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**GEOHERMAL ENERGY IMPACT IN BRAZORIA
COUNTY**

Final Report, July 15, 1978—November 30, 1979

June 1980

Work Performed Under Contract No. AS08-78ET27032

Alvin Community College
Alvin, Texas

U. S. DEPARTMENT OF ENERGY
Geothermal Energy

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GEOTHERMAL ENERGY IMPACT IN BRAZORIA COUNTY

FINAL REPORT
FOR THE PERIOD

15 JULY 1978 TO NOVEMBER 30 1979

SUBMITTED BY
BILL HORINE

JUNE, 1980

WORK PERFORMED UNDER CONTRACT

DE-AS08-78ET27032

ALVIN COMMUNITY COLLEGE
3110 MUSTANG ROAD
ALVIN, TEXAS 77511

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ABSTRACT

All activities performed by Alvin Community College and the University of Texas at Austin in association with the development of Geopressured-Geothermal energy are contained in this report. A discussion of the progress of the Test Well is also contained herein. Public seminars and workshops were presented to the local community. A summer intstitute in energy was also presented to local public school teachers. A campaign to publicize the development of the new energy resource was also waged. An overall evaluation of the project is also attached.

GEOPRESSURED-GEOTHERMAL ENERGY IMPACT IN BRAZORIA COUNTY

FINAL TECHNICAL PROGRESS REPORT

When it was decided that a Geopressured Geothermal Energy test well was to be drilled on Chocolate Bayou, the Social Science division of the Center for Energy Studies at the University of Texas at Austin began a survey of local citizens. The results of the survey indicated that residents of Brazoria county, while not exceptionally well informed regarding impacts of energy development, were generally interested in such matters. (see Tables 12-17 of Geothermal Energy Brochure in Appendix) The need was recognized for a means of educating the general public to the phenomenon of Geopressured-Geothermal Energy. It was also concluded that there was a genuine concern on the part of local officials and planners regarding the rapid growth that could accompany any energy development in Brazoria county.

On July 7, 1978, the drilling was begun by General Crude Oil Company on their land near Chocolate Bayou about five miles south of Alvin. The dedication of the Pleasant Bayou Test Well #1 was well attended by supporters of the project. A few of the dignitaries present were U.S. Congressman Bob Gammage, State Representative Jerry Benedict, State Congressman Jake Pickle, and representatives of the Department of Energy, the University of Texas, and General Crude Oil Company. The dedication was accompanied by a meeting of the Brazoria County Cities' Association at

Alvin Community College at which local government officials were briefed on the geopressured-geothermal resource.

Shortly after the spudding of the test well, the Department of Energy approved a proposal submitted by Alvin Community College related to the drilling of the well. This proposal, entitled "Geopressured-Geothermal Energy Impact in Brazoria County", included the establishment of a communication network within Brazoria County to disseminate information about the test well. A second aspect of the project included the presentation of programs on energy, growth planning, and geopressured-geothermal energy to local interest groups, educators, and government officials. In short, Alvin Community College was to act as the local publicizer and agent of the test well with the technical support of the University of Texas. On the University of Texas campus, the project was managed through the Director of Social Systems at the Center for Energy Studies. At Alvin Community College, the program was operated under the direction of an instructor of Biology.

Subsequent to the funding, an Advisory Committee was created and consisted of key leaders from the Alvin area: Mayors of Alvin and Pearland, representatives from Monsanto and General Crude Oil Company, the Brazoria county Judge, and a local U.S. Congressman. The committee was used on a consultancy basis and proved particularly helpful during the preparation of the short courses on growth planning.

During the course of the contract, local entities were provided with speakers knowledgeable in the background and development of geopressured-geothermal energy. Audiences included the Alvin Rotary Club, the American Mathematics Association in Two-Year Colleges, the Texas Environmental Health Association, the science and math section of the Gulf Coast Intercollegiate Conference, the Texas A&M Moody College at Galveston, the Summer Institute participants at Alvin Community College and the University of Houston at Clear Lake City, and the Gifted and Talented fourth grade class of Dickinson, Texas. In addition to these, shorter presentations were given to the city councils of Alvin, Angleton, Pearland, Friendswood, and Manvel regarding the status of the test well and the programs that would be presented by Alvin Community College.

