial	Adverse
Agricultural		X		
Financial			X	
Commercial			X	
Labor	X			
Industrial	X			
Governmental			X	
Environmental			X	
Professional			X	

Note: In general, geothermal development is not distinguished from other forms of energy development.

concern over the provision of community services and the long-term effects of rapid growth.

The industrial sector has the greatest awareness of geothermal energy but is the least optimistic about its contribution to the energy future. The concern is not over the discovery of geopressured geothermal zones, but over the energy potential of the resource and the ability of industry to attract venture capital for its exploitation.

Community Satisfaction

Throughout the county there is a high level of community satisfaction, although much concern is expressed over the availability of housing, inadequate highways, and lack of recreational facilities. Communities with a relatively narrow tax base are aware that increased growth may place heavy demands on local revenues. But there is some confusion as to what needs to be done. An expansion of the tax base in the small towns and communities in the middle-rural and upper Brazosport areas would generate strong opposition from farmers and ranchers who believe they already carry an unfair share of the tax burden. Local vendors generally support increased taxes since additional revenues will mean better services. However, no consensus prevails as to future courses of action.

The incorporated cities are turning to the state and federal government to obtain assistance for waste treatment plants, water systems, highways, and recreational facilities. In most cases where outside funding is sought, however, detailed application forms of federal/state agencies create a sense of intense frustration.

The unincorporated communities pose problems of a slightly different order. Their chief concerns are with law enforcement and road maintenance. Both services are currently provided by the county. Law enforcement usually consists of a drive-through visit once a week by a deputy sheriff. Few attempts are made to prevent vandalism and forms of local harassment due to "motorcycle freaks" and "hot-rodders." By contrast, county road maintenance is more than satisfactory and is perhaps the main reason that such localities do not incorporate. Incorporation would mean loss of county services.

Community satisfaction appears to be highest in the Brazosport area, where the tax base is large and where the levels of education and professional training are the highest in the county. While most residents of the middle-rural and upper Brazosport areas are satisfied with their living conditions, medical services and shopping facilities are frequently mentioned, along with law enforcement, as in need of improvement.

Local Political Involvement and Attitudes toward Local Planning

Each of the sector interviews underscored the importance of political participation in resolving community and regional problems. While those in the middle-rural and upper Brazosport areas were aware of the relatively small size of their constituencies, there was a clear perception that general and special purpose governments respond to both ballot box pressures and active intervention.

The extent to which local governments are able to anticipate problems, however, depends on their financial and planning resources.

Within the incorporated cities that surround the huge mineral/energy industries, there is a desire to utilize industrial planning expertise. But the industries are reluctant to create "dependent communities," even though many of them encourage their employees to participate in community activities.

With the exception of Lake Jackson, municipal planning is severely handicapped by lack of properly trained staff. In many instances, the city secretary or an untrained layman is responsible for local planning.

The situation is further complicated by intense political rivalries among the cities of the Brazosport area. The political cleavages divide along occupational lines, with working-class communities showing considerable resentment of professional/managerial communities. The cities of the middle-rural and upper Brazosport areas are envious of the tax base of the coastal cities and would like to participate directly in the economic growth made possible by industrial concentration.

The industrial sector views the governmental sector as useful but inept. The prevailing attitude is one that favors stabilizing public demands (especially taxes) so that long-range planning can occur. To this end, the industrial sector stresses limited formal contact with local governments, as well as

1. Preventing double and triple taxation from both city and special purpose governments
2. Taking advantage of tax-exempt municipal bonds in financing pollution abatement

3. Participating in intercity contracts that permit annual payments in lieu of taxes for a specified number of years.

PART III: CONCLUSIONS AND RECOMMENDATIONS REGARDING CITIZEN ATTITUDES TOWARD GEOTHERMAL DEVELOPMENT

SYNTHESIS

Fewer than half of the respondents in the mail survey indicated that they had been aware of the geothermal resource before receiving the questionnaire. Given the minimal amount of information distributed about the resource, this can be viewed as a substantial degree of awareness on the part of local citizens. The in-depth interviews revealed, however, that the awareness which does exist is superficial, and that there is little understanding about the nature of the resource. Area residents are favorable toward energy developments and tend to be nondiscriminating about the type of development involved. The main concern is that the mineral resource base continue to be exploited through diversified activities so that economic growth and development can continue. Both the survey and the interviews showed that favorability toward geothermal development is high.

The study area is a region in transition from rural to urban status. The economy is expanding; population growth is high. Attitudes are shifting as well, with rural residents looking with nostalgia but also with resignation at the changes occurring. Satisfaction with community life is high, although the interviews revealed that some communities have more severe problems with their services than do others. A strong sentiment exists that future developments should be under local control, even though outside advice and funding are viewed as necessary.

Neither the survey questionnaire nor the sector interviews gave evidence that there is an awareness of the stages through which a large-scale energy technology moves. This fact may appear surprising in view of the oil boom of 1915, yet the memory of this event is all but forgotten. Each generation, it seems, is left the task of anticipating community impacts in the light of prevailing attitudes and expectations.

In Brazoria County large-scale energy technologies (including geothermal) are likely to have the greatest impact on small towns and rural communities that lie within a 20- to 30-mile radius of the development sites. This prospect is confirmed by recent studies of mine-mouth lignite plants in East Texas as well as case histories of energy-producing facilities in other parts of the country. Based on existing evidence, a typical geothermal scenario for Brazoria County can be described as follows.

SCENARIO

1. A decision is made (usually in the private sector) to develop geothermal energy
2. Requisite permits are sought from state air and water quality agencies
3. Federal permits are sought
4. The local press covers hearings held by state/federal permitting agencies
5. Little interest is generated

6. Permits are granted
7. Construction begins
8. A rapid influx of people creates problems that are too large and interconnected for the locality to deal with
9. The housing market is severely affected; demand quickly exhausts supply of rental and owner-occupied housing
10. Trailer parks spring up; new construction begins
11. Pressures build for an expansion of public services, especially water treatment and sewage disposal
12. The locality finds that it has insufficient revenues to expand public facilities
13. Land prices increase sharply as a result of residential and industrial demands
14. Fire and police protection begins to break down
15. Mortgage lending institutions in the locality exhaust lending reserves
16. There is a shift in the locus of business activity from a central business district to the outskirts of the locality; shopping centers are built to serve the new subdivisions and trailer parks
17. Relations between "old-timers" and "newcomers" are strained as schools, hospitals, etc., are found to be inadequate
18. Taxes and tax rates increase to pay for needed facilities
19. Reassessment of property valuation occurs
20. Retired and fixed-income residents suffer because of increased taxes

21. Traffic congestion increases, as do maintenance and construction costs
22. Jurisdictional problems arise between the locality and the county
23. Administrative apparatus of the locality and the county proves inadequate
24. Outside help is sought in the form of state/federal officials, consultants, etc.
25. Changes are made in personnel; new institutions are created where needed
26. Slowly an impact management policy emerges

As indicated by this scenario, the development of geothermal power as a large-scale energy technology will force communities to respond to new demands. To do so, local governing bodies must identify the impacts of energy development and devise methods for their mitigation. These adaptations cannot be made without (1) the creation of a planning structure, (2) the coordinated use of existing state and federal assistance programs, and (3) the creation of financial solutions to fill the gap between expenditures for expanding services and the incoming revenues that usually lag behind community growth needs.

