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GRID-CONNECTED ICES: PRELIMINARY FEASIBILITY ANALYSIS AND EVALUATION

Final Report. Volume 2

June 30, 1977

Work Performed Under Contract No. EC-77-C-02-4214

de Laureal Engineers, Incorporated
New Orleans, Louisiana

U. S. DEPARTMENT OF ENERGY

Division of Buildings and Community Systems

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GRID-CONNECTED ICES
PRELIMINARY FEASIBILITY ANALYSIS & EVALUATION

FOR

U.S. ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION

FINAL REPORT

JUNE 30, 1977

VOLUME II OF III

HEALTH EDUCATION AUTHORITY OF LOUISIANA

NEW ORLEANS PUBLIC SERVICE INCORPORATED

DE LAUREAL ENGINEERS, INC.

ORR - SCHELEN - HAYERON AND ASSOCIATES, INC.

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TASK 1

PRELIMINARY ENERGY ANALYSIS

1.1 THE DEMONSTRATION COMMUNITY

1.1.1 HEAL Complex

The entire area known and identified as the HEAL Complex, in the Central Business District of New Orleans, is the Demonstration Community for which the Demonstration System will be designed. The HEAL Complex is a group of hospitals, clinics, research facilities, as well as medical educational facilities for undergraduate and graduate students to pursue medical doctorates and nursing degrees. (Refer to Exhibit I for artist's perspective view.)

The Health Education Authority of Louisiana (HEAL) is a state organization with a duly appointed Board of Trustees and professional staff to serve as a coordinating agency among the various institutions that comprise the medical complex in New Orleans.

HEAL was formed in 1968 by an act of the legislature of the State of Louisiana in order to accomplish the following overall goals:

- To operate in the New Orleans area a medical complex that will attract and foster the growth of organizations involved in patient care, health education and health research activities.

- To assist organizations constituting the complex to develop planning programs and to realize planning objectives.
- To facilitate, primarily through direct acquisition, the obtainment of land, which will provide for the orderly development of facilities for the use of the organizations constituting the medical complex.

As part of the Executive Department of the State of Louisiana, HEAL was established as a freestanding corporate and public instrumentality of the state and was vested with the necessary powers and functions to carry out its role.

The organization provides direction and coordination in the form of advice and counsel to the member institutions.

(1) Charity Hospital of New Orleans

Charity Hospital, as part of the state hospital system, has as its primary role the provision of medical care for indigent inpatients and outpatients and for acute and nonacute services. Charity also has a defined role in the area of health education, both through its role as the primary teaching hospital of the two medical schools and through the operation of its own School of Nursing and the conduct of allied health programs. There are 13 separate buildings within the Charity Hospital Complex, one of which is leased

to and operated by Louisiana State University. (Refer to Exhibit II, Appendix A, for identification and the physical profile of each building.)

(2) Eye, Ear, Nose and Throat Hospital

The Eye, Ear, Nose and Throat Hospital is a privately endowed, non-profit institution serving Greater New Orleans. Because this medical institution is located within the HEAL Complex and functions as a medical care and education institution similar to other HEAL institutions, it has been included within the ICES Demonstration Community as a potential user of the ICES. (Refer to Exhibit II, Appendix A, for identification and the physical profile of this hospital.)

(3) LSU Medical Center

LSU, as a state university, maintains primary responsibility for ensuring that the medical manpower needs of the State of Louisiana are satisfied to the maximum possible extent. LSU emphasizes the training of doctors and nurses and conducts medical research, and has recently established a School of Allied Health Professions and a School of Dentistry. In addition, the LSU Medical Center provides patient care services. LSU has three buildings within the LSU Medical Complex, including one building leased from Charity Hospital. (Refer to Exhibit II, Appendix A, for identification and physical profile of each building.)

(4) Veterans Administration Hospital

The Veterans Administration Hospital, a Federal institution, is located in the heart of the HEAL Complex. Because of its association with the HEAL Complex Medical Schools and its location within the complex of HEAL medical institutions it has been included as a potential prime user of the ICES central energy system. The VA Hospital is affiliated with LSU and Tulane Schools of Medicine and the LSU School of Dentistry. The staff includes specialists in all major fields of medicine and surgery. There are four buildings within the VA Medical Complex. (Refer to Exhibit II, Appendix A, for identification and physical profile of each building.)

(5) Tulane University Medical Center

Tulane University has essentially the same overall medical education, research and patient care objectives as LSU, but as a private institution. Its major goal is to continue as one of the leading private medical schools in the nation, as well as to help meet the health manpower requirements of the State of Louisiana. There are three buildings (excluding parking garages) within the Tulane Medical Complex that are considered part of the Demonstration Community. (Refer to Exhibit II, Appendix A, for identification and physical profile of each building.)

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ICES DEMONSTRATION COMMUNITY
HEAL COMPLEX NEW ORLEANS

1-1-5

EXHIBIT 1

1.1.2 Physical Profile of Building Structures

(1) Existing Building Structures

The Demonstration Community provides an existing demand for energy and is a readily available consumer of the utilities that would be provided by a central energy plant. The existing buildings are multi-story structures ranging in age from one to thirty-five years. The buildings are tightly spaced in order to take advantage of the highest order of land utilization and to obtain maximum benefit from the high cost of land in the area. The close spacing of buildings and functions will enhance the economic feasibility of a central utility system and will reduce the transportation distances of the distribution requirements.

The site plan of the Demonstration Community (Exhibit III) illustrates the relative locations of the existing structures with respect to each other. Individual site plans are included (Exhibit Va through Vg, Appendix A) to more clearly define building perimeter outlines and site relationships.

(2) Existing Utilities

The energy utilities now being supplied to the buildings in the Demonstration Community are natural gas and electricity.

NOPSI, the investor-owned utility franchised to operate in the city of New Orleans, uses oil as the primary fuel, and

gas, as available, to generate electricity, or, as a member of the Middle South Utilities system, receives economy interchange electricity from a high-voltage grid. Space-conditioning equipment for most of the buildings is electric; at two buildings natural gas is burned in steam generators to furnish steam power to turbines that drive centrifugal compressors, providing chilled water for comfort cooling systems.

(3) Existing Thermal Energy Systems

(a) Charity Hospital

Charity Hospital has a central plant chilled water system that serves all the buildings in the Charity Hospital Complex. There is one 3000 ton, turbine-driven centrifugal machine, approximately four years old, which operates on 225 psig steam. The condenser water system includes a cooling tower with five 50 HP fans, and two 250 HP condenser water pumps. Chilled water is circulated by two 250 HP motor driven pumps.

Charity Hospital also has several hundred window units and several small-capacity, local direct expansion systems -- all totaling approximately 1300 tons of refrigeration. It is planned that in the near future the existing chilled water system will be extended to the areas served by these scattered small systems and the direct expansion units and window units will be removed.

Bid documents are now being prepared to provide for the installation of a second turbine-driven 3000 ton machine, probably some time in 1978 or 1979.

The Charity Hospital steam plant is located in the same building as the chilled water plant. There are three 250 psig, gas-fired steam boilers, each rated at 40,130 pounds per hour output. All have combination burners that can also burn oil for fuel, although there is no oil system in the plant at this time. One of the three boilers is a standby unit.

Each boiler has a 30 HP forced draft fan. All discharge into a common stack. There are two 50 HP motor driven feedwater pumps and one turbine driven feedwater pump.

Current planning calls for the addition of a fourth boiler, to be installed when the new centrifugal chiller is added to that system.

In addition to supplying steam to the chiller turbine, this system provides steam for comfort heating, domestic water heating, laundry and incidental requirements.

(b) Eye, Ear, Nose and Throat Hospital (EENT)

Air conditioning is provided by a chilled water system supplying fan-coil units throughout the building. There are three chillers: one is a centrifugal machine, 190 tons,

29 years old; the other two are reciprocating types, each 50 tons, one 10 years old and one 15 years old. Each chiller has its own separate condenser water system and cooling tower.

Motor driven auxiliary equipment includes three condenser water pumps, total 45 HP; three cooling tower fans, total 30 HP; four chilled water pumps, one of which is a standby, total 20 HP.

The EENT steam plant is an 85 psig system, with three 31 year old gas-fired boilers, each rated at 56 BHP. The steam system is used for comfort heating, domestic hot water generation and incidental requirements. The laundry function, which used steam from this plant, has been discontinued; and it is anticipated that, since remaining steam requirements can be handled by one boiler, one of the three boilers will be removed.

There are three 5 HP boiler feed pumps; stack draft is natural.

(c) LSU

Each of the two existing buildings has its own air conditioning and heating plant.

Medical School - Air conditioning is provided by a chilled water system having all motor driven equipment. The original installation consists of two 300 ton centrifugal machines

and one 75 ton reciprocating machine, all 25 years old. Twelve years ago one 420 ton centrifugal machine was added to the system when the school building was enlarged.

Auxiliaries include two two-cell cooling towers, with two 20 HP and two 15 HP fans. There are two 20 HP condenser water pumps and two at 30 HP. Main chilled water pumps include two at 25 HP and two at 20 HP; plus two 7-1/2 HP and one 5 HP zone pumps.

There are three 25 year old, 60 psig steam boilers in the original plant, two rated at 150 BHP and one at 50 BHP. The largest units have 7-1/2 HP draft fans; the smallest one, 2 HP. Twelve years ago a third 150 BHP, 60 psig boiler, with 5 HP draft fan, was added to the system.

There are four 3 HP boiler feed pumps. This boiler plant is used for comfort heating, domestic hot water generation and incidental requirements.

Residence Hall - The air conditioning system includes two 150 ton electric motor driven centrifugal chillers, six years old. Auxiliary equipment includes a two-cell cooling tower with 10 HP fans, three condenser water pumps (one a standby) at 15 HP, and two chilled water pumps at 15 HP. The chilled water system is inoperative during the winter season.

There are two gas-fired, 50 psig, 125 BHP hot water boilers used for comfort heating. Each has a 5 HP draft fan. Both are thirteen years old.

Domestic hot water requirements are handled by six gas-fired units, each rated at 900 MBH input.

(d) Tulane

Each of the three existing buildings has its own air conditioning and heating plant.

Medical School

The medical school air conditioning developed in three stages. The original building still uses window units and several scattered direct expansion systems, all totaling approximately 350 tons. The second building has a chilled water system, with two motor driven centrifugal machines, one at 200 tons, one at 250 tons. The third building has one turbine driven centrifugal machine rated at 1075 tons.

Auxiliaries for existing systems include four condenser water pumps - two at 75 HP, one at 30 HP, one at 25 HP; two cooling towers - one with two 15 HP fans, the other with three 30 HP fans; four chilled water pumps - two at 60 HP, one at 30 HP, one at 25 HP.

The Tulane Medical School is proceeding with plans to modify its air conditioning system, to become effective some time in 1978. At that time the window units

and scattered direct expansion systems in the first building and the two motor driven centrifugal machines in the second building will be removed. The turbine centrifugal machine in the third building will be put on a standby status. There will be new motor driven centrifugal chilled water generators - two at 750 tons, one at 160 tons - to handle system requirements for all three areas of the Medical School.

There are two 250 psig steam boilers, both 15 years old, serving the steam requirements for all three areas of the school, including chiller turbine drive, domestic hot water generation, comfort heating and incidental requirements.

One is rated at 19,000 pounds/hour; the other, 23,000 pounds/hour. Each has a 15 HP forced draft fan. There are two 60 HP boiler feed pumps, one of which is standby, and two condensate transfer pumps at 5 HP. There are no plans to modify this steam plant.

Environmental Medicine

All equipment in this building is ten years old.

The air conditioning system includes two 60 ton reciprocating water chillers, each with two 30 HP motors. Auxiliaries include two cooling towers, 10 HP each; two condenser water pumps, 5 HP each; two chilled water pumps, 5 HP each. During the winter season the chilled water system

is inoperative; an air economizer system handles cooling requirements.

The steam plant is used for comfort heating, domestic hot water generation and incidental requirements. There is one 10 psig, natural draft, gas-fired steam boiler rated at 3,600 pounds/hour output; with two 3 HP boiler feed pumps, one of which is standby.

Hospital

This building went into service in 1976. All equipment is new.

Three 750 HP centrifugal electric drive air conditioning chillers serve this building. There are three 40 HP* cooling tower fans, three 40 HP condenser water pumps, three 60 HP chilled water pumps.