ACTIVITIES

Three Growth Planning Seminars were presented jointly by Alvin Community College and the University of Texas on the Alvin Community College campus in November of 1978 and February and June of 1979. The thrust of these programs was to present the detailed mechanisms that are involved in planning and implementing orderly growth to the governing officials of small cities and towns in Brazoria and surrounding counties. Although the central theme of these seminars dealt with energy resource-related growth, the information was highly pertinent to any growth related problems.

GROWTH PLANNING SEMINAR I

The first of these seminars was entitled "Growth Planning-- Who Makes the Rules?". The two-day agenda included speakers from the General Land Office and congressional and state representatives. There were also representatives of such state agencies as the Texas Commission of Jail Standards, the Texas Department of Water Resources, Texas Air Control Board, State Attorney General's Office, the State Fire Marshal, and the Texas Department of Health. The general purpose of this meeting was to acquaint local officials with the agencies that could be of help in planning for and financing growth. The seminar was concluded with a spirited one-hour panel discussion on the future of transportation in Brazoria County. Panelists included Congressman Bob Gammage, Representative Jerry Benedict, County Judge E.E. Brewer, Dick Khabat of the Texas Department of Highways and Transportation, Alfred Davey of the Houston-Galveston Area Council, and Dr. Sally Lopreato of the Center for Energy Studies at the University of Texas. Dr. Lopreato was the moderator of this session. The discussion pointed out the need for cooperation and communication between governmental levels and agencies. Publicity and attendance lists for all seminars may be found in the Appendix.

In planning the first seminar, questionnaires were mailed to more than two hundred members of the Brazoria County Cities' Association asking for

preferred dates and topics. Forty-three of the addressees responded with various suggestions, but with no discernable consensus. Particulars of the seminar were disseminated through Alvin and Angleton newspapers as well as individual mailings to local officials and other prominent citizens. The list of the attendees of this seminar may be found in the appendix. Attendance was much less than was expected. Evidence of this lies in the fact that we were prepared to conduct the seminar in the 350 seat auditorium at Alvin Community College. The nineteen attendees were never cramped for space.

GROWTH PLANNING SEMINAR II

The second growth planning seminar was entitled "Growth Planning--Tools of the Trade". The purpose of this one-day meeting was to present to local officials several means by which they could assess the growth rates in their respective communities. The methods presented included relatively simple paper and pencil assessments as well as very sophisticated, computer-based methods developed by University of Texas researchers. Strong Interest was expressed by the representatives of the county's most spectacularly growing city, Manvel.

The mailing list for the second seminar included the list used for Seminar I with an additional twenty names of newly elected individuals in the capacities mentioned earlier. Responses were light to the request for reservations. In order to boost interest and attendance, the Alvin Community College project

manager attended the city council meetings of five local cities. The cities visited included Alvin, Friendswood, Angleton, Pearland, and Manvel. The purpose of these visits was to describe the entire seminar program including a detailed description of the upcoming second seminar. A short program followed each presentation which dealt with the progress and looming success of the test well and of geothermal energy. Enthusiasm was expressed by each city council which suggested that the second seminar would have good attendance. Newspaper releases preceded the seminar by two weeks and one week respectively. Since the first seminar had been criticized as being too long (two days) and poorly timed (on weekdays), the second seminar was scheduled for on Saturday. Confident in the response we would have, we planned for the use of a room that would accommodate fifty people. The thirteen attendees found the room very spacious. After lunch, the seminar moved into the computer center for a hands-on demonstration of all assessment methods discussed in the morning. It should be noted that all those that attended were very positive in their evaluation of the programs.

GROWTH PLANNING SEMINAR III

The last of the three seminars dealt with funding schemes for growth planning and was aptly titled "Growth Planning--Who Pays the Bills?". Representatives of the Sociology Department at University of Texas, the Texas Department of Community Affairs, and a private planning consultancy firm discussed several tax and industry related funding schemes available to small cities. With the burgeoning development of Brazoria County as an industrial base, the latter scheme particularly interested the participants.