RECOMMENDATIONS

An initial recommendation that can be made for the successful promotion of geothermal development is that relevant information be made available to area residents on a timely basis. Uncertainty exists about a number of facets of the development, including possible

environmental effects. A second recommendation involves the availability of planning expertise to local decision-makers and groups. Mechanisms to promote both of these pursuits are needed at the state level. If developed and formalized, they would be of value to many Texas communities--not only those proximate to geothermal resources, but those which might have coal-fired generating plants, nuclear power plants, or any number of other energy-related developments. A third recommendation underscores the importance of coordinating federal and state assistance for managing the impact of energy development.

1. Information Dissemination

The University of Texas at Austin has been mandated by the U. S. Energy Research and Development Administration to provide a speaker's bureau, through which the various researchers involved in the development of the geothermal resource could be available for local presentations. This effort should be made more active than passive. As results from the test well are available, local groups should be contacted about possible presentations. The city councils of the various communities in the site area meet once a month, and these meetings are effective forums for information dissemination. While there is not a great deal of cooperation among the various communities, the possibility of one or more joint sessions should be explored.. Such action would reduce the number of individual briefings required. The state is an appropriate locus for the initiation of these meetings and could serve as a conduit among the communities and the university and industrial personnel involved in test-well development.

In addition to city councils, other groups should be made aware of the speaker's bureau as well. Groups of government officials

(e.g., county judges, etc.) and elected officials (e.g., mayors) should be contacted about possible briefings, including site visits. Local clubs are another possibility. The mail survey showed a relatively high degree of citizen involvement in church and other voluntary associations. Forty-seven percent of the respondents indicated at least minimal participation in civic clubs; nearly 70 percent indicated participation in church groups. Union participation received a 30 percent response, farm associations 17 percent, and business associations 46 percent. All of these types of groups represent possible forums for citizen discussion.

Personal presentations are much more effective means of informing people than mass media campaigns. However, many citizens cannot be effectively reached except through the media. Seventy-one percent of the survey respondents who claimed to be aware of the resource reported getting their information through newspapers, television, and radio. Local newspapers and radio stations should have material made available to them for articles or programs on the resource development. This strategy is not meant to imply simply news releases, but formatted programs designed to reach specific sectors (e. g., farm radio programs, women-oriented daytime television programs, and so forth).

The sector interviews explored a number of possible forums for information dissemination and citizen input (see table 20), including public hearings, city council meetings, community group presentations, professional seminars, media presentations, workshops, task forces, conferences, and commissioners courts. Perceived effectiveness was high for city council meetings and community group presentations

Table 20

FORUMS FOR INFORMATION DISSEMINATION AND PUBLIC INPUT (BRAZORIA COUNTY)

Types of Forum	Objective					Perceived Effectiveness			
	Information/ Education	Identification of Problems/ Values	Alternative Ideas	Technical Assessment	Conflict Resolution/ Consensus	High	Medium	Low	None
Public Hearings		X			X		X		
City Council Meetings		X			X	X			
Community Group Presentations	X					X			
Professional Seminars	X	X					X		
Media Presentations	X			X			X		
Workshops	X	X	X					X	
Task Forces			X	X				X	
Conferences	X								X
Commissioners Courts		X			X			X	

and low to zero for workshops, task forces, commissioners courts, and conferences.

The on-going management function and operations research project at The University of Texas at Austin can provide a context for the initiation of formalized researcher-state-community information links. At present it is not clear where the responsibility for pursuing this activity lies. A meeting should be held to include university researchers, representatives of relevant state agencies--coordinated through the Office of the Governor (Coastal Energy Impact Program) or the Governor's Energy Advisory Council--and ERDA, encompassing, perhaps, the federal-state relations division as well as the geothermal division. Many of the state agencies are already represented on the advisory council for the university's geothermal research programs, and those representatives should be included. Other groups which might be added are the Texas Department of Community Affairs (TDCA)* and the Texas Education Agency. It should be obvious that a substantial amount of state initiative will be required to make the information programs successful.

2. Community Advisory Channels

A number of growth simulation models are available through regional councils of governments (COGs) that can provide useful learning experiences for city and county officials interested in transportation, housing, and water quality problems. The North Central Texas COG, for example, has field-tested an urban growth simulation model and an interactive population and employment forecasting model. The Houston/Galveston Area COG (which encompasses Brazoria County) is currently

*For some state agencies, including TDCA, local communities must request aid before action can be taken.

experimenting with a community analysis model and a regional simulation and systems control model.

Regular participation by county and city officials on the technical and executive committees of the COG (including local staff contact and briefing sessions with COG personnel) has established a rudimentary communications network. This network can be used for anticipating future growth due to geothermal and other energy-related developments.

The state has in existence several programs related to local planning. In many cases, however, local areas may not be aware that these planning functions are in motion (for instance, disaster evacuation plans). State efforts should be instigated to find out more precisely what kinds of information, and in what form, are needed at the local level. The sector interviews showed, for instance, that some local leaders felt a need for advice in writing grant requests for federal and state assistance. Other types of relevant advice might include estimates of incoming population, estimates of expenditures required for school and other service expansions, and information on possible funding alternatives for such expansions. At this point it is not clear where federal and state assistance is inadequate, since it appears that small communities do not know how to exploit the avenues already available.

The university-state-federal meeting recommended in the previous section would serve as an initiation point for this program as well. Two subcommittees could be created to report on state efforts already under way which could be utilized and to make further recommendations with regard to the speaker's bureau and the community advisory program.

The sector interviews revealed some interest on the part of city officials in joint projects with local junior colleges that could analyze problems and provide staff assistance to city professionals. A measure of sentiment was also shown for professional short courses (lasting two or three days) that could be offered by nearby community colleges for upgrading administrative and managerial skills.

3. Coordinating Federal/State Impact Assistance

Not only is the political structure of Brazoria County fragmented, but impact funds for coping with growth are divided among a number of federal and state agencies. The major part of available federal money is earmarked for transportation, housing, and water quality projects, although the recently passed Coastal Zone Management Act Amendments of 1976 offer financial assistance to mitigate the effects of specified energy developments (including geothermal) in coastal areas.

Additional federal money may be sought through comprehensive service grants in the Law Enforcement Assistance Administration (Department of Justice), open space grants (Department of Housing and Urban Development), and special education grants (Department of Health, Education, and Welfare). Federal support in the form of government loans and loan guarantees is provided under the program for essential rural community facilities (Department of Agriculture), the jail construction assistance program (Federal Housing Administration), and the coastal energy impact program (Department of Commerce).

State impact aid largely takes the form of participation in federal matching programs (primarily transportation) and, upon request, providing

local communities with planning expertise. In making impact assistance more effective, several options may be pursued, including the following:

1. Federal energy reorganization that takes into account funding networks for mitigating the effects of large-scale energy technologies
2. Simplifying and streamlining the grant application process
3. Creation of an area-wide decision framework that encourages full participation by all parties at interest in both the public and private sectors (See appendix E).