The steam plant is a 15 psig system. There are three gas-fired boilers, each with a 7-1/2 HP draft fan. Two of the units are rated at 300 BHP; the third, used as standby, 250 BHP. Functions served include comfort heating, domestic hot water generation, sterilizers and autoclaves and other incidental requirements. There are two 20 HP boiler feed pumps, one of which is standby.

(e) Veterans Administration Hospital (VA)

Air conditioning is furnished by a central system supplying chilled water to fancoil units in the different buildings.

The main chiller plant has two 12 year old, 800 ton centrifugal machines for normal operation. There is a third 25 year old, 130 ton reciprocating machine serving an auxiliary function to operate from late Fall to early Spring between midnight and 6:00 A.M., a period during which the main plant is idle. There is one three-cell cooling tower for supplying condenser water.

Auxiliary equipment includes three condenser water pumps, one of which is standby, total 225 HP; three cooling tower fans, total 120 HP; three 75 HP and three 30 HP chilled water pumps, one of each being a standby.

The steam plant is a 110 psig system, with three 25 year old gas-fired boilers, each equipped for emergency oil firing, each rated at 315 BHP. The steam system is used for comfort heating, domestic hot water generation and incidental requirements. The laundry function originally in this hospital has been discontinued. Maximum steam demand can be handled by one boiler; however, during periods of heavier loads two boilers are in service.

One of the boilers has a 10 HP motor driven draft fan; the other two have turbine drive. Boiler feed pumps are all driven by steam turbines.

1.1.3 Site Characteristics

(1) Location

The HEAL Complex consists of 42.9 acres of land, excluding street right-of-way, in the Central Business District of New Orleans. Within the Complex there is a variety of land uses ranging from hospital buildings to related commercial and office buildings. The site is immediately adjacent to the Civic Center of the City, which is southeast of the Complex, and the Louisiana Stadium (Superdome), which is southwest of the Complex (See Exhibits III & VII). One-half to one block distance from the northeast boundary is Canal Street, the main commercial shopping area of the CBD.

The Complex is divided into three separate areas by the Interstate I-10 elevated expressway and by Tulane Avenue. Because of the large volumes of traffic on these major roadways, the HEAL Master Plan recommends the construction of pedestrian crossovers and the development of second level plazas interconnecting the buildings. The crossovers and elevated plazas will provide an excellent opportunity to conceal the distribution systems for the central energy plant utilities. (Refer to Exhibit VI.)

(2) Topography

The urban area of New Orleans is generally flat. The natural evolution of land formations and land build-ups

PROPOSED INTERCONNECTING
PEDESTRIAN WAYS

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EXHIBIT VI

1-1-17

MASTER SITE LOCATION MAP

SCALE
(APPROX.)

1 1/2 0 2 MILES

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EXHIBIT VII

1-1-18

resulting from silt deposits of the Mississippi River and of other rivers in the area created the higher elevations of natural levees and elongated ridges adjacent to each tributary. Thus, we can find land elevations of five, seven or ten feet above mean sea level (msl) as the highest elevations, and other areas with elevations of minus seven, ten and twelve feet below msl. On the average, the land approximates zero elevation msl for the urban area. The Demonstration Community is located in one of the few areas that are above zero elevation.

Since the city is surrounded primarily by water and the land elevations are low, the urban area is completely encircled with levees to protect from flooding. The levees are built to elevations of 22 feet above msl along the Mississippi River and 16 feet above msl along the lakes and waterways. Some of the largest pumps and pumping stations in the world have been constructed to continually pump surface and sub-surface storm water from the leveed areas. The pumping stations are electrically operated, with diesel standby generators for back-up emergency use should electric power fail.

(3) Climate

The climate of the New Orleans Urban Area is largely influenced by the many bodies of water surrounding the city. To the north and serving as a natural boundary is Lake

Pontchartrain, which is 600 plus square miles in area. The Gulf of Mexico is less than 50 miles south of the city. These major water areas and many other lakes, streams and wetlands surrounding the city modify the relative humidity and temperature to form a sub-tropical climate. The city is blessed with low or surface air currents that come from the Lake or the Gulf to decrease the range of temperatures between extremes. The average maximum yearly temperature is 78.2 degrees Farenheit, and the minimum is 59.0 degrees. Monthly temperature maximums vary from 90.7 degrees to 64.4 degrees, with monthly temperature minimums ranging from 73.0 degrees to 44.8 degrees. Average daily humidities range from 63 percent to 88 percent. Average rainfall is 53.9 inches per year. On the average, the area has approximately the same number of clear, partly clear and cloudy days.

(4) Transportation Systems

The Demonstration Community is ideally located within a short distance from all prime transportation systems, assuring capability for current and future importation and distribution of coal, the primary fuel for the ICES Central Plant. (Refer to Exhibit VII.)

The Demonstration Community is located approximately one mile from the Mississippi River. The Mississippi River System is navigable as far north as Minneapolis and St. Paul,

Minnesota, as far west as Sioux City, Iowa and as far east as Pittsburgh, Pennsylvania. Comprising the system are the Mississippi, Missouri, Arkansas, Red, Illinois, Ohio, Cumberland and Tennessee Rivers and numerous other waterways. Over 6200 miles of the system are maintained at a controlled depth of nine feet or more. The Mississippi River System provides a link between the Great Lakes and the Gulf of Mexico and permits waterway transportation to many of the great cities of the United States. Funneling down past New Orleans at mid-stream depths of 100 to 180 feet and controlled depths of at least 40 feet, the River makes the City a gateway port of the Gulf of Mexico.

The Gulf Intracoastal Waterway is maintained at a minimum navigable depth of 12 feet from Brownsville, Texas on the west to St. Marks, Florida on the east. The Waterway connects some of the major industrial cities of the Gulf Coast, including Houston, Galveston, Port Arthur, New Orleans and Gulfport. Extending inland through tributaries, the Waterway reaches Mobile, Montgomery and Birmingham, Alabama, and Columbus, Georgia. Eventually the system will reach inland toward Fort Worth and Dallas, Texas, via the Trinity River. The Waterway passes through New Orleans, crossing the Mississippi River on the westside at two locations, Harvey and Algiers Canals, and on the eastside at the Industrial Canal Lock.

The Mississippi River - Gulf Outlet, constructed by the U.S. Army Corps of Engineers, provides New Orleans with a straight-line, sea level waterway to the Gulf of Mexico. As a result, the distance from New Orleans to the Gulf is 40 miles shorter than by the river route. The waterway has an authorized width of 500 feet and a depth of 36 feet. Widening to 750 feet and deepening to 50 feet are currently under consideration.

The Inner Harbor-Navigation Canal connects the Mississippi River with Lake Pontchartrain, the Gulf Intracoastal Waterway and the Mississippi River - Gulf Outlet. The Canal is 5 1/2 miles long, 125 to 300 feet wide and has a controlled depth of 30 feet. Its water elevation is at sea level.

The area served by the Port is covered with a web of major railroad systems. Many of these converge on New Orleans, thereby connecting the Port by trunkline rail to every major city in the mid-continental United States and beyond. Second-day delivery service extends to Houston, Fort Worth, Dallas, Little Rock, St. Louis, Chicago, Cincinnati, Nashville, Atlanta and Jacksonville. First-day delivery service includes almost all of Louisiana, and cities such as Memphis, Jackson and Mobile. This rail system extends to every terminal in the Port, through the service of the New Orleans Public Belt Railroad, which acts as the switching agent for all mainline railroads.

The Interstate Highway System is being continually expanded. Many of the highways between New Orleans and other major cities are nearing completion. As a result, the second-day truck delivery area from New Orleans encompasses cities such as San Antonio, Dallas, Fort Worth, Kansas City, Chicago, Indianapolis, Cincinnati, Louisville, Atlanta, Savannah, St. Petersburg and Pensacola. First-day delivery area includes most of Louisiana, as well as Houston, Memphis, Birmingham and Mobile. The east and west portions of U.S. Interstate Highway 10, coupled with Highway 90, provide a main truck artery through the city, bypassing the congested streets.

1.1.4 Coal Handling Terminal

The Public Bulk Terminal, owned by the Board of Commissioners of the Port of New Orleans, handled a total of 1,685,511 short tons of bulk cargo, including coal, during the fiscal year ending June 30, 1975. (Refer to Exhibit VII.)

The Bulk Terminal, located on the Mississippi River - Gulf Outlet, is equipped with three gantry-type unloading cranes, a ship loader, a rail car loading station, a rail car dumping pit, ten storage tanks, open storage pads having a capacity of 85,000 tons, truck and track scales, a stacker and reclaimer and high speed conveyors. It can transfer import bulk cargoes from vessel to rail cars, motor trucks, river barges, storage tanks or open storage;

and it provides fast and efficient transfer of export bulk cargoes from bottom-dumping rail cars, motor trucks, river barges, storage tanks or open storage vessels.

The coal to be used as fuel for the proposed (CES Central) Plant would be received and distributed from the facility.

1.2 DEMAND PROFILES:

1.2.1 Demand Profiles for Existing and New Buildings

Service demand tabulated data and profiles were developed for electrical, steam and air conditioning requirements for the existing buildings, as well as for the near-future demands represented by additional structures or systems that are anticipated for the HEAL Complex during the next eight to ten years. The data are presented for individual buildings and for composites of existing buildings, future requirements and for all requirements within the next eight to ten years. These are the data used as the basis for establishing the required system service demands to be supplied to the Demonstration Community by the two candidate ICES Demonstration Systems - - power and steam in Plant System-3; power, steam and chilled water for air conditioning in Plant System-4.

Energy demand tabulated data and profiles are presented for the existing buildings, indicating requirements for electricity and for gas, as fuel, on typical days during Spring and Fall, Summer and Winter, for individual buildings and composites for all buildings.

The data for service and energy demands are included in Appendix B, in accordance with the following indexes:

Index of Thermal Service Demands

<u>Item</u>	<u>Page Number</u>	
	<u>Tables</u>	<u>Graph</u>
<u>Steam</u>		
<u>Composite - All Buildings</u>		
Spring and Fall	B-1-1	B-2-1
Summer	B-1-2	B-2-2
Winter	B-1-3	B-2-3
<u>Existing Buildings</u>		
Spring and Fall	B-1-4	B-2-4
Summer	B-1-5	B-2-5
Winter	B-1-6	B-2-6
<u>Future Additions</u>		
Spring and Fall	B-1-7	B-2-7
Summer	B-1-8	B-2-8
Winter	B-1-9	B-2-9
<u>Air Conditioning</u>		
<u>Composite - All Buildings</u>		
Spring and Fall	B-1-10	B-2-10
Summer	B-1-11	B-2-11
Winter	B-1-12	B-2-12
<u>Existing Buildings</u>		
Spring and Fall	B-1-13	B-2-13
Summer	B-1-14	B-2-14
Winter	B-1-15	B-2-15

Index of Thermal Service Demands (Continued)

Future Additions

Spring and Fall	B-1-16	B-2-16
Summer	B-1-17	B-2-17
Winter	B-1-18	B-2-18

Index of Energy Demands (Existing Buildings)

<u>Item</u>	<u>Page Number</u>	
<u>Composite - Gas and Electrical</u>	<u>Table</u>	<u>Graph</u>
Spring and Fall	B-1-19	B-2-19
Summer	B-1-20	B-2-20
Winter	B-1-21	B-2-21
<u>Gas</u>		
Spring and Fall	B-1-22	B-2-22
Summer	B-1-23	B-2-23
Winter	B-1-24	B-2-24
<u>Electrical</u>		
Spring and Fall	B-1-25	)B-2-(25,26, 27)-A
Summer	B-1-26	)thru I
Winter	B-1-27	)
<u>"Pure" Electrical Demand</u>	B-1-28	B-2-28

Tables on pages B-1-29 through B-1-67 list individual demands in support of tabulated and graphical values on documents listed in the indexes above.

The peak energy demand for the composite of existing buildings occurs in summer and, in equivalent million BTU per hour, is 56.99 for electricity, 158.98 for gas -- total 215.97.

The peak thermal service demands for the composite of existing buildings and near-future additions are: for air conditioning, 12,240 tons, occurring in the summer; for steam, 157,050 pounds per hour, occurring in the winter.

