GEOTHERMAL ENERGY INSTITUTE
680 BEACH STREET, SUITE 426
SAN FRANCISCO, CALIFORNIA 94109
(415) 474-0404

March 30, 1974

U. S. Atomic Energy Commission
Washington, D. C.

RE: River Bend Station Nuclear Power Plants
West Feliciana Parish, Louisiana

Proposed Allens Creek Nuclear Generating Station
Austin County, Texas

Bellefonte Nuclear Plants (Units 1 and 2)
Jackson County, Alabama

Gentlepersons:

We supplement our previous communications with respect to these proceedings and once again point out the inadequate evaluation of alternative energy sources, particularly geothermal energy sources, by either the applicants or by your staff.

NEPA requires not only a "rigorous exploration" and description of alternative courses of action but also "an analysis of their costs and impact on the environment." President's Council On Environmental Quality, 1972, Environmental Quality-Third Annual Report, p. 243.

EPA requires that "special care" be taken to respond fully to comments that are at variance with the staff's positon. We are of the considered opinion that a review of EIS documents prepared during 1973 and 1974 leads inevitable to the conclusion that this standard is not being followed and has been subseantially ignored.

We note that the Department of the Interior does not review the Commission's EIS documents for proposed nuclear power plants with respect to the substantive content of any analysis of alternatives. The U.S.G.S. review is limited to a review of the seismic situation for siting purposes.

May we furnish you with additional information which relates to the geothermal-geopressured potential of the Gulf Coast:

1. Jones, P. H. and Wallace, R. H., Jr., 1973, Hydrogeologic aspects of structural deformation in the northern Gulf of Mexico Basin: U. S. Geological Survey, Bay St. Louis, MIssissippi 39520.

2. U. S. G. S. Professional Paper 800-A, p. A10-A11, 1973.

3. Grossling, B.F., 1973, Geothermal potential of the United States: U. S. Geological Survey, Washington, D. C. Open-file report.

4. Houston Geological Society, 1971, Abnormal subsurface

pressure: Houston, Texas. (Contains an exstensive biblography).

5. U. S. Patent No. 3,258,069 (1966) Method for producing a source of energy from an overpressured formation.

6. Hise, B.R. and Hawkins, M.F., Jr., 1973, Geopressured water as an energy resource: Louisiana State University, Baton Rouge, Louisiana 70803.

Very truly yours,

Donald F.X. Finn

Donald F.X. Finn
Managing Director

CC; Environmental Protection Agency, Washington, D.C.
Joint Congressional Committee on Atomic Energy
Federal Energy Office
Office of Management and Budget
The Futures Group
Energy Information Office
The Energy Policy Project

ENCLOSURES (9 PAGES)

IMPORTANT PUBLICATIONS RELATED TO GEOPRESSURED WATER AS AN ENERGY RESOURCE

1. Hottman, C. E.: "Method for Producing a Source of Energy from an Overpressured Formation", U. S. Patent No. 3,258,069 filed Feb. 1963, granted June 1968, assigned to Shell Oil Company, New York, N.Y.

2. Proceedings of the First Symposium on Abnormal Subsurface Pressure, Louisiana State University at Baton Rouge, April 28, 1967. Sponsored by the School of Geology and the Department of Petroleum Engineering.

3. Jones, Paul H.: "Hydrology of Neogene Deposits in the Northern Gulf of Mexico Basin", Bulletin GT-2, Louisiana Water Resources Research Institute, Louisiana State University at Baton Rouge, April 1969.

4. Proceedings of the Second Symposium on Abnormal Subsurface Pressure, Louisiana State University, January 30, 1970. Sponsored by the School of Geoscience and the Department of Petroleum Engineering.

5. Third Symposium on Abnormal Subsurface Pore Pressure, Louisiana State University at Baton Rouge, May 15-16, 1972. Sponsored by the School of Geoscience and the Society of Petroleum Engineers of AIME.

6. Geothermal Energy-A National Proposal for Geothermal Resources Research, Final report of the Geothermal Resources Research Conference, Seattle, Washington, September 18-20, 1972, Walter J. Hickel, Chairman.

7. Parmigiano, J. M.: Geohydraulic Energy From Geopressured Aquifers, M. S. Thesis, May 1973, Department of Petroleum Engineering, Louisiana State University at Baton Rouge.