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Appendix A
MAIL QUESTIONNAIRE

THE UNIVERSITY OF TEXAS AT AUSTIN

CENTER FOR ENERGY STUDIES

AUSTIN, TEXAS 78712

Engineering-Science Building 143
(512) 471-7792 and 471-4946

February 22, 1977

Dear Citizen:

Strong indications exist that a new and unique resource called geothermal energy is located along the Texas Gulf Coast. This resource is made up of underground pockets of hot, highly pressured water at great depths. It is hoped that wells can be developed to bring that water to the surface for the generation of electricity, and for the separation of the natural gas that may be dissolved in the water. If the geothermal resource is developed, several communities along the Texas Gulf Coast could be affected. Researchers at the University of Texas in Austin are surveying residents about the possible development of geothermal energy in their area. The enclosed questionnaire asks for your opinion about several related issues. Your name was chosen at random from local telephone books, and will not be associated in any way with your answers. Please do not write your name on the questionnaire.

We hope you will feel free to give your frank and open opinions. There are no right or wrong answers to the questions. The purpose of this survey is to give the people of your area an opportunity to say how they feel about a development which concerns them.

The results of this survey will be given careful consideration by policymakers in deciding what to do in the development of the geothermal resource. As you can see, your response is important. The study will be available to decisionmakers at the national, state, and local levels, and to the public as well through the Center for Energy Studies. If you have any questions about this survey, please feel free to contact us at the above address or by phone in Austin (area code 512, 471-4946). A postage-paid envelope is included for your convenience in returning the questionnaire.

Thank you.

A handwritten signature in cursive script, reading "Sally Cook Lopreato".

Dr. Sally Cook Lopreato
Director, Social Systems
Analysis Division, CES

A handwritten signature in cursive script, reading "Marlan Blissett".

Dr. Marlan Blissett
Associate Professor,
L.B.J. School of
Public Affairs

The following questions ask about resource development in your area.

1. In what town do you live, or if you do not live in town, which community do you feel that you have the most contact with (shopping, work, school, and so forth)?

2. How long have you lived at your present location? _____

3. How long do you expect to remain in this community? _____

4. If you have lived at your present location five years or less, where did you live before?

County _____ State _____ Country, if not U.S. _____

5. Had you heard about the geothermal energy resource in the Gulf Coast area before receiving this questionnaire? Yes _____ No _____

6. If you had heard about this resource, where did you get your information? Please rank in order, with 1 being your most important source of information.

Newspapers _____	Co-workers _____	Relatives _____
Radio _____	Television _____	Church _____
Neighbors _____	Friends _____	Community clubs _____
Other (please specify) _____		

7. Whom would you prefer to have major responsibility for the development of this resource?

☐ Private enterprise
☐ County officials
☐ State officials
☐ Federal officials
☐ Other (please specify) _____

8. If it were up to you, would you permit the drilling of a geothermal test well in the community where you live?

☐ Yes
☐ No
☐ Wouldn't care one way or the other
☐ Don't know

9. If you own land, would you lease that land for geothermal development?

☐ I own land and would lease it for geothermal development.
☐ I own land, but would not lease it for geothermal development.
☐ I don't own land, but if I did, I would lease it for geothermal development.
☐ I don't own land, but if I did, I would not lease it for geothermal development.

10. In your opinion, would other people in your community be in favor of the development of geothermal energy?

☐ Yes, most would
☐ Yes, a few would
☐ No, most would not
☐ Don't know

For each of the following statements circle A if you agree with the statement, D if you disagree, and CS if you do not have an opinion on the item. There are no right or wrong answers; we are interested only in your opinion.

	<u>Agree</u>	<u>Disagree</u>	<u>Can't Say</u>
1. The U.S. is running out of energy resources.	A	D	CS
2. There will be no energy shortage as long as we are willing to work together to conserve.	A	D	CS
3. The nation-wide need for energy must take priority over the desires of local residents in areas where energy resources are plentiful.	A	D	CS
4. The oil and gas developments in this area have greatly benefited this community.	A	D	CS
5. This country should strive for greater economic growth even if it produces air and water pollution.	A	D	CS
6. Geothermal development would be a good thing for this part of Texas.	A	D	CS
7. If there were a shortage of water in this area, agricultural irrigation should have priority over energy production and other industrial uses.	A	D	CS
8. Economic and other benefits of geothermal development probably will outweigh undesirable environmental effects.	A	D	CS
9. Producing geothermal energy in this area will make the price of land go up.	A	D	CS
10. Only a few people, not the general public, will benefit from geothermal development.	A	D	CS
11. Local banks and merchants will benefit from geothermal development.	A	D	CS
12. The development of geothermal and other resources may lead to air and water pollution in this area.	A	D	CS
13. The big oil and gas companies are telling the truth about the energy shortage.	A	D	CS

Please write down any comments you may have regarding the following questions.

1. What advantages, if any, do you think would result from geothermal development?

2. What disadvantages, if any, do you think would result from geothermal development?

Below are further questions which allow you to express your opinions on the possible geothermal development.

1. How much influence do you feel each of the following could have on the decision to build or not to build a geothermal test site in this area?

	<u>Great Deal</u>	<u>Some</u>	<u>Very Little</u>	<u>None</u>
Political leaders	_____	_____	_____	_____
Environmental groups	_____	_____	_____	_____
Business associations	_____	_____	_____	_____
Local industries	_____	_____	_____	_____
Yourself	_____	_____	_____	_____

2. How well informed do you feel you are regarding energy matters?

☐ Very well informed
☐ Well informed
☐ Not well informed
☐ Know close to nothing about energy matters

3. Do you feel that enough information has been made available to you concerning energy matters?

☐ Yes
☐ No

4. Do you favor the proposed offshore oil terminal (SEADOCK) to be built 26 miles southeast of Freeport?

☐ Yes
☐ No
☐ Can't say

The questions below ask you to describe your community.

1. Overall, how do you feel about this community as a place to live?

Excellent _____ Good _____ Average _____ Below Average _____ Poor _____

2. For each pair of words in the following list, please indicate where along the scale you think your community fits. For example, if you feel your community is very unattractive, you would rank it as follows:

Attractive	1	2	3	4	5	Unattractive
Changing	1	2	3	4	5	Stable
People similar to me	1	2	3	4	5	People unlike me
Unsafe	1	2	3	4	5	Safe
Close-knit	1	2	3	4	5	Not close-knit
Crowded	1	2	3	4	5	Uncrowded
Friendly	1	2	3	4	5	Unfriendly
People are helpful to others	1	2	3	4	5	People don't care about others
Small town atmosphere	1	2	3	4	5	City atmosphere
Quiet	1	2	3	4	5	Noisy
Pleasant	1	2	3	4	5	Unpleasant
Polluted	1	2	3	4	5	Unpolluted

3. For the following list of services which are available in most towns and counties, please indicate how satisfied you are with each particular service for your community.