Owing to the fact that the second seminar was criticized for its length and its scheduling, the third seminar was scheduled for two and one-half hours on the evening of Thursday, June 21, 1979. An important advantage of this strategy was that the "Summer Institute in Energy Realities" was scheduled for June 18-21 and would hopefully attract interested citizens and public officials to this seminar. Newspaper descriptions of the agenda of these programs were published three weeks and then two days prior to the presentations. Individual mailings went to principals of all public schools in this area. A telephone campaign was also waged in order to arouse the interest of local community colleges in the programs. The attendance during that segment of the project was about eighteen people.

SUMMER INSTITUTE IN ENERGY REALITIES

Another facet of the education in energy resources and their potential was the Summer Institute in Energy Realities presented at Alvin Community College in June of 1979. The agenda for the four-day institute included speakers representing a wide ranging group of established as well as experimental energy sources. The theme of the institute was public awareness of the feasibility, costs, and disadvantages of fossil fuel and these same factors for alternative energy resources. The evenings were scheduled for speakers from such entities as N.A.S.A., Dow Chemical Company, the United States Department of Agriculture, Texas Department of Community Affairs, Houston

Lighting and Power Company, Brown and Root, Inc., Texas Energy Extension Service, and the Department of Energy. Topics included solar, geopressured-geothermal, biomass, coal, nuclear, and petroleum resources. Daytime activities consisted of visits to the Smithers Lake coal-fired electrical generation plant and the South Texas Nuclear Project construction site at Matagorda, Texas.

The target audience of the Summer Institute consisted of teachers in the public school systems in the surrounding area. The mailing list for this presentation included all the previously mentioned groups with the addition of the principals of all local public schools and chairmen of all local college science departments.

Results of this eighteen month endeavor have stimulated many activities in the area of energy education at Alvin Community College. In March, Alvin Community College Faculty members conducted a public solar energy workshop in which the participants actually built three functional solar collectors for heating of domestic hot water. An application was submitted to the Department of Energy for funds to construct and operate a solar greenhouse which would partially heat laboratories at the college. A solar energy course has been offered in the air conditioning and heating department for the first time. The most recent institutional commitment related to the concept of energy education includes participation in a national effort, "Energy and the Way We Live", whose aim is to promote community forums on energy. Alvin Community College will submit a series of press releases to the local paper in addition to broadcasting weekly talk shows over the campus radio station during three months in the spring.

Several tours of other institutions and of other energy facilities

have imparted knowledge relevant to the energy scene and have contributed toward the professional maturity of instructors and staff of Alvin Community College. Members of the faculty and staff were able to attend the National Energy Education, Business, and Labor Conference and regional meetings where these issues were discussed. However, the most significant benefit gained from involvement with the geopressured-geothermal energy impact program has been a heightened sensitivity of the college and local community to the realities of the energy situation as it presently exists.

A CRITIQUE OF THE PROJECT

First, it should be stated that the public interest in and attendance of the seminars on growth planning was limited. However, it may be assumed that this would be a normal reaction from the public for the following reasons:

(a) Planning is a function that is largely ignored by the general citizenry. The motivation to plan one's personal affairs is fairly strong. The drive to plan others' affairs is much less. The urge to plan the affairs and healthy futures of entire communities is practically absent in all but the most civic-minded among us. Growth planning receives even less attention from the general public than other forms of planning because of its method of gratification. It requires the concentrated efforts of several people, both public and private citizens, to be done correctly. The rewards of growth planning are slow in realization; so slow that in many cases, the original workers and officials on a given project may have left the area before the project reaches fruition.

In short, growth planning requires unusual devotion from private citizens and great effort from public officials whose duties are myriad, anyway.

(b) The reaction from most of the audiences spoken to was polite skepticism. A significant number of people in the area are conservative in the extreme. Many have some knowledge of oil field operations and usually are uncomfortable with hypothetical production rates from an undrilled well. "Wait and see" is the present attitude. Rather than hear predictions and extrapolated data, our neighbors prefer to hear the results.