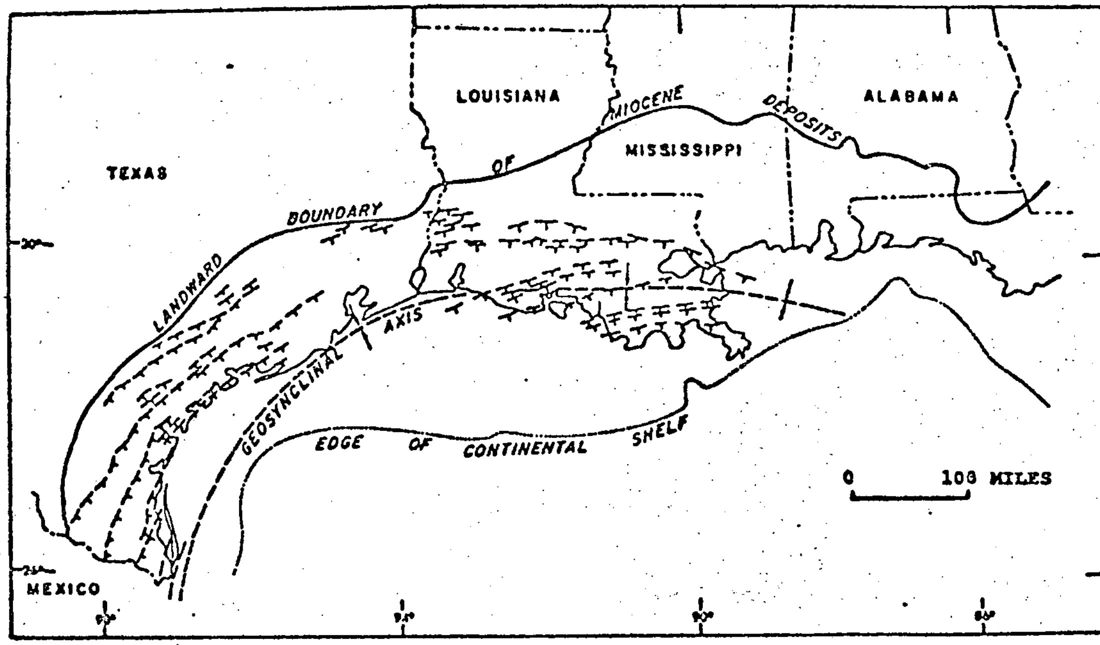

FIGURE 1 - MAJOR REGIONAL GROWTH FAULT SYSTEMS IN MIOCENE AND YOUNGER SEDIMENTSIN THE NORTHERN GULF COAST PROVINCE. (AFTER MURRAY, 1961)

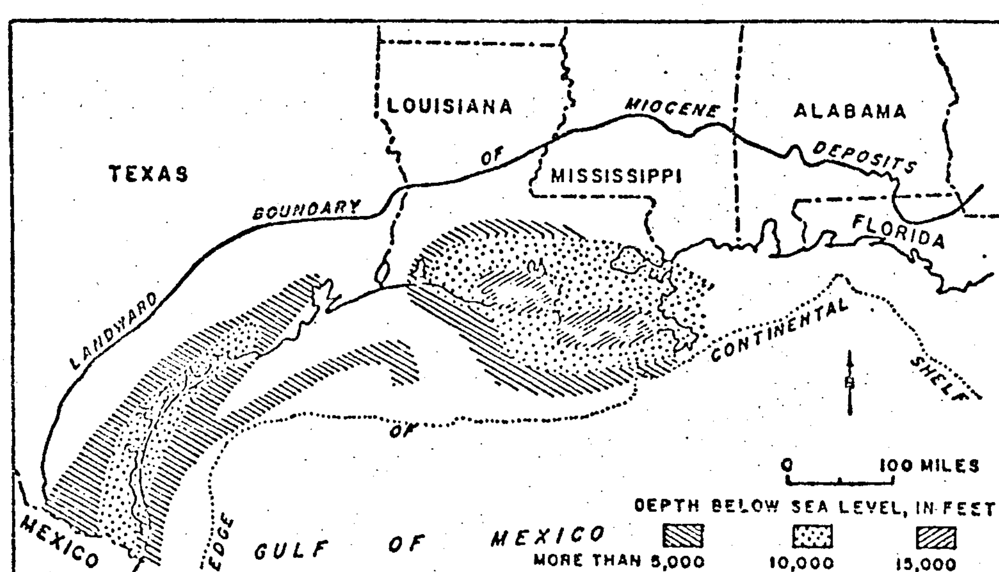

FIGURE 2 - LOCATION AND DEPTH OF OCCURRENCE OF GEOPRESSURES IN THE NORTHERN GULF OF MEXICO BASIN (AFTER JONES, 1969).