	<u>Very Satisfied</u>	<u>Satisfied</u>	<u>Dissatisfied</u>	<u>Very Dissatisfied</u>
Fire protection	_____	_____	_____	_____
Telephone service	_____	_____	_____	_____
Medical care	_____	_____	_____	_____
Sewage treatment	_____	_____	_____	_____
Water supply	_____	_____	_____	_____
Zoning laws	_____	_____	_____	_____
Availability of housing	_____	_____	_____	_____
Garbage pickup and disposal	_____	_____	_____	_____
School system	_____	_____	_____	_____
Streets and highways	_____	_____	_____	_____
Police protection	_____	_____	_____	_____
Electric power service	_____	_____	_____	_____
Shopping facilities	_____	_____	_____	_____
Recreational facilities	_____	_____	_____	_____

4. Which of the above community services would be a problem if there were a sudden population increase in your community?

	<u>No Problem</u>	<u>Minor Problem</u>	<u>Severe Problem</u>
Fire protection	_____	_____	_____
Telephone service	_____	_____	_____
Medical care	_____	_____	_____
Sewage treatment	_____	_____	_____
Water supply	_____	_____	_____
Zoning laws	_____	_____	_____
Availability of housing	_____	_____	_____
Garbage pickup and disposal	_____	_____	_____
School system	_____	_____	_____
Streets and highways	_____	_____	_____

- | | <u>No
Problem</u> | <u>Minor
Problem</u> | <u>Severe
Problem</u> |
|-------------------------|-----------------------|--------------------------|---------------------------|
| Police protection | _____ | _____ | _____ |
| Electric power service | _____ | _____ | _____ |
| Shopping facilities | _____ | _____ | _____ |
| Recreational facilities | _____ | _____ | _____ |
5. This community is too small and slow-moving.
 Agree _____ Disagree _____ Can't say _____
 6. There are not enough good jobs in this community.
 Agree _____ Disagree _____ Can't say _____
 7. If I had an opportunity to do so, I would move away from this community.
 Agree _____ Disagree _____ Can't say _____
 8. In order to deal with rapid development, this community would probably need to study and perhaps change its tax structure.
 Agree _____ Disagree _____ Can't say _____
 9. The growth of this community as a result of geothermal development would probably produce too much congestion--too many cars, too many houses, and too many people.
 Agree _____ Disagree _____ Can't say _____
 10. I would not like to see a lot of newcomers move into my community.
 Agree _____ Disagree _____ Can't say _____

The following statements have to do with decision processes in your community. Please circle the response which most closely reflects your opinion on each item.

	<u>Agree</u>	<u>Disagree</u>	<u>Can't say</u>
1. A person may lose friends if he or she gets involved in community issues	A	D	CS
2. It is really not necessary that most citizens participate actively in making important community decisions	A	D	CS
3. Decisionmakers in community affairs should be highly educated	A	D	CS
4. I do not like to work together with other people in groups or organizations	A	D	CS
5. Community decisionmaking should be done less by specialists and more by ordinary citizens .	A	D	CS
6. If people took more active part in community life, the community would be a better place in which to live	A	D	CS

		<u>Agree</u>	<u>Disagree</u>	<u>Can't Say</u>
7.	Elected officials in city and county government do not know enough about geothermal energy to plan for its development	A	D	CS
8.	City and county governments do not have adequate financial resources to cope with sudden growth	A	D	CS
9.	Our local leaders generally understand and respect the needs and desires of the people who live here	A	D	CS
10.	Average citizens could contribute much to important community decisionmaking if they had the free time to participate	A	D	CS
11.	The elected officials in this community should be held responsible if geothermal development has bad effects	A	D	CS
12.	Most of the decisions about the future of this community are made without considering the interests of the people who live here	A	D	CS
13.	Administrators in this community have the training and expertise to cope with current problems	A	D	CS
14.	This community should receive outside funding and advice from state or federal governments to aid in developing the geothermal site	A	D	CS
15.	How would you rate local governmental planning in your community? Good _____ Fair _____ Poor _____			
16.	Suppose a regulation were being considered by local government officials that you considered unjust. How likely is it that you would try to do something about it? Very likely _____ Somewhat likely _____ Not very likely _____			
17.	How likely is it that you would succeed if you made an effort to change this regulation? Very likely _____ Somewhat likely _____ Not very likely _____			

18. How would you go about trying to influence decisions about the future of this community? Please put a 1 by the first thing you would do, a 2 by the second thing, and so on.

☐ Work through informal groups, such as neighbors or friends.
☐ Work through a political party.
☐ Work through an interest organization such as a business or environmental group.
☐ Work individually by writing representatives and newspapers, or taking legal action.
☐ Take part in or organize public demonstrations.
☐ Other (please specify) _____
☐ Would not try to influence decision.

19. Please check whether or not you participate in any groups of the following kinds:

	Yes, active participation	Yes, but with minimal parti- cipation	No
Civic Clubs	_____	_____	_____
Environmental Groups . .	_____	_____	_____
Church Groups	_____	_____	_____
Business Associations . .	_____	_____	_____
Farm Associations	_____	_____	_____
Unions	_____	_____	_____
Other	_____	_____	_____

20. Have you ever held elected or appointed public office?

Yes _____ No _____

These final questions concern you and your family, but remember that your answers will be completely anonymous.

1. Are you presently employed?

Yes _____ No _____ Retired _____

2. Are you self-employed?

Yes _____ No _____

3. What is your main job or occupation? If unemployed or retired, give your last occupation. Briefly describe the work you do.

4. If you are married, is your spouse employed? Please leave blank if you are not married.

Yes _____ No _____ Retired _____

5. Is he/she self-employed?

Yes ____ No ____

6. What is your spouse's main job or occupation? Briefly describe the work he or she does.

7. What is or was your father's main job or occupation? Briefly describe the work he does or did.

8. What is your sex? Female ____ Male ____

9. How many children do you have? ____

10. In what year were you born? ____

11. What is the highest level of education that you and your spouse completed?

Self

____ No formal schooling
 ____ Grade school
 ____ Some high school
 ____ High school graduate
 ____ Some college
 ____ College graduate
 ____ Graduate degree

Spouse

____ No formal schooling
 ____ Grade school
 ____ Some high school
 ____ High school graduate
 ____ Some college
 ____ College graduate
 ____ Graduate degree

12. Please check whether you are:

____ White
 ____ Black
 ____ Mexican-American
 ____ Other (please specify) _____

13. In which of these groups do you think your total family income, from all sources, fell in 1976 before taxes?

____ less than \$5000	____ \$15,000 to \$19,999	____ \$30,000 to \$34,999
____ \$5000 to \$9999	____ \$20,000 to \$24,999	____ \$35,000 to \$39,999
____ \$10,000 to \$14,999	____ \$25,000 to \$29,999	____ \$40,000 or more

14. Do you own or rent your home?

Own (or buying) ____ Rent ____ Other (please explain) _____

15. If you own land besides your home in this county, approximately how many acres is that?

____ under 5 acres	____ 51 to 250 acres
____ 5 to 50 acres	____ 251 to 1000 acres
	____ more than 1000 acres

Thank you for taking the time to complete this questionnaire. Your effort will help make the opinions of those in your community known.