(c) Frankly, disenchantment with bureaucracy probably adds to the apathy. The recent problems in energy allocation, use, and conservation have produced many a jaded taxpayer.

All the above discussion is offered as an explanation of the poor attendance at our Growth Planning Seminars. The prevailing fact is that the people who participated in the programs derived vast benefits from them. Most of those attending were local government officials looking for valuable ideas and insight into improving their respective communities. Their comments were always enthusiastic regarding the value of this project. In short, although the growth planning seminars reached small audiences, they were key people in surrounding communities.

Attendance at the Summer Energy Institute and other directly energy-related presentations was moderate, but a great improvement over the attendance at the growth planning seminars. The target groups of these presentations

varied widely, but consisted mainly of public school teachers. Here, more curiosity regarding energy sources and their use was evident. The site visits to the coal-fired electrical generating facility and to the nuclear facility were grueling afternoons of heat, dust, and endless questions. Genuine interest showed in all participants.

If another program of this nature were attempted, I would recommend the following changes:

- (i) Plan all presentations to be done completely or serially during city council meetings. City and county officials have heavy demands on their time. Any incorporation of educational programs into already-scheduled meetings will help.
- (ii) Attempt to interest the Texas Municipal League in allowing presentations of the topic during their meetings. It appears that city officials use the League as an important forum for their training.
- (iii) Interest the general public first. Present a flashy program describing the topic. Present all viewpoints, stimulating controversy. Public interest could develop into public pressure on local leaders. This could lead to education of leaders as well as citizens.
- (iv) Previously identify by questionnaire persons who are distinctly interested in growth problems. One other possibility for interesting possible attendees is to work on a sector of the community between the elected officials and the general public. I refer to those people who are well motivated in the public

interest and who generally command the respect of their neighbors.
These people are usually more adept at applying pressure on
elected officials.

A P P E N D I X

PARTICIPANTS

SEMINAR #I

<u>NAME</u>	<u>OCCUPATION</u>	<u>CITY</u>
Wilma Adams	Realtor	Alvin
James Baker	Engineer	Angleton
Sue Bates	Graduate Student	Houston
Charles Burton	Retired	Alvin
Cecil Drachenberg	Assistant Superintendent	Alvin
John Ewing	Road Administrator	Angleton
Leo Hellman	-	Alvin
James Hold	Texas Highway Dept.	Alvin
Anne Hopkins	Reporter	Brazosport
Joe McQuade	Reporter	Alvin
Minnie Mae Newman	Realtor	Alvin
JoAnn Jolly	Realtor	Alvin
Stanley Kucherka	County Engineer, Fort Bend County	Rosenberg
Joe Phillips	Dean, Alvin Comm. Coll.	Alvin
Joyce Schumann	Councilwoman	Lake Jackson
Margaret Seals	School Board Member	Alvin
Reginald Shelton	High School Teacher (with 20 students)	West Columbia
Carlos Simpson	City Councilman	Danbury
Joe Snow	-	Angleton
G.E. Webb Jr.	Justice of the Peace	Alvin
Paul Webber	Director, Continuing Ed.	Alvin

PARTICIPANTS

SEMINAR #2

<u>NAME</u>	<u>OCCUPATION</u>	<u>CITY</u>
Edward Schlitzkus	Councilman	Iowa Colony
Leo Divin	"	Iowa Colony
Joyce Schumann	Councilwoman	Lake Jackson
E.D. Jopling	Wharten Co. Jr. Coll.	Wharton
Leroy Hanys	"	Wharton
Janice DelBello	City Secretary	Manvel
Georgia Lewis	Councilwoman	Manvel
Michael Heisiger	Reporter	Brazosport
Wilma Rains	Mayor	Liverpool
Bruce Byron	-	Sugarland
Marguerite Croix	Councilwoman	Manvel
Janet Berthiaume	-	Friendswood
Haskell Simon	Hospital Administrator	Bay City