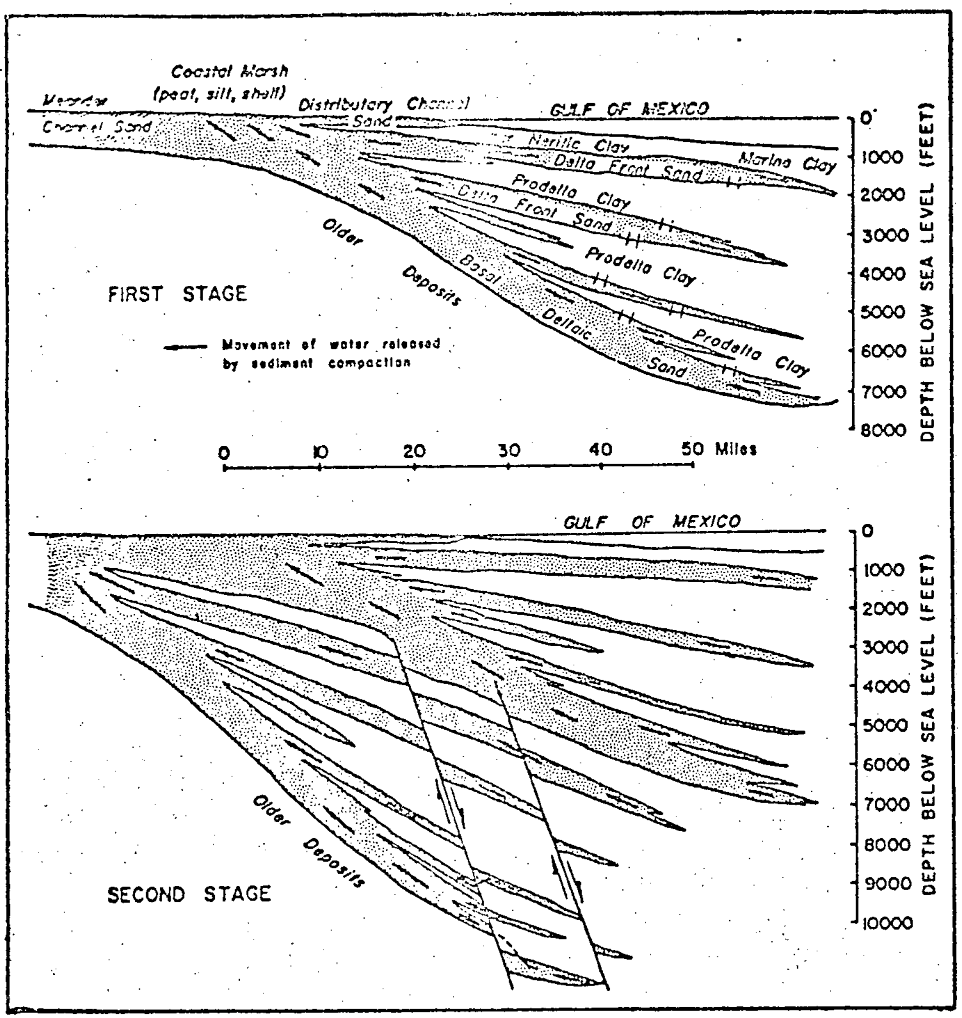

FIGURE 3 - CROSS SECTION SHOWING GEOPRESSURED ZONES CAUSED BY FAULTING(AFTER JONES, 1967)