Appendix B

COMMUNITIES USED IN THE SAMPLE SELECTION, GROUPED BY AREA

COMMUNITIES USED IN THE SAMPLE SELECTION, GROUPED BY AREA
(with 1973 population estimates)

EASTERN BRAZORIA COUNTY/GALVESTON COUNTY

Alta Loma	1,530
Arcadia	215
Brookside Village	1,507
Friendswood	7,500
Hitchcock	5,565
La Marque	17,000
League City	16,000
Pearland	8,000
Alvin	12,500
Manvel	110
Algoa	135

MIDDLE-RURAL

Angleton	10,000
Danbury	820
Iowa Colony	210
Liverpool	340
Richwood Village	1,560
Rosharon	435
Bailey's Prairie	228
Arcola	60
Sandy Point	30
Bonney	30
Otey	318

UPPER BRAZOSPORT

Brazoria	1,745
Damon	375
Sweeny	3,210
West Columbia	4,317
East Columbia	95
Danciger	314

BRAZOSPORT

Churchill	100
Clute	7,500
Freeport	12,550
Jones Creek	1,268
Lake Jackson	16,000
Oyster Creek	635
Surfside	1,620
Old Ocean	915

Appendix C

NEWSPAPER ARTICLE ON ATTITUDINAL SURVEY IN BRAZORIA COUNTY

Energy development topic of study

By DEE McILHENNY

Plans by the Energy Development Resource Administration (ERDA) to drill two test geothermal wells in Brazoria County, between Liverpool and Danbury, sometime this spring have given rise to a unique study.

The study, headed by a team from the University of Texas Center for Energy Studies (CES) and

the LBJ School of Public Affairs, with funds from ERDA, is designed to pinpoint problems a developing energy source can create in a community before those problems arise.

Dr. Marlan Blissett, associate professor in the LBJ School, is in Brazoria County conducting interviews with various area residents and overseeing distribution of question-

naires in the county. Dr. Sally Cook Lopreato, director, social systems analysis division, CES, is also heading the survey.

Blissett said the study began "when we got to thinking about work on geothermal energy in Texas" and when the realization came that little attention was paid to community impact before development of an energy source began.

From the interviews and questionnaires, Dr. Blissett said, the team hopes to find "some of the impact others will feel. Our concern is to find the kinds of things that are on the minds of people which might be phased into the planning stages of energy development."

The study hopes to reveal, Dr. Blissett said, the impact another source of energy would have on an

already booming area, in particular on housing, schools, roads, government and environment.

"Nobody can come to grips with the magnitude of the problems," he said, "until somebody knows what they will be."

"For example, the community might have to go to some form of governmental structure that encompasses all of the

towns in the Brazosport area.

"Also, I don't see how the county alone can cope with the problems that will develop."

Calling Brazoria County highways "clogged like crazy," Dr. Blissett cited them as one example of an already existing problem that would be aggravated by additional growth (Please turn to P. 10, Col. 5)

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Study...

(Continued from Page 1) resulting from new energy sources.

"Something needs to be done to bring relief," he said in what he described as an "already major boom area."

The test wells will tap the huge geothermal stream that cuts across Texas, Dr. Blissett said, to see if there is a feasible source of energy there.

The water could be hot enough, he said, to

produce steam for electricity. There could be enough dissolved natural gas in the water for use or the water could be used as a heat source for industry.

"We won't know how important they are until they've been drilled and we get the results from the test wells."

Once the development of an energy source is under way, Dr. Blissett said, it is characterized by "different stages of public awareness and the emergence of conflict of interests."

This is due, in part, he said, to the long-range nature of resource development projects and inattention community groups are likely to give to delayed or future impacts.

"In the planning phases, for example, little information is given to sectors of the community not immediately involved."

"There is almost no discussion about competing resource uses."

short-term costs versus long-term benefits, or preserving future options in the face of high initial commitments of capital.

"The result is a development process that is frequently brought to a halt."

Blissett thinks it is possible to alter the pattern by community involvement in the planning stages and a campaign of public awareness during the predevelopment stages. Then, possible conflicts can be identified

and steps taken to prevent or correct them.

Awareness can be created by various methods, he said, of which the initial interviews and questionnaires are the first.

Later stages would include public assemblies and hearings, community group presentations, information seminars, media presentations, and visits from local energy agents.

Interviews are now being conducted. Dr. Blissett said, with various sectors or interest groups in the county, including finance, government, industry and environmental groups.

Also, questionnaires, some 3,000 of them, will be distributed to county residents asking their opinions.

Appendix D
SUMMARY OF SECTOR INTERVIEWS

Number 1: FINANCIAL SECTOR, WEST COLUMBIA

The financial community in West Brazoria is in favor of growth and is capable of supplying the capital needed for that growth. We should not be afraid of growth, but long-range planning is necessary if demands and services are to be coordinated. Both the local city government and the school district are working toward meeting growth impacts. Existing services are being improved or extended, and land for new facilities is being acquired. With growth, there will be increased financial demands made upon the local taxpayers. People are reluctant to approve new tax increases, but they must recognize that in order to keep in step with growth, adequate financing must be available. The local communities must look for help from the state and federal government for program and financial assistance in meeting the impacts of growth despite misgivings about red tape and external control.

Number 2: GOVERNMENTAL SECTOR, WEST COLUMBIA

The chief problem in growth management is financial. Growth demands exceed the capacity and willingness of the community to finance them. The financial investment cities must make to meet growth demands is recovered only over long periods. With continued escalating growth, it creates a hardship on taxpayers and city officials who must work to keep city costs as low as possible.

The city council can provide aggressive leadership in planning for growth. Our council is interested in long-range planning. In addition, we have passed an ordinance regulating mobile home locations and have inventoried residential housing, condemning those which are unsuitable for occupancy. The local council of governments is helpful in meeting growth needs.

Number 3: GOVERNMENTAL SECTOR, WEST COLUMBIA

There is a need in Brazoria County for planning for natural disasters, by both individual cities and the county as a whole. The existing highway system is not adequate to handle the traffic flow that would occur if evacuation of the area were necessary, as in case of a hurricane. The existing levy system cannot prevent the substantial flooding which would occur during a hurricane. Additional growth in the county would only escalate an already-serious problem.

Number 4: PROFESSIONAL SECTOR, WEST COLUMBIA

The community can manage growth and enjoy it, if it does not occur so fast as to overwhelm the citizens. This community is favorable toward energy development because energy is the economic base for this county and its population. We will lose our small town image as growth continues, and while we are in favor of growth, concern for preserving what is already here should be an integral part of planning for it.

Number 5: COMMERCIAL AND AGRICULTURAL SECTORS, DAMON

As this area develops, there will be population increases, probably more than we can handle. As the population grows, land values and taxes will increase, forcing out the agricultural sector. Since the land values are lower in this area than in the rest of the county, people are drawn to this community. Trailer communities are springing up, and the new residents are not participating in the community. Only a few of them even register to vote. This attitude of impermanence hurts our community. We do not receive adequate law enforcement services from the county, primarily because we are such a small community.

In order to plan properly for the anticipated growth, this community needs to incorporate. Although incorporation will eventually occur, in the past citizens have been opposed to it. They fear increased taxes and the loss of existing county services. Taxpayers already face increases for expansion and repair of our existing sewage and water facilities.