1.2.2 Demand Profiles For Non-Building Services

No non-building energy services are involved. The City of New Orleans provides and pays operating costs for outside utilities such as street lighting.

1.3 FUTURE GROWTH OF THE DEMONSTRATION COMMUNITY

1.3.1 Community Development

Each of the primary institutions has prepared separate master plans declaring their own intentions for future growth. With the establishment of HEAL, the overall HEAL Complex Master Plan was prepared incorporating the individual institutions' plans into a single phased program. This program does not include Veterans Administration Hospital or Eye, Ear, Nose and Throat Hospital, which are not under the authority of HEAL. The HEAL Master Plan was issued March 1, 1973. Since its initial release certain planned building programs have been implemented and completed and others are currently under construction.

The HEAL Master Plan for the Medical Complex calls for doubling the existing facilities and for adding more hospital, education, nursing and research functions. Some of the older existing buildings are proposed to be razed and new modern and larger structures to be constructed in their place. To facilitate better communications among areas and complexes, overhead first-, second-, and possibly third-level plazas and concourses or walkways are proposed. Street crossovers and pedestrian connectors from parking garages have already been constructed as part of the initial development.

The growth and development of the HEAL Complex as a university health science center is viewed as a continuing process evolving from the present foundation of patient care, education and research programs and resources now provided by the LSU Medical Center, The Tulane Medical Center and Charity Hospital. Growth and development plans were made for strengthening and expanding current programs so that the HEAL Complex may accomplish its overall objectives, and they serve as the basic framework for the long-range planning program for the HEAL Complex.

The HEAL Complex has three primary goals, including:

- Ensuring that the health manpower requirements of the State of Louisiana are adequately met either by offering or ensuring the provision of a full range of medical education programs for physicians, nurses, dentists and allied health personnel.
- Providing for the inpatient and outpatient health care needs of the population of the service area in an effective and efficient manner, either directly or through affiliations and arrangements with other providers of health care services.
- Conducting the basic, clinical and applied research necessary to ensure that the most innovative and

effective means are used in training medical manpower resources and delivering and providing for personal health care services.

The following list outlines the planned future growth of the Demonstration Community. The future buildings listed below are keyed by letters to the composite site plan, Exhibit IV.

(1) Charity Hospital

- Construct a 600-bed addition on Gravier Street (Tower I) (A).
- Provide a Rehabilitation Facility through alterations and an addition to the Lapeyre-Milttenberger Building.
- Continue with the remodeling and updating of its adjunct service departments and its clinical areas.
- Construct a 600-bed addition (Tower II) immediately to the west of the Tower I addition (B).
- Continue alterations to the existing hospital building, expanding the specialized care facilities outlined in the program.

(2) Louisiana State University

- Construct a new Medical Science Education Building at the northwest corner of S. Roman and Perdido Streets. (Presently under construction) (C)
- Construct an above-grade link between the new Education Building and the existing Residence Hall as part of the interchange network and distribution system.

- Construct a new facility for Clinical Science departmental offices and laboratories and Medical Center administration, and remodel the existing facilities as necessary. (D)
- Construct an Ambulatory Care Teaching Center on Gravier Street immediately south of St. Joseph's Church. (E)
- Construct an above-grade link between the existing building and the Ambulatory Care Teaching Center as part of the interchange network and distribution system.

(3) Veterans Administration Hospital

- Construct a two-story office facility adjoining the existing main hospital building. (F)
- Construct a combined Clinic Building and parking garage on the northwest corner of Gravier and Freret Streets. (G) (The V.A. plans are in addition to the HEAL Master Plan)

(4) Eye, Ear, Nose and Throat Hospital

No plans are available for future expansion or alterations to the Eye, Ear, Nose and Throat Hospital.

— (5) Tulane University

- Construct a Research Building adjacent to the proposed New Education Building. (H)
- Construct a New Education Building immediately to the east of the present building and connected to it. (I)

- Construct a 300-bed Teaching Hospital immediately northeast of the existing Education Building across Tulane Avenue. (J)
- Construct a 5-story addition on top of the existing building to house the School of Public Health and Tropical Medicine.
- Construct an above-grade link between all structures as part of the interchange network and distribution system.
- Make the necessary alterations to the existing teaching facility to serve the Clinical Science departments.

(6) HEAL

- Construct an above-grade link between the parking structure and the existing above-grade network and between the parking structure and the Tulane parking structure as parts of the interchange network and distribution system.
- Construct a Central Energy Plant.
 - The Central Energy Plant should be planned as an integral part of the total Complex system.
 - The distribution lines from the plant should be a part of the interchange network and distribution system of the Complex.
- Arrange with Charity Hospital to make the alterations necessary to provide centralized food service and general stores to the two medical schools as well as to Charity itself.

- Construct or arrange for the construction of student and staff housing units as indicated. (H)
- Construct shared service facilities across Tulane Avenue including doctors' offices, commercial offices, medical records center and a library. (K) & (L)

The above list represents a very active future growth program. The HEAL Complex, including the Veterans Administration and Eye, Ear, Nose and Throat Hospitals, has presently 3.7 million square feet of floor space on the 43-acre site. The ultimate development of the future will increase the Complex to over 7 million square feet, which will better than double the current facilities.

1.3.2 Proposed Growth

The proposed initial ICES Central Plant and system will be designed to provide for the existing and near-future HEAL Complex buildings. Additional capabilities to satisfy the ultimate HEAL master plan development will be taken into consideration to allow incremental expansion of the plant as the new facilities become operational. For this reason the plant site and the major distribution systems will be sized to fulfill the overall existing and future requirements; however, the initial construction will accommodate only the existing facilities and near-future construction.

1.3.3 Demonstration System

Both candidate ICES plant capacities for thermal service demands are based on anticipated demand levels for existing building services and for developing services that are expected to materialize with new building construction within the next eight to ten years. It is felt that for plants in these ranges of sizes it would be uneconomical and imprudent to restrict initial equipment to immediate requirements and plan to add additional equipment during expansion of demand within a relatively short period of time.

The incremental development of demand for the two thermal utilities follows:

<u>Year</u>	<u>Community</u>	<u>Steam</u> <u>Pounds/Hour</u>	<u>Air-Conditioning</u> <u>Tons</u>
Initial	Existing Buildings	116,140	8,210
1980-81	LSU Basic Science	20,100	1,340
1981-85	Other Future Consumers	<u>20,810</u>	<u>2,710</u>
	Cumulative, year 1985	157,050	12,260

Blank

1-3-8

1.4 CONVENTIONAL ENERGY SYSTEM

1.4.1 Identification

The Conventional Energy System is defined as a conventional central heating/cooling plant with no electric generation and is identified as Plant System - 1. It utilizes more conventional steam pressures and temperatures, less expensive equipment and is also coal-fired, with oil standby. This plant system is included as a basis of evaluation with Plant Systems 3 and 4 and is not offered as a candidate system.

1.4.2 Existing Plant System

This plant system is also conventional in nature in that it currently exists and is composed of eight individual plants serving the member institutions forming the HEAL Complex, and also considers similar plant systems for the buildings planned for construction in the near future. This system is identified herein as Plant System - 2.

These plants at present generate steam at relatively low pressures and temperatures and provide cooling effect by means of steam turbine driven and electric driven centrifugal equipment. Fuel is basically interruptible gas, with some plants having oil standby burning capability but without oil storage and piping systems.

Retrofitting the existing boilers for oil is feasible,

providing space for oil storage and truck access can be made available. This probably can be accomplished at certain plant locations, i.e., the larger plants, with others being too cramped for space to allow such accommodation.

1.4.3 Heat Balances, Conventional Energy System

Heat balances have been developed for Plant System - 1, Conventional Energy System, and are included in HB - 1, HB - 2, and HB - 3. These heat balances are based on supplying steam, at 270 psi saturated, for heating functions, and chilled water for cooling purposes; no electrical power would be generated.

HEAL GRID CONNECTED I.C.E.S.

PLANT SCHEME 1
270PSI SATURATED

H.B. NO. 1

Conventional Plant
No Electrical Generation

Maximum Heating Day
Steam to system 150,000#/Hr.
Cooling to system 4,000 Tons
(4,000 Tons @ 96% = 3,850 Tons)

HEAL GRID CONNECTED I.C.E.S.

H.B. NO. 2

PLANT SCHEME I
270PSI SATURATED

Conventional Plant
No Electrical Generation

Maximum Cooling Day
Steam to system 90,000#/hr
Cooling to system 12,000 Tons
(12,000 Tons @ 88.5% = 10625 Tons)

HEAL GRID CONNECTED I.C.E.S.

PLANT SCHEME I
270PSI SATURATED

H.B. NO. 3

Average Annual Load

Steam to system 518,000,000#

Cooling to system 37,000,000 Ton Hrs
(4,223 Tons @ 91% = 3,850 Tons)

Conventional Plant
No Electrical Generation

The following values are derived from these heat balances:

(1) Maximum Heating Day

150,000 #/hr base; 1202 BTU/# = 150,000#/hr to System

Cooling Load = 4,000 tons at 96% diversity

= 3,850 tons to system

(See Heat Balance No. 1)

(2) Maximum Cooling Day

50,000 #/hr base; 1202 BTU/# = 50,000 #/hr to System

Cooling Load = 12,000 tons at 88.5% diversity

= 10,625 Tons to System

(See Heat Balance No. 2)

(3) Average Annual Load

Steam to Heat System

518,000,000 #Steam

37,000,000 ton-hours,

60,000 #/hr Avg.
to System

at 91% diversity

$$\frac{37,000,000 \times .91}{8760} = 3850 \text{ Tons Avg.}$$

1.4.4 Cost Estimates

(1) Plant System - 1 (Conventional Energy System)

Site Work	\$	175,000
Building 1,040,000 cu. ft. @ \$1.50/cu. ft.		2,760,000
Boilers, 2 @ 250,000 #/hr. @ \$14.00/#		7,000,000
Deaerating F.W. Heater & B.F. Pumps		115,000
Condensate Receiver & Pumps		40,000
Steam & Condensate Piping		1,100,000
Water Treatment		30,000
Misc. Equip. & Piping		45,000
Coal Hopper (Overhead)		55,000
Coal Handling		350,000
Ash Handling		150,000
Oil System		200,000
Stack		350,000
Electrical		850,000
Refrigeration Units, 3 @ 5,000 tons @ \$140/T		2,100,000
Cooling Towers		750,000
Chilled Water & Condenser Water Pumps & Piping		1,075,000
Misc. Pumps & Equipment		<u>70,000</u>
	\$	17,215,000
Contingencies		<u>1,721,000</u>
	\$	18,936,000
Escalation		<u>1,893,600</u>
TOTAL	\$	<u><u>20,829,600</u></u>

(2) Plant System - 2 (Existing Plants)

All costs are based on 1977 replacement values.