PARTICIPANTS

SUMMER INSTITUTE AND THIRD SEMINAR

<u>NAME</u>	<u>OCCUPATION</u>	<u>CITY</u>
John Bethscheider	Director, Alvin Comm. Coll.	Alvin
Mrs. Kenneth Buchorn	Citizen Advocate	Brazoria
Henry Corke	Teacher	Dickinson
Marguerite Croix	Councilwoman	Manvel
James DeWitt	Trustee, Alvin Comm. Coll.	Friendswood
Tom Driskill	Instructor, Alvin Comm. Coll.	Alvin
Leo Hellman	-	Alvin
Sandra Hendrickson	Secretary, Alvin, Comm. Coll.	Alvin
John Holst	Instructor, Alvin Comm. Coll.	Alvin
Wallace Houk	Librarian, Alvin Comm Coll.	Alvin
C.R. Jones	-	Alvin
Tom Jones	Teacher	Alvin
Margaret Kemp	Teacher	Manvel
Frank LeVoy	Councilman	Manvel
Troy Lewis	Administrator, Alvin Comm. Coll.	Houston
Steven Long	Teacher	Alvin
Gwen Meadows	-	Alvin
WilliamD. Meyer	Exxon, Inc.	Alvin
Bill Moose	Instructor, San Jacinto Coll.	Pasadena
John V. Mutchler	-	Alvin
Bill Raygor	Plumber	Alvin
Frank Rose	Physician	Alvin
M.J. Rossano	Administrator, Alvin Comm. Coll.	Alvin
R.D. Sadow	-	Alvin
Gloriann Spiller	City Secretary	Liverpool
Curt Warnick	Teacher	Alvin
Joyce Warnick	Teacher	Alvin
Bruce Westmoreland	Welding Instructor	Alvin

PROSPECTS, PROJECTIONS, SOLUTIONS:
ENERGY DEVELOPMENT IN BRAZORIA COUNTY

I. PLANNING: WHO MAKES THE RULES?

November 2, 1978

- 8:30 - 9:00 REGISTRATION
- 9:00 - 9:15 WELCOME
Rodney Albright, President, Alvin Community College
- 9:15 - 9:45 INTRODUCTION TO THE SEMINAR
Bob Armstrong, Commissioner
General Land Office
- 9:45 - 11:00 OVERVIEW OF THE COMMUNITY IMPACT PHENOMENON
Sally Cook Lopreato, Associate Director,
Center for Energy Studies, UT-Austin
- 11:00 - 12:00 LEGAL ASPECTS OF PROBLEM SOLVING
Francine Fredericks, Assistant Attorney General
Attorney General's Office
- 12:00 - 1:00 Lunch
- 1:00 - 3:00 ENVIRONMENTAL REGULATIONS AND PLANS
Bill Horine, Alvin Community College, Moderator
- A. Water Use Restrictions
1. Water Availability
Bill Klemt, Geologist
Texas Department of Water Resources
 2. Water Rights
Kent Jones, Head, Water Use Permit Applications
Section, Texas Department of Water Resources
- B. Air Pollution Restrictions
Lloyd Stewart, Regional Supervisor
Texas Air Control Board
- C. Land Impact-subsidence
Bob Gabrysch, Hydrologist, U.S. Geological Survey
- 3:00 - 3:15 Coffee
- 3:15 - 4:30 ENVIRONMENTAL REGULATIONS AND PLANS (contd.)
- D. Coastal Management Program, General Land Office
W.D. "Red" Oliver, Director of Coastal Planning
General Land Office
- E. Open Space Planning and Recreation
Alf Davey, Houston-Galveston Area Council
- 4:30 Adjourn

November 3, 1978

9:00 - 10:30 POPULATION GROWTH AND ACCOMMODATION
Tom Reid, Mayor, Pearland, Moderator

A. Police facilities
Robert Viterna, Commission on Jail Standards

Fire facilities
Wayne Smith, State Fire Marshall's Office

B. Waste Water and Solid Waste
Merton Coloton, District Manager,
Texas Department of Water Resources

Jack C. Carmichael
Director, Division of Solid Waste Management,
Texas Department of Health

10:30 - 10:45 Coffee break

10:45 - 12:30 POPULATION ACCOMMODATION (contd.)