Number 6: AGRICULTURAL SECTOR, DAMON

People in the West Brozos are generally pro-energy development, but as a farmer, I am not in favor of growth. I like broad open space between me and my neighbor. When growth comes, I will have to move. With increasing growth, the burden of taxation is on the property owner. Other taxing mechanisms which spread the burden out across the community more equitably should be developed. The farmer cannot afford to own his own land any more.

Number 7: PROFESSIONAL SECTOR, DAMON

Growth brings in people with a different philosophy and a different value system than what is found in the rural area. This change is disruptive to our way of life. It affects the traditional quality of life in our community. This is particularly evident in our school system, where low academic standards and permissiveness are rampant. While this situation is a disservice to the students, there is no movement for improvements from the school board or the population.

Number 8: AGRICULTURAL AND COMMERCIAL SECTORS, DAMON

While I am not knowledgeable about geothermal energy resources, this county is highly favorable to energy development. The land is

available for additional growth; we just need to get investors into the smaller communities to build. People are moving to our community, and since housing is not sufficient, trailer parks have been established. Many of these people are not permanent and do not make any contribution to the community.

We are envious of the more prosperous communities in the county because they have money and we have to fight for the taxes to run our schools and cannot even afford to incorporate. If more and more businesses come into the community, we will have to incorporate. At present we need to improve and expand our water and sewage facilities and to make improvements in county law enforcement capability for this area. Because of our small population, we do not receive adequate service from the county in this area despite increased vandalism.

Number 9: COMMERCIAL SECTOR, DAMON

I am in favor of growth for our community and have been for years. Although this community was an oil boom town at one time, it has been static for years. Now we are beginning to experience some growth. This will put substantial demands on our water supply, which has always been a problem because of saltwater contamination. People here do not favor incorporation because they feel it would cost them money and they would lose the services that the county presently provides.

Number 10: COMMERCIAL SECTOR, DAMON

The land needed to handle additional growth is not available. Purchasing the land is very difficult because either the owners are not willing to sell, the title to the land is unclear, or the title is held

by numerous people. Some of these land-acquisition difficulties are the result of the original oil boom which occurred in the early part of this century.

Number 11: GOVERNMENTAL SECTOR, WEST COLUMBIA

Growth is very exciting for this community. I am very excited about what could happen. The old-timers in this community were opposed to growth for years. Without the needed land we could not grow, but now that is changing. Growth, however, puts heavy demands on the existing water and sewage facilities. Expansion of these services is necessary. Other services, such as medical services, need attention. This area needs one large hospital capable of providing good service rather than a proliferation of small hospitals. The lack of population and the inability to cooperate have prevented this consolidation in the past.

Number 12: AGRICULTURAL AND COMMERCIAL SECTORS, DAMON

People in this area are very much in favor of continued and increased energy development. I am not sure how this community will be able to cope with growth. I would like to see it grow. I can see there ought to be some planned growth, and unless the town incorporates, I don't know how we are going to do any planning. People are afraid of incorporation because of the city taxes that will accompany such development.

Number 13: COMMERCIAL SECTOR, WEST COLUMBIA

This community and its city council are in favor of energy development because we realize we are going to need additional energy. Although there has been conflict in the past over the issue of growth,

this is less true today. The business community realizes it will benefit from additional growth. Realizing that rapid growth creates additional demands on city services and city facilities, we are prepared to meet this challenge. The most important problem we face in meeting growth needs is additional housing. We need to improve and expand our city services, such as water and sewage. A bond issue was just approved for such purposes.

Communities in this area identify themselves as the West Brazos. This identification gives us more political clout in the county than we would have individually. On the county level there is a real need to improve our highway system.

Number 14: GOVERNMENTAL SECTOR, WEST COLUMBIA

The most urgent planning need is in those areas that have experienced rapid urban growth in the last five years. The commercial business sector has shown the greatest increase and is branching into the residential sector. Although we have building codes, we do not have any zoning or land use controls. We do have a mobile home ordinance, but this applies to only one part of the residential sector.

At present adequate planning is going into water and sewage disposal facilities, but in the future much more planning will have to be done to balance urban growth with environmental protection. Currently I am the total planning staff. In projecting future demand for city services (water, streets, waste disposal, etc.), one is led to the conclusion that managing urban growth requires a planning capability that is adequate to the task.

Number 15: GOVERNMENTAL SECTOR, ANGLETON

The people in Brazoria County are favorable toward any type of development with no questions asked about the possible adverse effects of such development. Historically the county has been probusiness, and this attitude continues to this day.

The industrial sector is very powerful in county and city government, in county and city politics, and in state politics where the county is concerned. Cities and counties are directly affected by the sales and property taxes from the industrial sector. Employment and subsidiary industries are dependent upon the major industries in the county also.

Growth in the northern part of the county is affected by its proximity to Houston. Patterns in housing construction are also affected by flood plain insurance provisions which encourage growth in areas of the county above the flood plain.

Before geothermal energy is ever developed for commercial purposes, environmental considerations such as subsidence and underground water flow patterns must be taken into consideration. Land use patterns will change as agricultural lands are developed for commercial and industrial purposes. These changes will alter the character of the county. Moving away from dependence on the land will mean an exploitation rather than conservation of the land and its resources. The industrial, commercial, and agricultural sectors all work together in opposition to government-imposed land use regulations.

Planning and cooperation in Brazoria County are hindered by geographic divisions within the county. Fragmented special purpose and general purpose government units retard planning, but consolidation is

viewed as a loss of independence and authority by individual cities, allowing strong special interests to have more access. It is politically inexpedient for elected officials to advocate such a position. Regional governments are not seen as having much immediate use. If planning potential could be identified, and if there were ordinance-making provisions, the county government could lead in planning for growth.

Number 16: FINANCIAL AND COMMERCIAL SECTORS, LAKE JACKSON

Anything that can be done to develop more energy in a sensible manner should be done. Land to meet growth requirements is available if undue environmental constraints are not placed upon its development. The growth can take care of housing problems. Highway needs are critical but can be solved with sufficient funding and state interest.

Number 17: FINANCIAL SECTOR, LAKE JACKSON

Any new energy source in this era of energy shortages would be good for the local communities and the local economy, provided that it was cost competitive with other forms of energy and that it was not so environmentally harmful as to take away its economic advantages. However, local awareness of geothermal resource potential is minimal.

The county is prepared to handle growth from geothermal development although there is a need in the area for common government, which would result in better planning. The problems of growth are well known because this area has experienced rapid economic development in the last twenty to forty years. The advantages of growth outweigh the disadvantages. Housing and highways are two critical areas. Additional construction is needed in both areas. Residential and commercial construction lags

behind demand, and the lending capital from local financial institutions is shortest for such construction. Local financial institutions are capable of handling demands for additional capital. Since Brazoria County is a capital-short area, local financial institutions must use funds from capital-long areas (capital surplus) of Texas and other states. Federal programs are also needed to meet growth demands.

Number 18: COMMERCIAL SECTOR, LAKE JACKSON

In any resource development, communications are extremely important. The local newspapers are not effective in disseminating information because either the information presented is too complex or it has to compete with other news articles and other interests. Information on geothermal development should be communicated in as simple a way as possible so that people will understand how it will affect their lives. There should be opportunities for people to communicate their opinions. The opportunities could be provided through opinion surveys which are clearly and simply written.