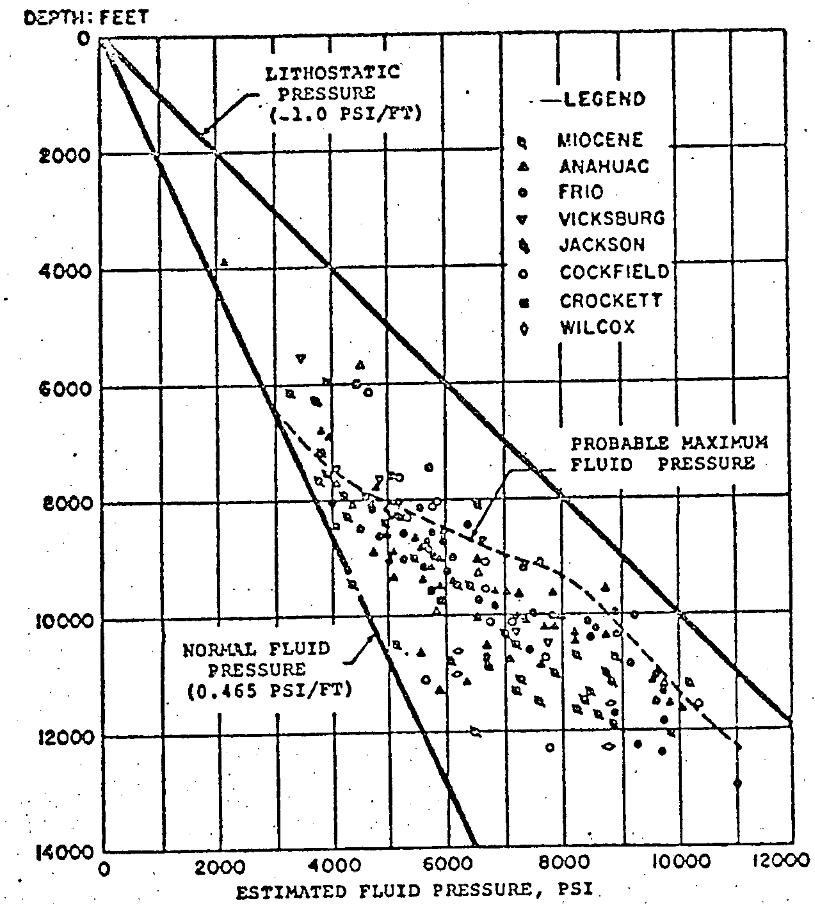

FIGURE 4 - FLUID PRESSURES IN WELLS IN THE NORTHERN GULF OF MEXICO BASIN (AFTER CANNON AND SULLINS, 1950).

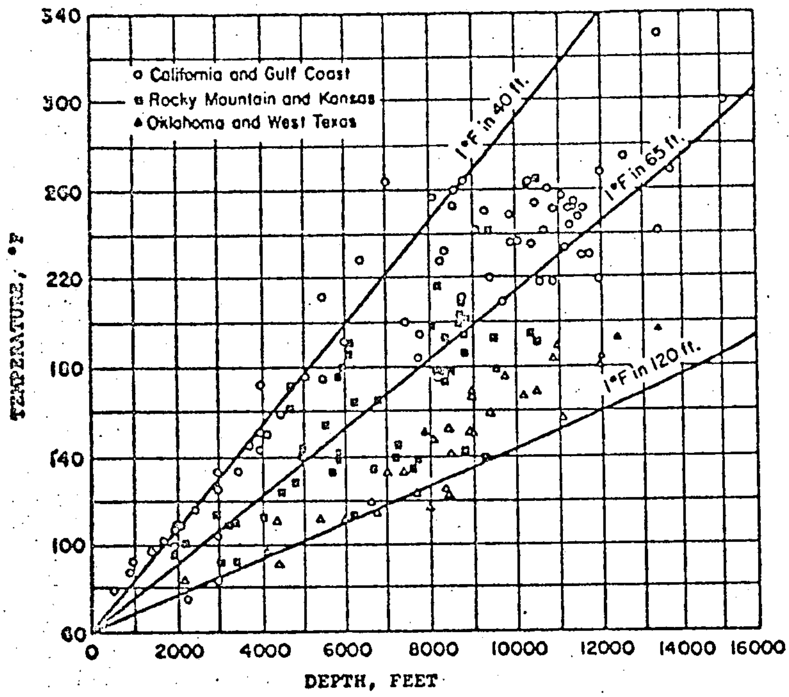

FIGURE 5 - SUBSURFACE TEMPERATURES MEASURED IN WELLS IN THE U.S. (AFTER VOGELSANG, 1958).