(a) Summary

<u>Operators Employed</u>	<u>Institution</u>	<u>Number of Plants</u>	<u>Costs</u>
23	Tulane	3 Plants	\$ 2,599,000
8	LSU	4 Plants	2,588,550
4	EENT	1 Plant	226,800
10	VA	1 Plant	1,299,000
<u>9</u>	Charity	1 Plant	2,910,000
54 Total			
	10-Plant Total		\$ 9,623,350
	Contingencies		<u>963,000</u>
			\$ 10,586,350
	Emissions Control		<u>1,000,000</u>
	TOTAL		\$ 11,586,350

<u>(b) Tulane Environmental Medicine Plant</u>		<u>Costs</u>
Heating 3600 #/hr @ \$10.00/#	\$	36,000
Cooling 113 tons @ \$300/ton		33,900
Building Space) 60,000 cu. ft. Stack Space) @ \$1.50/cu. ft.		90,000
Fuel System		20,000
Plumbing & Ventilation		25,000
Electrical		<u>10,000</u>
Sub-Total	\$	214,900

<u>(c) Tulane Hospital</u>		
Heating 29,325 #/Hr @ \$8.00/#	\$	234,600
Cooling 2190 tons @ \$250/ton		547,500
Building Space) Stack Space) 150,000 cu. ft. @ \$1.50/cu. ft.		225,000
Fuel System		30,000
Plumbing & Ventilation		40,000
Electrical		<u>22,000</u>
Sub-Total	\$	1,099,100

<u>(d) Tulane Medical School</u>		
Heating 42,000 #/hr @ \$7.50/#	\$	315,000
Cooling 2,000 tons @ \$230/ton		460,000
Building Space) 250,000 cu. ft. Stack Space) @ \$1.50/cu. ft.		375,000
Fuel System		40,000
Plumbing & Ventilation		60,000
Electrical		<u>35,000</u>
Sub-Total	\$	1,285,000
<u>Total Tulane, \$2,599,000</u>		

(e) LSU Residence Hall

Heating 9340 #/hr @ \$10.00/#	\$	93,400
Cooling 300 tons @ \$300/ton		90,000
Building Space) Stack Space	110,000 cu. ft. @ \$1.50/cu. ft.	165,000
Fuel System		25,000
Plumbing & Ventilation		30,000
Electrical		<u>18,000</u>
Sub-Total	\$	421,400

(f) LSU Medical School

Heating 15,000 #/hr @ \$9.00/#	\$	135,000
Elect. Cooling 1095 tons @ \$230/ton		251,850
Building Space) Stack Space	130,000 cu. ft. @ \$1.50/cu. ft.	195,000
Fuel System		30,000
Plumbing & Ventilation		35,000
Electrical		<u>25,000</u>
Sub-Total	\$	671,850

(g) LSU Basic Science

Heating 20,700 #/hr @ \$9.00/#	\$	186,300
Cooling 2,000 tons @ \$230/ton		460,000
Building Space) Stack Space	150,000 cu. ft. @ \$1.50/cu. ft.	225,000
Fuel System		35,000
Plumbing & Ventilation		40,000
Electrical		<u>28,000</u>
Sub-Total	\$	974,300

(h) LSU Ambulatory Care

Heating 10,000 #/hr @ \$10.00/#	\$ 100,000
Cooling 700 tons @ \$240/ton	168,000
Building Space } Stack Space } 120,000 cu. ft. @ \$1.50/cu. ft.	180,000
Fuel System	25,000
Plumbing & Ventilation	30,000
Electrical	<u>18,000</u>
Sub-Total	\$ 521,000
<u>Total LSU, \$2,588,550</u>	

(i) EENT Hospital

Heating 1900 #/hr @ \$12.00/#	\$ 22,800
Cooling 300 tons @ \$300/ton	90,000
Building Space } Stack Space } 50,000 cu. ft. @ \$1.50/cu. ft.	75,000
Fuel System	12,000
Plumbing & Ventilation	15,000
Electrical	<u>12,000</u>
<u>Total, EENT Hospital</u>	\$ 226,800

(j) Veterans Administration Hospital

Heating 57,000 #/hr @ \$7.00/#	\$ 399,000
Cooling 2,000 tons @ \$230/ton	460,000
Building Space) Stack Space) 190,000 cu. ft. @ \$1.50/cu. ft.	285,000
Fuel System	50,000
Plumbing & Ventilation	65,000
Electrical	<u>40,000</u>
<u>Total, VA Hospital</u>	<u>\$ 1,299,000</u>

(k) Charity Hospital

Heating 120,000 #/hr @ \$7.00/#	\$ 840,000
Cooling 3000 tons @ \$230/ton	690,000
Cooling Pkg. 1300 tons @ \$500/ton	650,000
Building Space) Stack Space) 300,000 cu. ft. @ \$1.50/cu. ft.	450,000
Fuel System	60,000
Plumbing & Ventilation	75,000
Electrical	80,000
Electrical Pkg.	<u>65,000</u>
<u>Total, Charity Hospital</u>	<u>\$ 2,910,000</u>

1.5 CANDIDATE ICES

1.5.1 Plant Systems Description

(1) Plant System - 3

This plant system contemplates producing high-pressure, high-temperature steam, passing through a steam turbine driving an electric generator and then to the steam distribution system for use in the various institutional buildings. This concept allows for the generation of by-product electric power to be fed into the NOPSI grid system. The power so generated will be variable and directly dependent upon the steam generated to serve the community building systems.

It is further planned that this plant is to be coal-fired, with No. 2 fuel oil as an alternate standby fuel.

The plant will be complete with 100% standby boiler capacity, one turbine-generator and standard auxiliary equipment, including staged feed water heating to maximize system efficiency. The coal handling and storage facilities on site will be totally enclosed to minimize fugitive dusting, noise and unsightliness.

It is planned that five to six days' supply of maximum coal consumption would be maintained on the site, with an additional supply for not less than 30 days at the New Orleans Public Bulk Terminal located east of the

City and approximately 30 minutes trucking time from the plant.

The plant will also be equipped with a No. 2 fuel oil standby system with a storage capacity of approximately three days' supply at maximum load.

A completely enclosed ash handling and storage system is also included in the proposed plant design.

At the gas exit of the boilers primary dust collectors, economizers and bag filters or electrostatic precipitators will be provided to clean up the gas prior to discharge, with a single radial stack approximately 300 feet above grade.

The plant will provide space for offices, locker rooms, maintenance shops and storage for spare parts and either allow space for expansion or be so arranged that incremental space can be added at a later date as needed.

The steam distribution system will emanate from the plant and proceed north to the community on Freret Street, also west to LSU buildings on the west side of Claiborne Avenue.

The steam will be provided from the turbine generator exhaust header at approximately 185 psig and 575° superheat. If necessary, this steam could be desuperheated prior to entrance into the distribution system.

Necessary water treatment equipment will be provided as required.

1.6.1(2) Plant System - 4

This plant system is basically similar to Plant System - 3 as described but, in addition, will provide cooling effect to the community as well.

It is planned that the cooling effect will be generated by steam turbine driven centrifugal compressors taking steam from the exhaust header of the steam turbine generator set.

This arrangement provides for a heat sink during the cooling season as does Plant System - 3, the difference being that in the case of Plant System - 3 the cooling effect is accomplished by equipment installed in the community plants, as differentiated from Plant System - 4, which produces cooling effect at the proposed plant and provides for chilled water distribution to the community -- much in the same manner as the steam distribution system.

Plant System - 4 would require a larger facility than Plant System - 3 to house the refrigeration equipment and provide for the necessary cooling towers which would be mounted on the roof portion of the plant over the refrigeration equipment. All other features of the plant would be substantially as described for Plant System - 3.

The demonstration plants have been considered as producing by-product electrical power, as differentiated from the primary thermal utilities of steam and chilled water, and therefore have not been provided with standby or split load capacity for electrical generation. If two turbine generators were provided at approximately 5000 KW capacity each, the cost of the equipment would increase to approximately \$220 per KW, or \$1,100,000 each, versus \$1,575,000 for the single 11,220 KW unit and would be difficult to justify economically.

The reliability of this type of equipment is very high and normally requires less than 10 days to two weeks down time every two to five years.

1.5.2 Site Requirements

The primary site, as previously indicated, is the one square block area adjacent to Perdido Street on the north, Poydras Street on the south, Freret Street on the east and Robertson Street on the west.

Plant System - 3, if never planned to be converted and expanded to a Plant System - 4, would require approximately the northern 200 feet of the entire block. This assumes that there will be no ground storage of coal at this location but rather incorporating a vertical storage facility in conjunction with the enclosed truck unloading facility.

Plant system - 4, as previously indicated, utilizes virtually the entire block; however, if we again assume no ground coal storage on this site as above, we would probably require approximately 260 - 275 feet of the entire block, leaving approximately 125 - 140 feet of the south portion of the site for other purposes.

The site will require an adequate supply of water, storm and sanitary sewer connections, as well as a major connection facility to WOPSI electrical distribution system.

It is planned that the cooling towers would be roof mounted and enclosed with an architectural treatment consistent with the main plant building to present a pleasing appearance.

1.5.3 Selection of Optimum Plant Cycle & Electrical Generating Unit Considerations

Turbine Generators

Unit	Throttle Conditions	Throttle Flow, #/hr.	Max. Exhaust Condition	KW Max.	Cost	Cost/KW	#Steam/KW
1	950#/900F	230,000	185#-1315h	9062	\$1,320,000	\$145/KW	25.38#/KW Max.
2	1250#/950F	230,000	185#-1298h	11220	\$1,526,000	\$136/KW	20.58#/KW Max.
3	1335#/780F	230,000	185#-1218h	9357	\$1,400,000	\$150/KW	24.58#/KW Max.
4	1450#/950F	230,000	185#-1288h	11740	\$1,600,000	\$137/KW	19.68#/KW Max.

The optimum system requires a unit with a capacity in excess of 10,000 KW, with lowest steam rate, highest exhaust enthalpy and lowest cost per KW. This unit is selected as No. 2 above.

For purposes of comparison, unit 1 above was used to test the above criteria and a heat balance for each unit was run at the plant maximum cooling day condition. The results prove out the above criteria, indicating unit 2 is capable of generating 9200 KW, versus 7200 KW for unit 1, with a net heat rate saving of 530,000 BTU/hr. (See heat balances Nos. 8 & 8A and Table 1.)

1.5.4 Heat Balances

The heat balances indicate plant operational modes under maximum daily load conditions for the heating and cooling seasons, as well as the annual average plant load condition. Days of minimum load would occur in the spring and fall during days of minimal heating and cooling requirements. Remaining loads would be due to process steam requirements, distribution losses and plant steam use. These days are quite rare and probably do not exceed 20 days per year.

The maximum fuel input occurs in Plant System - 4, Heat Balance 7, maximum heating day at 198,480 #/hr. of steam generated, while providing maximum heating requirement of 150,000 #/hr., 4000 tons of cooling effect and 9.5 megawatts of electrical energy.

At this condition, it is estimated that a peak hour value would be in excess of these quantities by approximately 10%, or totals of 218,000 #/hr., 4400 tons and 10.5 megawatts.

Plant system - 3, HB 4, maximum heating day, is noteworthy in that essentially the same community needs are met, with the exception of the cooling effect i.e., 2,400 tons vs. 3,850 tons. Cooling for Plant System - 3 is accomplished by means of existing steam and electric driven equipment provided within the community plant system. Plant System - 4 generates 400 KW more than

Plant System - 3. These cooling and electrical services would require an additional 34×10^6 BTU fuel input for Plant System - 3.

The average annual heat balances were calculated to provide a measure of the total annual utilities provided to the HEAL community in order that total fuel costs would be calculated and total by-product electrical generation determined. These values, as well as steam and cooling effect to the community, are the parameters on which monetary values can be placed, thus determining energy input costs and energy output values.

Heat Balances 1, 2 and 3 for Plant System - 1 show that a conventional energy plant, 270 psig saturated, requires more steam generation in pounds/hour than either Plant System 3 or 4, without benefit of any by-product electric power generation. This larger boiler capacity requirement could well pay for the difference in the cost of high pressure boilers (1250 - 950 F for Plant Systems 3 and 4) as compared to 300 psi design (i.e. approximately 20% larger).

Table No. 1
COMPARATIVE HEAT BALANCE
FOR MAXIMUM COOLING DAY
PLANT SYSTEM - 4

<u>System</u>	<u>1250#/950F</u>	<u>850#/900F</u>	<u>Difference</u>
Total Steam	190,050#/hr.	188,242#/hr.	1,808#/hr.
Kilowatts	9,200 KW	7,200 KW	2,000 KW
Fuel input, BTU/hr.	305.5×10^6	299.2×10^6	6.3×10^6
2,000 KW x 3415 = 6,830,000 BTU/hr.			
Less Diff. 6,300,000 BTU/hr.			
Net Gain 530,000 BTU/hr.			

This comparative analysis, based on Heat Balances Nos. 8 and 8A, is made to indicate the advantages of using the higher pressure and temperature of 1250 psig/950F vs. 850 psig/900F.