Number 19: FINANCIAL SECTOR, LAKE JACKSON

The financial community favors energy development because we need to diversify our sources of energy, particularly since energy resources are the basis of this county's economic development. On the basis of prior experience with growth, the banking system can handle additional growth without any problems although outside sources of capital will be utilized. Long-range, coordinated planning is difficult to achieve when responsibility for such planning is lodged in the many different city governments in the county. However, there is a feeling of optimism that

solutions to growth problems can be devised for such long-range planning. Any planning that occurs should involve local government. The local city government reflects the value systems of its particular population although the business sector may be underrepresented. The reason is that active political participation may be perceived as adversely affecting the businesses. Local government rather than state or federal government should take the lead. Often federal or state government intervenes without consulting local government or ignores local wishes. This practice should stop.

Number 20: AGRICULTURAL SECTOR, ANGLETON

Geothermal resource development is too new for the average farmer to understand its potential effects. While it could provide additional and perhaps cheaper energy sources which would be advantageous to the farmer, the possible negative environmental effects could be harmful to his way of life. With growth comes pressure for land development, which will result in the loss of agricultural lands and the displacement of the farmers. Growth is beneficial to the area, however, because growth is a prerequisite to a strong economy. There is a prodevelopment attitude in this area, and the local governments are doing a good job in working to provide adequate services to meet these growth demands.

Number 21: PROFESSIONAL SECTOR, LAKE JACKSON

Energy is vital to the survival of the southern part of Brazoria County, but an understanding of the possible contribution of geothermal energy is unknown. The ability of the people in the Brazosport area is not adequate to plan for growth. Part of the problem here is that those

who own the land and control its development are not necessarily local people. Realization of this fact is generating some concern in the community, particularly among younger professionals and landowners. While they will benefit economically from the growth that will take place, they are concerned about the way that growth will take place. They are concerned with trying to get a grip on growth and to save or preserve something of the environment. This concern is not uniform among all local landowners, and it is creating some tension. The concern is not over growth itself, but over the management of that growth. This concern is not present in the other cities in the area.

Number 22: GOVERNMENTAL AND INDUSTRIAL SECTORS, LAKE JACKSON

Geothermal development could have some beneficial results for local governments if it could be utilized for the provision of city services such as the heating of water and homes. Comprehensive, coordinated growth planning is hindered by the heterogeneity of the different communities in the area. This fact reflects the different value systems within particular communities and different levels of willingness to support city services and planning efforts to meet growth demands. The composition of the different communities is evident in the differing amounts of authority given to city governments to handle growth problems. In Lake Jackson, the city council is able to keep up with growth needs because the value system here supports this power. It is still difficult, however, to provide city services and planning and to balance these against the level of support taxpayers are willing to provide. This problem is faced by all the communities in the county.

Number 23: FINANCIAL SECTOR, LAKE JACKSON

My knowledge of geothermal resource potential is limited, but this area is highly dependent upon energy resources. It is of vital importance to this area to use any reasonable approach to producing power. The financial sector has been able to supply capital to meet growth needs, particularly through the development of outside sources of funds in capital surplus areas.

There is a positive attitude concerning growth and the ability of the area to cope with future growth. Most of the people who came to this area were attracted by the dynamic growth potential of the area. While the Brazosport area is really one economic unit, there is no common government although attempts have been made in the past. Intercity rivalries have prevented such unification and will probably do so in the future. Therefore, the many municipal governments must cope with growth problems individually. The two most pressing are housing shortages and highway inadequacies.

Number 24: PROFESSIONAL SECTOR, LAKE JACKSON

The lack of permanence results in community instability. There are no longer established institutions and families which serve as sources of influence and opinion. There is no local culture or tradition. The Brazosport area is different from Angleton, Sweeny, and West Columbia, where old families are still involved in the local economy. Growth planning is hindered by the fragmentation of governmental units. It is easier to promote rivalry than unity and cooperation in this area. The local newspaper is exclusively preoccupied with local government and does not provide adequate coverage of state, national, or international news.

Number 25: PROFESSIONAL SECTOR, LAKE JACKSON

The attitude of transiency in this area is fed by the number of weekend homes located here. The owners live and work elsewhere during the week, a fact that causes tremendous transportation problems. In addition, 25 to 30 percent of the population are construction workers involved in remodeling or expanding the economic base. This factor creates an attitude of impermanence.

Descendants of pioneer families are involved in county and municipal government. The only way common government could be achieved for this area would be as the result of a tragedy such as a hurricane or as the result of the loss of the economic base. Local government tends to be reactive rather than planning-oriented. There may be some advantage in the lack of common government. While this is a slow method of meeting growth problems, the fact that all interested parties must be acknowledged and consulted is beneficial. The county is divided into distinct geographical units. One of these divisions is the East Brazos/West Brazos split.

Primary problems of growth in this county are housing and transportation. Another critical problem is solid waste disposal. It is difficult to site areas because of the terrain. It is also a problem to find locations remote from the population. Another problem is the unrecorded subdivisions in rural areas. These are not controlled and are without proper utilities, streets, and sewage facilities. Part of the problem results from stringent ordinances on mobile home parks within the municipalities.

Number 26: ENVIRONMENTAL SECTOR, LAKE JACKSON

Our family moved to this area because of the high growth projections. This region is generally part of the southern growth phenomenon, but a

significant question for this area is the future effect of the energy crisis. Growth management is critical in this area, particularly in the unincorporated parts of the county where there is a need for control of development, particularly sewage and septic tank ordinances. The county is split into geographic units. The north end of the county is oriented toward Houston and not to the southern area. One common feeling in the county is hostility toward federal intervention. This feeling transcends all sectors. All are concerned with local control, even though it is often difficult for people to define this precisely.

Number 27: ENVIRONMENTAL AND PROFESSIONAL, LAKE JACKSON

Lake Jackson differs from other cities in the county. There are no pioneer families in Lake Jackson in contrast with the rest of the county, where more traditional and older families dominate. The problem of impermanence and transiency is reflected in the staffing of the local newspaper and in the quality of construction occurring in the area. Housing quality is lacking. We are creating instant slums. The state and federal elected representatives and the regional councils of governments do not seem to be effective in helping the county meet its problems.

Number 28: LABOR SECTOR, LAKE JACKSON

There is a concern over future energy supplies in this county, and geothermal energy, provided there were no negative environmental effects, could help contribute to that future supply.

Transportation and housing are two of the biggest concerns in this area. The highway system cannot adequately and safely handle existing traffic, and in the event of a natural disaster such as a hurricane, there would be severe evacuation problems. There is a need for more attention from the state on this matter. Housing contributes to the highway problems because the lack of adequate housing in the immediate area means that people must commute over long distances. While private enterprise is primarily responsible for housing developments, there is a need for federal programs to assist in low-income housing. There is also a lack of housing for retired people. The flood disaster control plan at present is contributing to the housing shortage because there is a slowdown in building until legal challenges are resolved.