C. Electricity and Telephone Service
Otto Schroeder, Houston Lighting & Power

Dwight Spurlock, Community Public Service

Bill Bales, Southwestern Bell Telephone

D. National Flood Insurance
Everett Rowland, Head, Community Services Unit,
Texas Department of Water Resources

12:30 - 1:30 Lunch

1:30 - 3:00 INTERGOVERNMENTAL RELATIONS: Transportation
Sally Cook Lopreato, CES, Moderator

Panel Discussion:

Federal: Bob Gammage, U.S. Congressman

State: Jerry Benedict, State Representative

Regional: Alf Davey, Houston-Galveston Area Council

County: E.E. Brewer, Brazoria County Judge

City: Allen Gray, Mayor, Alvin

3:00 - 3:15 Coffee Break

3:15 - 4:30 INTERGOVERNMENTAL RELATIONS (contd.)

4:30 Adjourn

MONDAY, JUNE 18, 1979

7:00 PM-Registration

7:30PM- Film "Toward the Third Century", An award-winning film that introduces the energy situation as it is today.

8:00PM- Panel Discussion: "Future for Existing Energy Sources"

The panel will include:

Mr. D.L. McLallen, Staff Planning Advisor, Exxon Co.

Mr. D.A. Buell, Supt. H.O. Clarke Power Station-Coal

Mr. Andy Sansom, Director, Texas Energy Extension Service, University of Houston-Nuclear Power

Dr. Don Beeth, Nuclear Engineer, Brown and Root, Inc.-Nuclear Power

Mr. Bob Gammage, Attorney and former Congressman, Governmental views

9:30PM- Announcements and Adjournment

TUESDAY, JUNE 19, 1979

7:00PM- Registration

7:15PM- New and Alternate Energy Sources

7:20PM- Geopressured Geothermal Energy

Mr. Keith Westhusing, U.S. Department of Energy

8:00PM- Solar Satellite Program

Mr. Harold Benson, NASA, Deputy Chief of Systems Design Office

8:40PM- Ethanol from Biomass as a Potential Energy Source

Mr. B.A. Smith, Research Chemist, U.S. Department of Agriculture

9:20PM- Biomass Conversion of Marine Algae into Methane and Ethanol

Mr. Dennis Milligan, Senior Research Biologist, Dow Chemical Co.

WEDNESDAY, JUNE 20, 1979

7:00PM- Registration

7:15PM- Energy Conservation in Institutional Buildings

Dr. Charles Polk, President, Daytona Beach Community College, Daytona Beach, Florida

7:45PM- Energy Conservation in Transportation

Mr. Alfred Davey, Project Coordinator, Llewelyn-Davies Associates

8:15PM- Presentation and Use of the Energy-Environment Simulator from University of Houston at Clear Lake City

THURSDAY, JUNE 21, 1979 "GROWTH PLANNING: WHO PAYS THE BILLS?"

7:00PM- Governmental Sources of Funds for Growth Planning

Dr. Sally Lopreato, Center for Energy Studies, University of Texas, at Austin

7:45PM- Strategies for Small Communities in Growth Planning

Mr. Jack Russell, Consulting City Manager, Alvin, Texas

8:30PM- Interactions for Industry and the Small Community in Growth Planning

Mr. Jerry Heare, Director, Community Development Div., Texas Industrial Commission

9:15PM- Wrap-up of Growth Planning Seminars and Adjournment

****SITE VISITS**

**SITE VISITS ARE PLANNED TO THE FOLLOWING
LOCAL ENERGY FACILITIES:**

TUESDAY, JUNE 19, 1979, 1:30 PM

Smithers Lake Coal-fired Electrical Generation Plant, Rosenberg, Texas

WEDNESDAY, JUNE 20, 1979, 12:30 PM

South Texas Nuclear Project Construction Site, Matagorda, Texas

**Transportation will be provided by the College for 25 persons to the coal-fired plant and for 50 persons to the nuclear facility on a first come, first served basis.

***THURSDAY, June 21, 1979**

Pleasant Bayou Test Well for Geopressured Geothermal Energy, Liverpool, Tx.

*Tentative

FUNDING PROVIDED BY:

U.S. Department of Energy
and

Texas Coordinating Board