Table No. 2
UTILITY SERVICE

Building	(1) Steam System		Cooling System	
	(2) Demand Lbs/Hr	Annual Lbsx10 ³	Demand Tons	(3) Annual Tonsx10 ³
<u>Eye, Ear, Nose, Throat Hosp.</u>	1,140	3,600	200	600
<u>L.S.U.</u>				
Residence Hall	7,600	17,800	300	900
Medical School	15,000	28,100	1,000	3,000
Basic Science (under const.)	20,100	37,600	1,340	4,020
Amb. Care/Clinic (future)	9,380	17,500	625	1,875
Sub-Total	52,080	101,000	3,265	9,795
<u>Tulane</u>				
Medical School	11,100	42,100	1,575	4,725
Hospital	15,200	78,700	1,970	5,910
Environmental Medicine	3,600	16,600	90	270
Future (Med. Sch. Expansion)	7,300	30,000	485	1,455
Sub-Total	37,200	165,400	4,120	12,360
<u>Veterans Adm Hospital</u>				
Existing	16,500	47,200	1,200	3,600
Future	4,130	11,800	300	900
Sub-Total	20,630	59,000	1,500	4,500
<u>Charity Hospital</u>	46,000	189,000	(4) 3,175	(4) 9,525
Total	157,050	518,000	12,260	36,780
Design Capacity	180,000	518,000	12,000	37,000

- (1) Includes all steam and hot water requirements for all building functions except turbine-drive air conditioning equipment.
- (2) Maximum Winter day demand at 7:00 A.M.
- (3) Based on 3000 equivalent full load hours.
- (4) Includes future conversion of existing local DX systems to chilled water served by central plant.

(1) Load Data - Heat Balances

Basic load data for the existing facilities were procured and analyzed and to these values additional values were included for the proposed HEAL Master Plan Phase I addition, with the following load data projected for maximum heating day, maximum cooling day, and average annual values, as shown in Table No. 2, Utility Service.

(a) Plant Scheme 3 - No refrigeration generated

Maximum Heating Day (1250#/950F)

150,000 #/hr (1202h base equiv.) -	150,000 #/hr.
4,000 tons refrigeration load	
60% by steam = 2400 tons @ 15#/ton =	<u>36,000 #/hr.</u>
Total	186,000 #/hr.

Steam generated @ 1250#/950F
Steam turbine exhaust @ 1305h
Equiv. steam to system = $186,000 \times \frac{1202}{1299} = 172,110\#/hr.$

(See Heat Balance No. 4)

Maximum Cooling Day

12,000 tons - 60% by steam =	7,200 tons
7,200 tons x 15#/ton	108,000#
80,000 #/hr. to heat	<u>80,000</u>
Total	188,000#/hr.

$188,000 \times \frac{1202}{1300} = 173,427\#/hr.$
to system

(See Heat Balance No. 5)

Average Annual Load

Steam to heat system	518,000,000# Annual
Cooling 37,000,000 tons-hrs.	
@ 65% steam	
= 22,200,000 @ 15#/ton =	<u>333,000,000</u>
Total	851,000,000 # Steam

$851,000,000 \times \frac{1202}{1323} = 773,168,500 \# \text{ Annual}$
Average Load = 88,260 #/hr.

Electric generation = 3,800 KW x 8760 hrs =
33,288,000 KW hrs

(See Heat Balance No. 6)

(b) Plant Scheme 4 - Plant Total Refrigeration

Maximum Heating Day (1250#/950F)

150,000 #/hr (1202h base equiv.) - 150,000 #/hr.
4,000 tons refrig. load @ 96% Div. = 3850 Tons

$$150,000 \times \frac{1202}{1297} = 138,840 \text{ #/hr. Steam to system}$$

Steam generated @ 1250/950F 198,480 #/hr.

Steam turbine exhaust at 1297h

(See Heat Balance No. 7)

Maximum Cooling Day (1250#/950F)

80,000 #/hr. steam to heat - 80,000 #/hr.

12,000 tons @ 85% Div. = 10,625 tons

$$80,000 \text{ #/hr} \times \frac{1202}{1302} = 73,855 \text{ #/hr. Steam to system}$$

Steam generated @ 1250/950F 190,050 #/hr.

(See Heat Balance No. 8)

Maximum Cooling Day - Comparative H.B.

850#/900F

80,000 #/hr. Steam to heat 80,000 #/hr.

12,000 tons @ 85% Div. = 10,625 tons

$$80,000 \text{ #/hr} \times \frac{1202}{1318} = 73,292 \text{ #/hr. Steam to System}$$

Steam generated @ 850/900F 188,242 #/hr.

(See Heat Balance No. 8A)

Average Annual Load

Steam to Heat System	518,000,000 #Steam
Cooling: 37,500,000 ton/hrs.	59,130 #/hr.
	Avg.
= 4223 tons/hr. x Div. 91% = 3850 tons/hr. Avg.	
$59,130 \times \frac{1202}{1310} =$	54,255 #/hr.
	Steam to System
Steam generated @ 1260/950F	102,858#
Electric generation: 4,100 KW x 8760 hrs. =	
(See Heat Balance No. 9)	35,916,000 KW hrs.

Summary of Heat Balances 1 through 9 follows, along with individual Heat Balances 4 through 9. For Heat Balances 1, 2 and 3, see Section 1.4.

HEAT BALANCE SUMMARY

<u>Heat Balance</u>	<u>Load Condition</u>	<u>Steam Generated</u> <u>#/hr.</u>	<u>Cooling</u> <u>Effect</u> <u>Tons</u>	<u>Megawatts</u> <u>Generated</u>	<u>Fuel Input</u> <u>BTU/hr. x 10⁶</u>
<u>Plant System -1 (270 psi sat. - No Electrical Generation)</u>					
HB 1	Max. Heating Day	218,675	3,850	-	279.3
HB 2	Max. Cooling Day	240,240	10,625	-	303.6
HB 3	Average Annual	119,505	3,850	-	152.9
<u>Plant System -3 (1250#/950F - No Cooling Effect)</u>					
HB 4	Max. Heating Day	189,366	2,400	9.1	304.5
HB 5	Max. Cooling Day	190,777	7,200	9.2	306.7
HB 6	Average Annual	99,185	2,534	3.8	159.9
<u>Plant System -4 (1250#/950F - with Cooling Effect)</u>					
HB 7	Max. Heating Day	198,480	3,850	9.5	320.4
HB 8	Max. Cooling Day	190,050	10,625	9.2	305.5
HB 8A*	Max. Cooling Day	188,242	10,625	7.2	299.2
HB 9	Average Annual	102,858	3,850	4.1	164.2

*HB 8A appears for comparative information only, using steam at 850 psi and 900F.

Plant System - 4 (HB 7) has the highest fuel input, but when compared to Plant System -3 (HB 4), it is obvious that it provides 1,450 tons and 400 KW more than Plant System - 3. This additional delivered energy would require a fuel input of 34.4×10^6 BTU, which is in excess of the difference of fuel input for the two schemes, i.e., $320.4 - 304.5 = 15.9 \times 10^6 < 34.4 \times 10^6$; therefore, Plant System - 4 is more fuel efficient than Plant System - 3.

This is true for each Heat Balance comparison of Plant System - 4 vs. Plant System - 3.

Also Plant System - 4 compares favorably with conventional Plant System - 1. The largest fuel input difference occurs on a maximum heating day - HB 7 vs. HB 1. Both plant systems provide the same thermal requirements, however Plant System - 4 provides 9,500 KW of electrical energy in addition to the other services. The fuel input difference - 320.4×10^6 - 279.3×10^6 equals 41.1×10^6 , or 4,230 BTU/KW generated. A comparison of HB 8 and HB 8A values indicates the advantages of plant operation at 1250/950 vs. 850/900, as an additional 2,000 KW are generated for a fuel input difference of 6.3×10^6 BTU, or 3,150 BTU/KW.

It therefore can be concluded that Plant System - 4 is the preferred system from the standpoint of thermal efficiency.

Heat Balance Nos. 1 through 9 treat the plant load conditions as they would exist at the completion of Phase 1 of the HEAL Master Plan.

Phase 2 of the Master Plan suggested the addition of approximately 3,165,000 square feet, to bring the entire community to a gross area of 7,700,000 square feet, or an increase of approximately 70% over the total space at the

Phase I level of 4,525,000 square feet. Maximum hourly steam loads for the plant could approach 325,000 #/hr. at this point of time which has not been specifically determined as of this date.

HEAL GRID CONNECTED I.C.E.S.

PLANT SCHEME 3
1250 PSI — 950°F

H.B. NO. 4

Maximum Heating Day
Steam to system 150,000#/HL
Cooling to system 2,400 Tons
(4,000 Tons @ 60% Steam)

HEAL GRID CONNECTED I.C.E.S.

PLANT SCHEME 3
1250 PSI — 950°F

H.B. NO. 5

Maximum Cooling Day
Steam to system 80,000#/hr
Cooling to system 7200 Tons
(10,625 Tons @ 60% Steam)

HEAL GRID CONNECTED I.C.E.S.

PLANT SCHEME 3
1250 PSI — 950°F

H.B. NO. 6

Average Annual Load

Steam to system 518,000,000#

Cooling to system 37,000,000 Ton Hrs.

@ 60° Steam = 22,200,000 Ton Hrs.

HEAL GRID CONNECTED I.C.E.S.

PLANT SCHEME 4
1250 PSI — 950°F

H.B. NO. 7

Maximum Heating Day
Steam to system 150,000#/Hr.
Cooling to system 4,000 Tons
(4,000 Tons @ 96% = 3,850 Tons)

HEAL GRID CONNECTED I.C.E.S.

PLANT SCHEME 4
1250 PSI — 950°F

H.B. NO. 8

Maximum Cooling Day
Steam to system 80,000#/Hr.
Cooling to system 12,000 Tons
(12,000 Tons @ 88.5% = 10,625 Tons)

HEAL GRID CONNECTED I.C.E.S.

HLB. NO. 8A

PLANT SCHEME
850 PSI — 900°F

Maximum Cooling Day
Steam to system 80,000#/hr.
Cooling to system 12,000 Tons
(12,000 Tons @ 88.5% = 10,625 Tons)

HEAL GRID CONNECTED I.C.E.S.

PLANT SCHEME 4
1250 PSI — 950°F

H.B. NO. 9

Average Annual Loads
Steam to system 58,000,000#
Cooling to system 37,000,000 T.Hrs.
(4,223 Tons @ 91% = 3,850 Tons)

COST ESTIMATES

<u>Item</u>	<u>Plant System -3</u>	<u>Plant System -4</u>
Site Work	\$ 150,000	\$ 175,000
Building @ \$1.50 cu. ft.	1,950,000	3,007,500
Boilers, 2 @ 225,000 #/hr.	7,200,000	7,200,000
Turbine Generator, 11,220 KW	1,575,000	1,575,000
Deaerating F.W. Heater & B.F. Pumps	150,000	150,000
Condensate Receiver & Pumps	40,000	40,000
F.W. Stage Heater	8,000	8,000
Steam & Condensate Piping	1,250,000	1,500,000
Water Treatment	40,000	85,000
Misc. Equipment & Piping	50,000	80,000
Coal Hopper Overhead	55,000	55,000
Coal Handling	350,000	350,000
Ash Handling	150,000	150,000
Oil System	200,000	200,000
Stack 300'	350,000	350,000
Electrical Work	750,000	1,050,000
Refrigeration Units	--	2,100,000
Cooling Towers	--	750,000
Chilled Water & Condenser Water Pumps & Piping		<u>1,075,000</u>
Totals	\$ 14,268,000	\$ 19,900,500
Contingencies	<u>1,426,000</u>	<u>1,990,000</u>
	\$ 15,694,000	\$ 21,890,500
Escalation	<u>1,569,000</u>	<u>2,189,000</u>
Total	\$ 17,263,000	\$ 24,079,500

1.5.6 Distribution Piping Systems

Plant System - 3 - Power and Steam Generation: --

Under the concept of Plant System - 3, the distribution system for steam and condensate return will be run elevated above ground, coincident, wherever possible, with planned elevated interconnecting pedestrianways between HEAL complex buildings. This pipe system will be welded construction, seamless, Schedule 40 steel pipe for steam; Schedule 80 for condensate return. Insulation will be calcium silicate with aluminum protective cover. Meters and valves will be provided in branches to all buildings.

Since this steam distribution system will be maintained at approximately 185 psig, at those Community buildings where lower pressures are required, i.e., all except Charity Hospital and Tulane Medical School, pressure-reducing stations will be provided. The system mains and branches will be able to accommodate steam demands for present requirements, as well as for possible conversions to steam energized air conditioning chillers in those buildings that now are equipped with motor-driven chillers.