In this area, which is already a high growth area, there is an attitude of impermanence. People did not expect to remain here long and as a result did not plan for retirement in the county. There is a need for the city and county governments to plan for temporary large population increases from construction work forces engaged in building large projects.

Common government for the Brazosport area is needed. Growth will be hampered until there is adequate and coordinated organization and planning to meet the growth needs. This would mean consolidation of city governments and a reorganization of county governments. Area problems can only be handled adequately by area government, and at present they are hindered by political and jurisdictional rivalries.

Number 29: AGRICULTURAL AND FINANCIAL SECTORS, LAKE JACKSON

People in Brazoria County are aware of the geothermal resource, but are not knowledgeable about the specifics of its development and its

impacts on the county. The area, however, is highly favorable to energy diversification because this area is highly dependent upon energy and will suffer economically from any lack of energy resources. This resource should be developed by private enterprise if it is possible.

The planning capability to meet present problems such as transportation problems and future growth problems is handicapped by the presence of many individual municipalities in the area. Consolidation would better enable them to plan, but it is opposed by the cities. They do not want to lose their independence. A major impetus for consolidation is the lack of tax base in some of the smaller communities, with the result that they merge with larger municipalities. The financial institutions in the county are well prepared to handle growth needs and have developed avenues outside the area to bring in the additional capital necessary for growth.

Number 30: INDUSTRIAL AND ENVIRONMENTAL, LAKE JACKSON

The pace and volume of growth are incremental. The people in Brazoria County have become accustomed to the increasing scale of development and growth. The public and private sectors in Brazoria County are intermingled. The large companies are knowledgeable about the growth that results from economic development. They are aware of the problems that can result and are ready to inform and consult with local communities about the impacts of economic development. The sizable taxes paid by large companies create an interest in and a concern for community growth. There is also a philosophy in Brazoria County that encourages private initiative and discourages excessive reliance on local governments in dealing with local problems. The low temperatures

of the geothermal resource make commercial utilization unlikely. This opinion is based on existing information which prior drilling and research in the county have produced.

Number 31: ENVIRONMENTAL AND PROFESSIONAL, LAKE JACKSON

Much of the planning in Brazoria County occurs within the private sector. People in this county do not take advantage of the opportunities that do exist for participating in future planning.

Housing shortages and a lack of adequate highways are the major problems in the county. There is a lack of low-cost housing in the area, and the high demand in the housing market has pushed up the price of houses. There is an outward migration north from the older communities in southern Brazoria County.

Roads in this county are built to cause development, not to serve it. The lack of planning has resulted in an inadequate system. Older people are particularly affected by the isolation resulting from a dependence on the automobile and lack of a mass transit system.

Number 32: GOVERNMENTAL SECTOR, ANGLETON

In our city for years there was opposition to growth. Now we are moving away from that attitude, realizing that we can benefit from growth if it is handled properly. Planning that projects into the future is absolutely necessary because it takes so long to accomplish anything. The very slowness of working with state and federal agencies to receive financial assistance creates citizen disillusion. Not enough attention is paid by these levels of governments to local needs and to local perceptions of community problems. For instance, agencies

often base program allocations on population projections that are vastly out of sync with actual local population trends. People tend to view growth in a positive fashion, and it is only after growth is under way that the negative problems surface. There must be a better perception of the impacts of growth. The councils of governments are distrusted by many local governments, but if the local governments would make them work, they could be our best area representative to other levels of government.

Number 33: GOVERNMENTAL AND INDUSTRIAL SECTORS, ANGLETON

Whether growth comes as a result of geothermal development or industrial growth elsewhere in the county, we have to find better and quicker ways to cope with growth pressures. Growth is good if it does not come faster than we can accommodate it. We need better coordination of existing programs. The councils of governments must have authority if they are to function well, but many cities fear giving them too much power.

Appendix E

PARTIES AT INTEREST IN BRAZORIA COUNTY THAT SHOULD BE
INCLUDED IN AN AREA-WIDE DECISION FRAMEWORK

1. General Purpose Governments
2. Special Purpose Districts
3. Regional Planning Entities
4. Principal Taxpayers

1. GENERAL PURPOSE GOVERNMENTS

<u>County</u>	<u>Cities</u>	
	<u>Incorporated</u>	<u>Unincorporated</u>
Brazoria	Alvin	Bonney
	Angleton	Damon
	Bailey's Prairie	Danciger
	Brazoria	East Columbia
	Brookside Village	Old Ocean
	Clute	Otey
	Danbury	Oyster Creek
	Freeport	Rosharon
	Hillcrest Village	Sandy Point
	Iowa Colony	Surfside
	Jones Creek	
	Lake Jackson	
	Liverpool	
	Manvel	
	Pearland	
	Richwood	
	Sweeny	
	West Columbia	

2. SPECIAL PURPOSE DISTRICTS

Alvin Independent School District
Alvin Junior College District
Angleton-Danbury Hospital District
Angleton Drainage District
Angleton Independent School District
Blue Water Municipal Utility District
Brazoria County Conservation and Reclamation District #3
Brazoria County Drainage District #4
Brazoria County Drainage District #5
Brazoria County Fresh Water Supply District #1
Brazoria County Mosquito Control District
Brazos River Authority
Brazos River Harbor Navigation District
Brazosport Independent School District
Brazosport Junior College District
Commodore Cove Improvement District
Damon Independent School District
Indian Springs Utility District
Iowa Park Municipal District
Oak Manor Municipal Utility District
Pearland Independent School District
Sweeny Hospital District
Sweeny Independent School District
Treasure Island Municipal Utility District
Varner Creek Utility District
Velasco Drainage District
Waters Davis Soil and Water Conservation District #318
West Brazoria County Drainage District

3. REGIONAL PLANNING ENTITIES

Houston/Galveston Area Council of Governments

Houston/Galveston Health Systems Agency

Regional Education Service Center

4. PRINCIPAL TAXPAYERS

<u>Taxpayer</u>	<u>Type of Business</u>
Alvin State Bank	Bank
Amoco Petroleum Company	Oil and gas
Barta Brothers Butane Company	Butane distribution
Barta Brothers Gin Company	Cotton gin
Coastal States Crude Gathering Company	Pipeline
Dow Badische Chemical Company	Chemical plant
Dow Chemical Company	Chemical plant
Exxon Oil and Refining Company	Oil and gas
First Freeport National Bank	Bank
First National Bank (Alvin)	Bank
First State Bank (Danbury)	Bank
Fort Bend Telephone Company	Telephone utility
General Crude Oil Company	Oil
Houston Lighting and Power Company	Electric utility
Houston Natural Gas Company	Gas utility
The MacDonald Family	Oil
Missouri-Pacific Railroad Company	Railroad
Mobil Oil Corporation	Oil
Monsanto	Chemical plant and pipelines
Nalco Chemical Company	Chemical plant
Phillips Petroleum Company	Oil
Phillips Pipeline Company	Pipeline
Shell Oil Company	Stabilization plant
Southwestern Bell Telephone Company	Telephone utility
Texaco, Incorporated	Oil
Texas Eastern Transmission Company	Pipeline
Union Oil Company of California	Oil

Source: Texas Municipal Reports, Municipal Advisory Council of Texas,
Austin, Texas, 1973-1975.