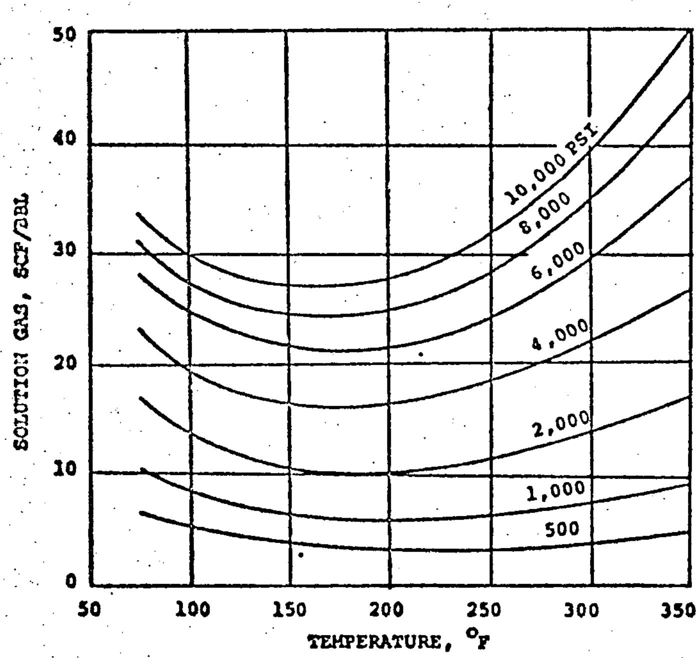

FIGURE 6 - SOLUBILITY OF METHANE IN WATER (AFTER CULBERSON AND MCKETTA, 1951).

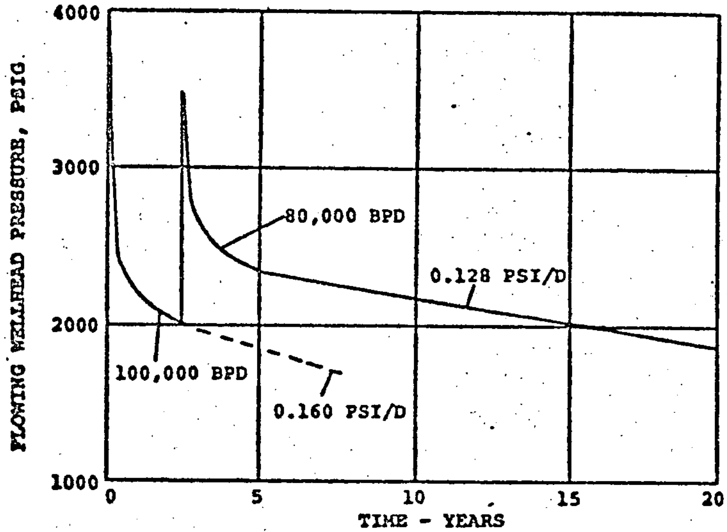

FIGURE 7 - SURFACE PRESSURE AND FLOW RATE HISTORY PREDICTED FOR A GEOPRESSURED WELL BASED ON DATA OF TABLE I (AFTER PARMIGIANO, 1972).