<u>Estimated Costs:</u>	<u>Steam</u>	<u>Condensate</u>	<u>Total</u>
	\$305,000	\$222,000	\$527,000

Plant System - 4 - Power, Steam, Chilled Water

Generation: ---

Under the concept of Plant System - 4, the steam and condensate distribution system described under Plant System - 3 will be the same. In addition, piping systems for chilled water supply and return will be installed, following the same routing as for the steam system. This piping will be welded construction, seamless, Schedule 40 steel. Insulation will be equivalent of 2-inch urethane, with vapor barrier and aluminum protective cover. Meters, mixing valves and isolating valves will be installed in each building's branch line.

Estimated Costs:	<u>Steam</u>	<u>Condensate</u>	<u>Chilled Water</u>	<u>Total</u>
	\$305,000	\$222,000	\$960,000	\$1,487,000

ICES
ROUTING OF DISTRIBUTION SYSTEM FOR THERMAL UTILITIES

DE LAUREL ENGINEERS, INC.
CONSULTING ENGINEERS
NEW ORLEANS, LA

SCALE
100 0 200 FEET

EXHIBIT VII

1-5-28

1.5.7 Costs, Revenues, Efficiency

(1) Owning and Operating Costs

The following estimated annual Owning and Operating Costs are presented for each of the Plant Systems studied.

The first costs represent estimated plant costs as well as estimated utility distribution costs with the exception of electrical tie to grid.

Depreciation is taken over 20 years. Interest is taken as 6% per annum, or leveled at 3.15% of first costs.

Insurance is taken as 1/2 of 1% of plant costs.

Equipment maintenance contract costs are taken at approximately 1% per year of equipment cost.

Fuel cost for coal is \$1.60 per million BTU; for gas, \$1.75 per million BTU.

Electrical costs were figured at \$0.035 per KWH.

Water and sewer costs were based on current city rates.

Operating labor costs were taken at \$20,000 per year per man for ICES plant personnel, and at \$18,000 for HEAL institution plant personnel.

Maintenance labor and materials costs include two maintenance men plus materials.

Land cost for the plant site is estimated at \$4,000,000.

ANNUAL OWNING - OPERATING COST

	<u>Plant System - 1</u> <u>Conventional</u>	<u>Plant System - 3</u> <u>Power, Steam</u>	<u>Plant System - 4</u> <u>Power, Steam, Cooling</u>
<u>Initial Capital</u>			
<u>Outlay (1)</u>			
Plant System	\$ 20,829,000	\$ 17,263,000	\$ 24,079,500
Distribution System	<u>1,487,000</u>	<u>527,000</u>	<u>1,487,000</u>
Total	<u>\$ 22,316,000</u>	<u>\$ 17,790,000</u>	<u>\$ 25,566,500</u>
<u>Fixed Costs:</u>			
Depreciation, (20 yrs.)	\$ 1,115,800	\$ 889,500	\$ 1,278,325
Interest, (6%) (2)	828,954	686,385	931,344
Insurance, (0.5%)	111,580	88,950	127,832
Maintenance Contract	<u>125,000</u>	<u>100,000</u>	<u>150,000</u>
Sub-Total	\$ 2,181,334	\$ 1,764,835	\$ 2,487,501
<u>Operating Costs:</u>			
Fuel	\$ 2,143,046	\$ 2,232,190	\$ 2,301,427
Electricity in Plant	379,953	100,810	369,596
Electricity-Refrig. Effect-HEAL (3)	-	619,627	-
Water/Sewer	60,000	5,500	60,000
Operating Labor, Plant (24)	480,000	(20) 400,000	(24) 480,000
Operating Labor, HEAL Complex	-	(54) 972,000	-
Maintenance Labor & Materials	<u>60,000</u>	<u>50,000</u>	<u>70,000</u>
Sub-Total	\$ 3,122,999	\$ 4,380,127	\$ 3,281,023
<u>Management Fee (4)</u>	562,139	501,930	590,584
<u>Total Annual Owning & Operating Costs</u>	<u>\$ 5,866,472</u>	<u>\$ 5,646,892</u>	<u>\$ 6,359,109</u>

- (1) Plant system and distribution system only; land costs not included.
 (2) Interest on land purchase of \$4,000,000 included in total interest charge.
 (3) Plant System - 3 is adversely affected by the need to operate the existing plants' cooling systems, requiring some electric drive equipment, electric driven auxiliaries, and a complete staff of 54 men total among the several individual plants.
 (4) Management Fee calculated at 18% of operating costs.

(2) Estimated Annual Revenues

Annual revenues were estimated for each of the three plant systems based on the following assumed rates:

Steam sales @ \$3.75 per 1,000 # steam.

Cooling Sales @ \$0.12 per ton hour

Electricity (sell-back) @ \$0.02 per KW hour

	<u>Plant System - 1</u>	<u>Plant System - 3</u>	<u>Plant System - 4</u>
<u>Annual Product Sales:</u>			
Steam	\$18,000,000#	851,000,000#	518,000,000#
Cooling	37,000,000 ton hrs.	--	37,000,000 ton hrs.
Electricity	--	33,288,000 KW hrs.	35,916,000 KW hrs.
<u>Sales Revenues:</u>			
Steam	\$ 1,942,500	\$ 3,191,250	\$ 1,942,500
Cooling	4,440,000	--	4,440,000
Electricity	--	665,760	718,230
Total Plant Revenue	\$ 6,382,500	\$ 3,857,010	\$ 7,100,730

Based on these revenue figures and the values for owning and operating costs shown in the immediately preceding table,

*Plant System - 1 shows a surplus of \$516,028 per year;

*Plant System - 3 shows a deficit of \$¹2,789,882 per year;

*Plant System - 4 shows a surplus of \$ 741,622 per year.

Plant System -4 is the most economically feasible and is also the most serviceable and efficient. (See efficiency evaluation in following paragraph.)

* Surplus and deficit figures are presented only to illustrate relative economics among the three systems. Product selling rates will reflect the effect of actual owning and operating costs.

(3) Relative Plant Efficiencies

On the basis of heat input vs. heat output, relative efficiencies were calculated for each of the three plant systems, with the results tabulated as follows:

EVALUATION OF PLANTS ON BASIS OF
ENERGY INPUT VS. ENERGY OUTPUT

Equivalent BTU/Hour x 10⁶

Plant System - 1 Plant System - 3 Plant System - 4

Average Hourly
Input

Fuel	152.90	159.30	164.20
Electrical	<u>4.20</u>	<u>1.13</u>	<u>4.12</u>
Total	157.10	160.43	168.32

Average Hourly
Output

Cooling	46.20	--	46.20
Steam	71.07	105.50	71.07
Electric	<u>--</u>	<u>13.00</u>	<u>14.00</u>
Total	117.27	118.50	131.27

Efficiency: $\frac{\text{Output}}{\text{Input}}$	0.746	0.738	0.780
--	-------	-------	-------

(4) Existing Plant Systems Owning and Operating Costs
(Plant System-2)

This analysis of a theoretical plant system, as now exists with gas fuel, is based on 1977 replacement costs and is presented solely as a comparison to the candidate ICES plant systems No. 3 and No. 4 and the conventional Plant System -1. It includes gas-electric plant systems for existing plants and for near-future requirements.

First cost⁽¹⁾ \$11,586,350

Fixed costs:

Depreciation	579,317
Interest 6%	364,970
Insurance 0.5%	57,931
Maintenance	
Contract	<u>150,000</u>

Fixed Charges \$ 1,152,218

Operating costs:

Fuel (gas)	1,946,000
Electricity	619,627
Water-Sewer	70,000
Operating Labor	
(54)	972,000
Maintenance, Labor	
& Material	<u>65,000</u>
	\$ 3,672,627

Total Owning
& Operating \$ 4,824,845

(1) Land cost not included; assumed available on present property.
See cost estimates Section 1.4

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1-5-34

1.6 ELECTRIC POWER DISTRIBUTION

Agreements which depend upon the outcome of the feasibility study have been reached between NOPSI and HEAL as summarized below: (Refer to Exhibit 1.6.a, NOPSI letter dated March 17, 1977, in this section, and NOPSI and HEAL letters in Section 2.4 for further details.)

- (1) NOPSI will wholly own, operate and construct any electric distribution facilities emanating from the ICES central plant.
- (2) NOPSI will install a designated 24 KV distribution feeder from the ICES central plant to the existing NOPSI Derbigny sub-station at 1841 Julia Street. This feeder would be supplied from the generator through a 13.8 KV, 1200 V oil circuit breaker, 12 MVA, 13.8 - 24 KV autotransformer and 24 KV sectionalizing switches.

This feeder will utilize existing duct banks and will connect to the Derbigny sub-station 24 KV bus via a 24 KV, 600A oil circuit breaker and the appropriate sectionalizing switches. The total estimated installed cost of all equipment necessary to provide this interconnection is \$725,000.

The preceding agreements eliminate any problems associated with:

- (1) Electrical distribution and metering, as such will be

accomplished in accordance with established methods and procedures and existing requirements.

- (2) Load transfer and associated interruptions and transients on critical loads, as the utility company grid will remain the primary electrical power source under any circumstances and the maximum power supplied to the utility company grid will be a very small percentage of the grid capacity.

NEW ORLEANS PUBLIC SERVICE INC.

POST OFFICE BOX 88300

NEW ORLEANS, LOUISIANA 70160

March 17, 1977

CHARLES J. GINNOTT
VICE PRESIDENT

4845 GUST LEE BLVD-2ND
ST NEW ORLEANS, LA 70114

Mr. W. D. de Laureal, Sr.
de Laureal Engineers, Inc.
1512 International Trade Mart
Two Canal Street
New Orleans, Louisiana 70130

SUBJECT: ERDA "ICES" PROJECT

Dear Mr. de Laureal:

Your communication of March 2, 1977, requested information related to the preparation of the ICES study from BEAL and WOPSI.

Following is our response to your request listed under the various tasks shown in your outline:

TASK I

With respect to projections for future electric and gas costs, it must be recognized that the unsettled situation regarding national and local fuel supplies and costs make it impossible to prepare estimates with any degree of certainty. However, taking into consideration these limitations, our latest estimate of Fuel Adjustments and City Gate Cost Adjustments for the ten year period 1977-1986, which was prepared in June of 1976, is listed below:

ESTIMATED ADJUSTMENTS

<u>YEAR</u>	<u>ELECTRIC FUEL ADJUSTMENT - ¢/KWH</u>	<u>CITY GATE GAS COST ADJUSTMENT - ¢/MCF</u>
1977	1.770	11.51
1978	2.154	19.59
1979	2.083	28.54
1980	1.599	38.39
1981	1.317	49.18
1982	1.537	61.07
1983	1.452	74.08
1984	1.491	88.50
1985	1.562	104.34
1986	1.653	121.72

The above estimates were prepared prior to the FPC Opinions No. 770 and No. 770-A which established new higher national gas rates for interstate gas supplies. Estimates which will be made later this year will probably show an increase of about 75¢/MCF over those made prior to Opinions No. 770 and 770-A, for City Gate Cost Adjustments.

EXHIBIT 1.6.a

An Investor-Owned Company -- Member of The Southern Company System

1-6-3

Mr. W. D. de Laureat, Sr.
Page 2
March 17, 1977

TASK I (continued)

The above costs would be added to the costs derived from the base rates for Electric Schedule LR-2 and Gas Schedule LG-2, both of which are applicable for large customers similar to those comprising the NEAL complex. Copies of these schedules are attached.

TASK II

Under this section five (5) items are mentioned. Regarding Item 1 (Labor-Related Regulations) and Item 3 (Applicable Taxes), we know of no regulations or taxes that would be peculiar to the ICES system that are not already covered in our existing operations. Regarding Item 2 (Utility Regulations), Item 4 (Applicable Certificates for the System), and Item 5 (Analysis of Potential Legal Problems and Methods of Resolutions), we have already covered these in our letter to you of December 16, 1976, a copy of which is attached. Also, attached is a pamphlet containing copies of Louisiana Revised Statutes 33:4405, and 4406; and Ordinances Nos. 6822 C.C.S., 7067 C.C.S., 7068 C.C.S., and 7069 C.C.S. of the City of New Orleans. These statutes and ordinances relate to the City's regulation of the Company and to the right of the Company to provide electric, gas, and transit services in New Orleans.

TASK III

It is planned that a 12 MVA Generator will operate at 13.8 KV and will be located near the intersection of Poydras and Robertson Streets, as was shown in the original proposal of ERDA dated November 17, 1976.

WOPSI proposes to install a designated 24 KV Distribution Feeder from the Central Facility to Derbigny Substation at 1841 Julia Street. This feeder will be supplied from the generator through a 13.8 KV, 1200A oil circuit breaker, 12 MVA, 13.8 - 24 KV autotransformer and 24 KV sectionalizing switches. This feeder will utilize existing duct banks and will connect to the Derbigny Substation 24 KV Bus via a 24 KV, 600A oil circuit breaker and the appropriate sectionalizing switches.

The total estimated installed cost of all equipment necessary to provide this interconnection is \$725,000.00. It is assumed that the generator and its control system will be included in other estimates.

TASK IV

Under this section, clarification of ownership and operation of the utility systems is requested. Members of our Company's management have discussed a proposal whereby NEAL's tax-free bonding authority may be used to finance the construction of the Demonstration System which may then be leased to WOPSI to operate as another part of its utility system. It is the opinion of our Company that this would be the preferable arrangement for the ownership and operation of the Demonstration System. WOPSI would be agreeable to an arrangement of this nature, provided that the results of

Mr. W. D. de Laureat, Jr.
Page 3
March 17, 1977

TASK IV (continued)

the Phase II Study prove to our satisfaction that the project would be beneficial to our other customers, members of the HEAL Complex, and NOPSI. One of the provisions we will require in such an agreement is the right to review the final design and construction of the facilities.

We would want to wholly own, operate, and construct any electric distribution facilities emanating from the Demonstration System. Also, we would not, under any circumstances, agree to relinquishing our ownership of the existing NOPSI electric distribution systems now serving members of the HEAL Complex.

Regarding Electric Rate Schedules, we will use the existing Schedule LX-2 or a superseding schedule for the sale of electrical energy to the individual members of the HEAL Complex. As operators of the system, any electrical energy dispatched to our system from the Demonstration System will be shown as a credit to the thermal system and will be given a value comparable to that of the energy we purchase through our interchange agreement with other utilities. Rates for the thermal energy sold from the Demonstration System should be based on cost of service, and considerably more information will have to be made available before any attempt at rate design can be initiated.

As we have observed several times in the past, both NOPSI and HEAL are being asked to "firm-up Commitments" and to furnish data and information concerning a project for which the final design concept has yet to be formulated. With so little information available at this time, it is not possible for NOPSI to make commitments of any firm nature, to apply for permits, to develop rates, or to negotiate contracts. We believe these must wait for the study to develop further and produce factual information which can serve as a basis for proceeding with some of the actions requested.

We have indicated in our several meetings and past communications that our Company is committed to participating in the ERDA "ICES" study. However, the results of the study will have to serve as the basis for determining the nature of our ultimate participation in the project.

The above is the best information we have available at this time concerning your request relative to the ERDA "ICES" study. Should you need clarification or have any questions, please call me.

Sincerely,

CJS/jc

Attachments

cc: Messrs. M. J. Cade
A. J. Bradmann
W. C. Nelson

M. L. Burnett
S. L. Drumm

EXHIBIT 1.6.a
-6-5

NEW ORLEANS PUBLIC SERVICE INC.

GAS SCHEDULE 14-2

APPLICATION OF SCHEDULE

This schedule is applicable to gas used by any Customer served at one location. Service hereunder shall be metered at one point of service, is for the exclusive use of the Customer, and shall not be resold, shared with or furnished to others except that the Customer may furnish service to its tenants if no specific charge is made therefor.

In the event of shortage of deliveries of gas to Company, service under this schedule will be subject to curtailment in order for Company to serve essential human needs.

NET MONTHLY BILL

Rate:

- (a) **Commodity Charge**
 \$715.00 for the first 650 Mcf or less;
 91.4¢ per Mcf for the next 4,350 Mcf;
 \$8.1¢ per Mcf for the next 5,000 Mcf;
 \$6.4¢ per Mcf for all additional Mcf.
- (b) **City Gate Gas Cost Adjustment**
 Plus or minus, per Mcf, the amount by which Company's City Gate cost per Mcf supplied under this schedule during the month is more or less than \$.70 per Mcf.

 City Gate cost shall be based on the currently effective Gas Tariff(s) as filed by Company's gas supplier(s) with the appropriate regulatory body having jurisdiction.
- (c) **Tax Adjustment**
 Plus or minus the applicable proportionate amount of any new, increased or decreased taxes levied after the effective date of this schedule that Company may be required to pay to any governmental authority. The term "taxes" as used herein shall not include ad valorem, income, excess profits, corporation franchise, or other taxes which can be apportioned only on the basis of estimates.

PAYMENT

The net monthly bill calculated in accordance with the above rate will be increased five per cent if payment is not made on or before the due date shown on the bill, which shall not be less than fifteen days after it is rendered.

SERVICE PERIOD

This schedule applies to service for a period of not less than one year unless otherwise agreed to by a Company.

Effective Date November 14, 1975

NEW ORLEANS PUBLIC SERVICE INC.ELECTRIC SCHEDULE LE-2APPLICATION OF SCHEDULE

This schedule is applicable to the total alternating current electrical requirements of any Customer at one location, other than standby and breakdown requirements, and to the existing direct current electrical requirements of those locations supplied direct current service on the effective date of this schedule. Service hereunder is for the exclusive use of Customer and shall not be remetered, resold, shared with or furnished to others except that Customer may furnish service to its tenants if no specific charge is made therefor. Customer's total electrical requirements at one location shall be served from a single metering installation except as follows:

- (1) Any Customer requiring separate service and/or metering for exit lights or other emergency purposes, x-ray or other special technical equipment, or an existing direct current installation.
- (2) Any Customer as a tenant in a multi-storied office building and receiving electricity from separated meter centers.
- (3) Any location served on the effective date of this schedule by more than the number of meters specified hereon but otherwise qualifying for service hereunder and where Customer's electrical installation remains substantially unchanged.
- (4) Any circumstance where more efficient utilization or better operation of Company's distribution system would result from multi-metered installations.

NET MONTHLY BILLRates:(a) Demand Charge

\$200.00 for the first 50 kw, or less, of Billing Demand;
 3.25 per kw for the next 50 kw of Billing Demand;
 2.80 per kw for the next 100 kw of Billing Demand;
 2.05 per kw for all additional kw of Billing Demand.

(b) Energy Charge

2.34¢ per kwh for the first 5,000 kwh;
 1.38¢ per kwh for the next 10,000 kwh;
 1.04¢ per kwh for the next 15,000 kwh;
 .92¢ per kwh for all additional kwh.*

*Less .10¢ per kwh for all kwh in excess of the greater of
 (1) 72,000 kwh, or (2) 360 kwh per kw of Billing Demand.

(c) Direct Current Surchage

\$1.00 per kw of Direct Current Demand.

NEW ORLEANS PUBLIC SERVICE INC.

ELECTRIC SCHEDULE LE-2 (Cont'd.)

(d) Fuel Adjustment

Plus or minus the product of the kilowatt-hours used by the Customer during the month multiplied by the amount that the average fossil fuel cost per kilowatt-hour as delivered to Company's customers in the City of New Orleans during the month is more or less than .200 cent.

(e) Primary Voltage Adjustment

Application of this clause is limited to those locations receiving a primary voltage adjustment on the effective date of this schedule and is further limited to a maximum discount based on the applicable primary voltage adjustment shown below and the highest Billing Demand created by the primary electrical requirements at such location during the 12 month period preceding the effective date of this schedule:

1. Locations previously served under electric rate schedule PHE-1 Minus \$.71 per kw
2. All other locations Minus \$.19 per kw

(f) Tax Adjustment

Plus or minus the applicable proportionate amount of any new, increased or decreased taxes levied after the effective date of this schedule that Company may be required to pay to any governmental authority. The term "taxes" as used herein shall not include ad valorem, income, excess profits, corporation franchise, or other taxes which can be apportioned only on the basis of estimates.

BILLING DEMAND

The Billing Demand each month shall be the greater of (a) the Monthly Demand for the current billing month, or (b) the highest Monthly Demand established during the billing months of June through October occurring in the twelve month period ending with the current billing month. The Billing Demand when determined under (b) shall be limited to a maximum of 1.3 times the monthly demand for the current month.

Direct Current Demand shall be the direct current portion of the Monthly Demand.

MONTHLY DEMAND

The Monthly Demand (taken to the nearest kw) shall be the sum of the highest fifteen minute kw demands registered on the meters through which Customer takes service hereunder during the month.

The minimum demand for any meter shall not be less than ten per cent of the electrical capacity required to serve Customer's load on such meter.

NEW ORLEANS PUBLIC SERVICE INC.

ELECTRIC SCHEDULE LR-2 (Cont'd.)

POWER FACTOR

Power factor should be maintained by Customer as near unity as possible and shall not be leading. Company shall have the option of installing a kilovolt-amperes (kva) demand meter in lieu of any kw demand meter, in which event the kw demand shall be eighty per cent of the kva demand.

PAYMENT

The net monthly bill calculated in accordance with the above rate will be increased five per cent if payment is not made on or before the due date shown on the bill, which shall not be less than fifteen days after it is rendered.

SERVICE PERIOD

This schedule applies to service for a period of not less than one year unless otherwise agreed to by Company.

Effective Date November 14, 1975

EXHIBIT 1.6.a

1-6-9

1.7 CHILLED WATER SYSTEM

1.71. Retrofitting and Interfacing With Existing Plants & Equipment

Retrofitting the existing refrigeration equipment can be arranged for the larger, newer machines. If the interest is to replace existing electric drive equipment with steam-using equipment - either turbine or absorption, as space would permit, this can be accomplished; however, the cooling tower capacity would have to be increased.

Another possibility, in conjunction with Plant System-4, utilizing a central cooling plant with chilled water distribution, is to reconnect selected existing machines into the chilled water return and allow them to run on the return water, taking their normal flow and contributing to lowering the return water temperature to the ICES central plant. This may be utilized as standby or peaking capacity. With this arrangement, no additional cooling tower capacity would be needed, as the electric drives could be used as is for standby or peaking operations.

The HEAL Phase 1 planned expansion indicates approximately a 42% increase in steam requirements and in excess of 42% for cooling effect, assuming all of the new space added would be air conditioned. The HEAL Phase 2 planned expansion also is sizeable, 70% over the Phase 1 totals. This magnitude of expansion indicates that the existing plants

could not be expanded sufficiently and that, in implementing the HEAL Master Plan, three new remote plants would be required.

It may be prudent to relocate and reuse some of the larger existing equipment in the contemplated plants. This would depend upon the scheduling of new plant construction and the timing of new building service need.

The question of long-range economical fuel supply, however, still presents a serious dilemma for the Master Plan 3-plant configuration.

1.7.2 Consideration of Single Central Plant vs. Multiple Central Plants

Advantages of a single plant of the type proposed as Plant-System-4 versus the construction of three semi-localized plants within the HEAL complex as indicated in HEAL Master Plan:

(1) Lower overall first cost - Economy of scale

- (a) Less total installed capacity, due to load diversity
- (b) Single building vs. three buildings
- (c) Single stack vs. three stacks
- (d) Single point delivery of fuel (coal or oil)
- (e) Less cost per unit of capacity

(2) Lower operating cost

- (a) Single plant runs at more efficient loading than multiple plants
- (b) Utilization of by-product electrical generation would provide more services than a three-plant system
- (c) Less staff possible: 20 people vs. 60 people

(3) Fuel utilization

The fuel for the proposed plant systems is coal, which is in

plentiful supply for the foreseeable future, thus guaranteeing continued service for many years. Coal, delivered to the plant at an estimated cost of \$1.40 to \$1.60 per million BTU, is and will probably remain the most economical fuel.

The phasing out of gas as fuel for plants of this magnitude is probable within the short term; and oil will also become more difficult to obtain and more costly. New storage facilities would be required for oil.

1.7.3. Comparison - Centrifugal Refrigeration vs. Centrifugal/Absorption Combination

The following table compares operational features of three systems of chilled water refrigeration systems for air conditioning: turbine drive centrifugal; combination of turbine drive centrifugal and standard absorption; combination of turbine drive centrifugal and two-stage absorption.