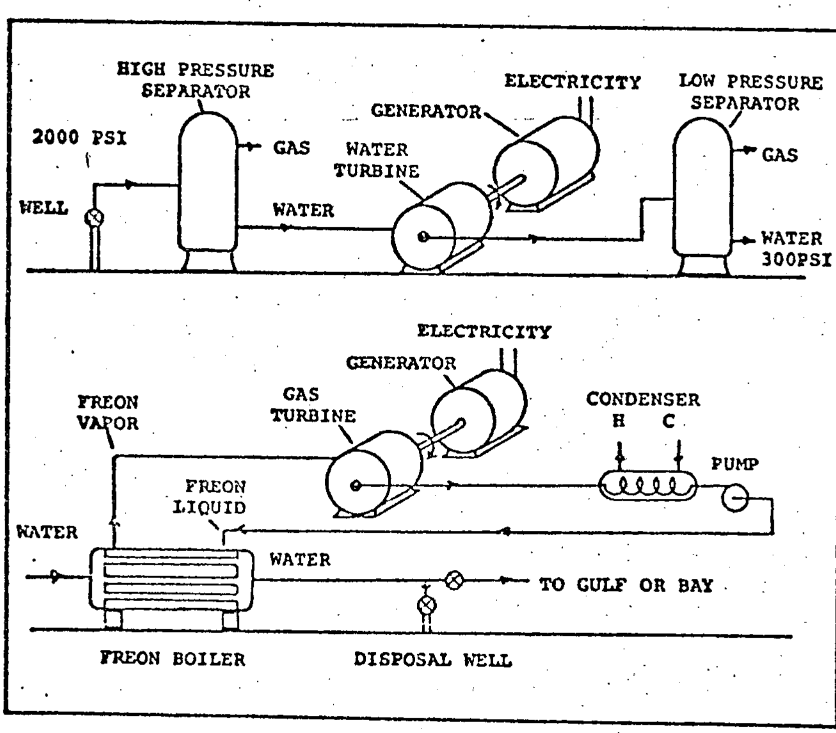

FIGURE 8 - SCHEMATIC OF SURFACE INSTALLATIONS USED TO CAPTURE ENERGY FROM GEOPRESSURED WATER WELLS.

TABLE I-WELL AND AQUIFER DATA

DEPTH OF RESERVOIR	12,000 FT
INITIAL PORE PRESSURE	10,000 PSIG
STRATUM THICKNESS	200 FT
ROCK POROSITY (PERCENT)	20
ROCK PERMEABILITY	100 MD
ROCK COMPRESSIBILITY (EFFECTIVE)	$10^{-5}PSI^{-1}$
RESERVOIR TEMPERATURE	260°F
WATER VISCOSITY (AT 260°F)	0.30 CP
WELL DIAMETER (PIPE I.D.)	9 IN
WELL RADIUS	0.375 FT
RESERVOIR RADIUS	10 MILES
CLOSED EXTERNAL BOUNDARY	

TABLE 2

DATA FOR POWER PRODUCTION ESTIMATE

WELL FLOW RATE	80,000 BWPD
FLOWING SURFACE PRESSURE	2,000 PSIG
WELLHEAD WATER TEMPERATURE	260°F
NATURAL GAS CONTENT OF WATER	30 SCF/BBL
GAS PRODUCTION RATE	2,400 MCF/DAY
GAS HEATING VALUE	1,000 BTU/SCF
WATER TEMPERATURE AT DISCHARGE	100°F

TABLE 3

POWER PRODUCTION ESTIMATE

KIND OF ENERGY	CONVERSION EFFICIENCY (PERCENT)	ELECTRIC POWER (MEGAWATTS)
NATURAL GAS	25	7.5
GEOHYDRAULIC	75	1.5
GEOTHERMAL	11	6.0
	TOTAL	15.0

TABLE 4

INSTALLATION ECONOMICS

GEOPRESSURE	
ASSUME 3 WELLS FOR A PLANT	= 45 MEGAWATTS
3 WELLS AND DISPOSAL FIELD	= $10,000,000
SURFACE POWER STATION	= $ 7,000,000
TOTAL COST	= $17,000,000
COST/KW	= $380
NUCLEAR $/KW	= $300-$500-$600+

TABLE 5

OPERATING ECONOMICS

GEOPRESSURE	
OPERATING COST FOR 3 SOURCE WELLS PLUS DISPOSAL FIELD	= $500,000/YR.
RAW POWER PRODUCED	= 400 x 10^6 KW-HR/YR.
RAW POWER COST (FUEL COST)	= 1.25 MILS/KW-HR
NUCLEAR (FUEL COST)	= $\pm$ 1.5 MILS/KW-HR

TABLE 6

NATURAL GAS FROM GEOPRESSURE WATER

500 WELLS .447 TCF/YR

TOTAL GAS OVER 15 YR. LIFE 6.50 TCF

TOTAL GAS OVER 30 YR. LIFE = 13.00 TCF

CONVENTIONAL SOURCES

	PRODUCTION RATE (TCF/YR)	RESERVES (1-1-72) TCF
STATE OF LA. (INCLUDES OFFSHORE)	8	80
U.S.	23	280

TABLE 7

GEOPRESSURE POWER

500 WELLS @ 15 MW./WELL--7500 MEGAWATTS

CONVENTIONAL POWER CONSUMPTION

INSTALLATION	RATE OF CONSUMPTION (MEGAWATTS)
L.S.U.	20
CITY OF LAFAYETTE, LA.	150
STATE OF LA.	4100
U.S.	300,000

TABLE 8

LSU RESEARCH PROPOSAL

	WORK	ESTIMATED COST
PHASE 1 (ONE YEAR)	GEOLOGIC SURVEY WELL TESTING WATER ANALYSIS	$ 500,000
PHASE 2 (FOUR YEARS)	TEST WELL TEST FACILITY PILOT PLANT	$10,000,000