	<u>Turbine Drive Centrifugal</u>		<u>Combination: Centrifugal w/ Standard Absorption</u>		<u>Combination: Centrifugal w/ Two-Stage Absorption</u>	
	<u>Full Load</u>	<u>Partial Load</u>	<u>Full Load</u>	<u>Partial Load</u>	<u>Full Load</u>	<u>Partial Load</u>
	<u>HB-10</u>	<u>HB-11</u>	<u>HB-12</u>	<u>HB-13</u>	<u>HB-14</u>	<u>HB-15</u>
Tons	5,000	3,350	5,000	3,350	5,000	3,350
BTU/Ton	11,062	10,468	10,959	11,574	10,175	9,813
Turbine						
Steam						
Rate, #/Ton	9.0	8.6	21.0	18.7	21.0	18.6
Absorption						
Steam						
Rate, #/Ton	---	---	19.0	23.0	16.0	16.5
Turbine						
Tons	5,000	3,350	2,375	1,850	2,162	1,575
Absorption						
Tons	---	---	2,625	1,500	2,838	1,775

Evaluation of units will be on the basis of partial load operations, since this will be the operational mode for the major portion of the cooling season.

The partial load BTU/ton ratings are:

Turbine Drive Centrifugal	10,468
Combination: Centrifugal w/Standard Absorption	11,574
Combination: Centrifugal w/Two-Stage Absorption	9,813

This rating comparison favors the combination centrifugal with two-stage absorption system over the turbine drive centrifugal system by 655 BTU/ton. Translated into fuel cost savings, as indicated below,⁽¹⁾ this amounts to \$48,470 per year.

However, this combination centrifugal with two-stage absorption system, at \$2,220,960, is higher, by \$480,950, on a first-cost basis than the turbine drive centrifugal at \$1,740,000 -- resulting in a pay-back period of 10 years.

(1) Fuel Cost Savings
 $\frac{\text{BTU/Year}}{0.8 \times 10^6} = 37 \times 10^6 \text{ ton hrs.} \times 655 \text{ BTU/ton} = 24,235 \times 10^6$
 $\text{Fuel Cost Savings} = \frac{24,235 \times 10^6 \times \$1.60}{0.8 \times 10^6} = \$48,470$

furthermore, there are indications that the operation of combination systems is very difficult to maintain at optimum settings of load distributions between the machines at constantly varying load conditions. The partial load steam rate tends to approach that of straight absorption as the load is decreased below 67 percent, leading to overall steam rates higher than calculated in the accompanying heat balances 10 through 15. We therefore do not recommend the further consideration of either combination refrigeration system configuration.

H.B. NO. 10

CENTRIFUGAL CHILLER SYSTEM

$$\begin{aligned} 50,700 \text{ \#}/\text{Hr} \times 1305 \text{ BTU/\#} &= 66,163,500 \text{ BTU/Hr} \\ 50,700 \text{ \#}/\text{Hr} \times 214 \text{ BTU/\#} &= \underline{10,849,800} \text{ BTU/Hr} \\ &= 55,313,700 \text{ BTU/Hr} \end{aligned}$$

$$55,313,700 \text{ BTU/Hr} \div 5,000 \text{ Ton} = 11,062 \text{ BTU/Ton}$$

H.B. NO. 11

66 2/3 %

3,350 Ton

MAIN STEAM HEADER 185°-200° (130.3)

215

450°/HR.

PRV

GENERATOR

2.5 K PUMP

28,475°/HR.

3.337 TON CHILLER

CONDENSER

HOT WATER PUMP

28,475°/HR.

29

$$35,070,400 \text{ BTU/Hr.} \div 3,350 \text{ Ton} = 10,468 \text{ BTU/Ton}$$

HEAL GRID CONNECTED I.C.E.S.

H.B. NO. 12

COMBINATION CENTRIFUGAL/ABSORPTION CHILLER SYSTEM

Full Load
5,000 Ton

$$50,975 \text{ \#/Hr.} \times 1305 \text{ BTU/\#} = 65,478,375 \text{ BTU/Hr.}$$

$$50,975 \text{ \#/Hr.} \times 215 \text{ BTU/\#} = \underline{10,961,250 \text{ BTU/Hr.}}$$

$$54,517,125 \text{ BTU/Hr.}$$

$$\begin{aligned} 110 \text{ H.P. Elect. Drive B.F. Pump} \\ \times 2,544 \text{ BTU/H.P.} &= \underline{279,840 \text{ BTU/Hr.}} \\ 54,796,525 \text{ BTU/Hr.} \end{aligned}$$

$$54,796,525 \text{ BTU/Hr.} \div 5,000 \text{ Ton} = 10,959 \text{ BTU/Ton}$$

HEAL GRID CONNECTED I.C.E.S.

H.B. NO. 13

COMBINATION CENTRIFUGAL/ABSORPTION CHILLER SYSTEM

Partial Load
66 2/3 %
3,350 Ton

$$35,395 \text{ #/Hr.} \times 130.5 \text{ BTU/#} = 46,190,475 \text{ BTU/Hr.}$$

$$35,395 \text{ #/Hr.} \times 215 \text{ BTU/#} = 7,617,050 \text{ BTU/Hr.}$$

$$38,573,425 \text{ BTU/Hr.}$$

78.5 H.P. Elect. Drive B.F. Pump

$$\times 2,544 \text{ BTU/H.P.}$$

$$= 199,707 \text{ BTU/Hr.}$$

$$38,773,132 \text{ BTU/Hr.}$$

$$38,773,132 \text{ BTU/Hr.} + 3,350 \text{ Ton} = 11,574 \text{ BTU/Ton}$$

HEAL GRID CONNECTED I.C.E.S.

H.B. NO. 14

COMBINATION
CENTRIFUGAL/ABSORPTION CHILLER
SYSTEM-2 STAGE

Full Load
5,000 Ton

$$\begin{aligned}
 46,452 \text{ #/Hr} \times 1,305 \text{ BTU/#} &= 60,619,860 \text{ BTU/Hr} \\
 46,452 \text{ #/Hr} \times 215 \text{ BTU/#} &= 9,996,630 \text{ BTU/Hr} \\
 &= 50,623,230 \text{ BTU/Hr}
 \end{aligned}$$

$$\begin{aligned}
 110 \text{ H.P. Elect. Drive B.F. Pump} \\
 \times 2,544 \text{ BTU/H.P.} &= 254,400 \text{ BTU/Hr} \\
 &= 50,877,630 \text{ BTU/Hr}
 \end{aligned}$$

$$50,877,630 \text{ BTU/Hr} \div 5,000 \text{ Ton} = 10,175 \text{ BTU/Ton}$$

HEAL GRID CONNECTED I.C.E.S.

H.B. NO. 15

COMBINATION
CENTRIFUGAL ABSORPTION CHILLER
SYSTEM-2 STAGE

Partial Load
66 2/3%
3,350 Ton

$$29,995 \text{ #/Hr} \times 1303 \text{ BTU/#} = 39,143,475 \text{ BTU/Hr.}$$

$$29,995 \text{ #/Hr} \times 215 \text{ BTU/#} = 6,448,925 \text{ BTU/Hr.}$$

$$32,694,550 \text{ BTU/Hr.}$$

$$78.5 \text{ H.P. Elect. Drive B.F. Pump} \\ \times 2,544 \text{ BTU/H.P.} =$$

$$178,080 \text{ BTU/Hr.}$$

$$32,872,630 \text{ BTU/Hr.}$$

$$32,872,630 \text{ BTU/Hr.} + 3,350 \text{ Ton} = 9,813 \text{ BTU/Ton}$$

(1) Comparative Installation Costs

Installation costs for the three types of refrigeration systems under consideration are given in the following tables.

(a) Straight Condensing Turbine Drive Refrigeration, 5,000 tons

Refrigeration units, 5,000 tons @ \$140/ton	\$ 700,000
Cooling tower, 15,000 gpm	200,000
Chilled water and condensing water pumps	90,000
Diesel pump and equipment	15,000
Piping: Chilled water, condenser water, steam and condensate	375,000
Electrical Work	<u>200,000</u>
	\$ 1,580,000
Contingencies	<u>160,000</u>
Total	\$ 1,740,000

Cost per ton = \$348

(b) Combination, Turbine-Drive Centrifugal with Standard Absorption Machines, 5,000 tons.

Turbine drive refrig. unit, 2,375 tons @ \$125/ton	296,875
Absorption machines, 2 @ 1,312.5 tons @ \$100/ton	262,500
Cooling towers, 17,500 gpm	220,000
Chilled water and condensing water pumps	120,000
Miscellaneous pumps and equipment	20,000
Piping: Chilled water, condenser water steam and condensate	656,250
Electrical Work	<u>250,000</u>
	\$ 1,825,625
Contingencies	<u>182,500</u>
Cost per ton = \$402	Total 2,008,125

(c) Combination Turbine-Drive Centrifugal with Two-Stage Absorption Machines, 5,000 tons

Turbine drive refrigeration units, 1

• 2,162 tons @ \$125/ton \$ 270,250

Absorption machines, 2-stage, 2 at

1,419 tons @ \$170/ton 482,460

Cooling towers, 17,500 gpm	220,000
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Chilled water and condenser water pumps	120,000
---	---------

Miscellaneous pumps and equipment	20,000
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Piping: Chilled water, condenser water	
steam and condensate	656,250

Electrical Work	250,000
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\$ 2,018,960

Contingencies	<u>202,000</u>
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Total \$ 2,220,960

Cost per ton - \$444

1.8 PROJECTION OF BENEFITS DERIVED FROM ELECTRICAL ENERGY
GENERATION BY ICES

The average annual heat balances indicate that 33,288,000 KW hours would be generated as by-product power for Plant System-3 and 35,916,000 KW hrs. would be generated for Plant System-4. Projected community electrical usage based on Phase 2 of the HEAL Master Plan program is estimated at approximately 120,750,000 KW hrs., as compared to the past year consumption of 78,500,000 KW hrs.

It is estimated that a central Plant System-4 as proposed would require approximately 10,000,000 KW hrs. This would leave a net surplus to the grid of 25,916,000 KW hrs., or 21.5% of the community requirement. This percentage would probably be higher if Plant System-4 were to be implemented, since there would be no community electric drive cooling effect provided. This reduction in electric power usage could be as much as 20,000,000 KW hrs., which would indicate a percentage of 25.7% of community requirements.

In the case of Plant System-3, the projected electric energy consumption would be 120,750,000 KW hrs., as it is assumed that the existing electric drive cooling effect would remain in use. The central plant consumption would be on the order of 3,000,000 KW hrs., leaving a net surplus power to the grid of some 30,000,000 KW hrs., which is 24.5% of the total community requirement.

As indicated by NOPSI, this surplus power would be fed into the grid system and be credited to the HEAL complex utility costs.

Based on proposed rate increases and fuel adjustments, it appears possible for electric rates to approach four cents (4¢) per KW in the year 1977. If this assumption is correct, it may indicate that the plant by-product electric power may be credited at 2¢ per KW, or approximately \$700,000 per year.

The installation of electrical generating equipment in the proposed plant could also serve the community as an emergency power supply within their restricted grid area - or, isolated, could serve to maintain the plant operation separately and independently of the grid in an emergency.

This power is generated at less than 4,000 BTU per KW hr. heat rate, which is extremely energy efficient, as most plants' heat rates exceed 10,000 BTU per KW hr. This is based on average values and gets as low as 3500 BTU per KW hr. at certain plant load conditions. This energy efficiency is a direct result of the integrated nature of the community energy system, as compared with conventional power plants which would reject otherwise useful heat to the environment.

Chart No. 1.8.a indicates the reduction in electrical power demand for each of the two plant systems studied. Utilization of Plant System-3, which provides only steam energy to the HEAL buildings, renders a summer/winter peak demand ratio of 1.52, which is identical to the existing conditions; whereas, utilization of Plant System-4, which provides chilled water as well as steam energy to the HEAL buildings, renders a summer/winter peak demand ratio of 1.27.

Note: The variance of the current composite peak demands for summer and winter from those provided in Exhibit 1.5.0, Chart I of the November 17, 1976 proposal to ERDA in response to RFP No. E(11-1)-P-76-0016, is due primarily to the more factual data involved with the Tulane University Hospital as used in this study. The Hospital had just recently been completed when the proposal was prepared.

Chart 1.8.a

INDIVIDUAL BUILDING ELECTRICAL POWER ELIMINATED BY ICES

EXISTING BUILDING	PLANT SYSTEM-3 STEAM ENERGY ONLY			PLANT SYSTEM-4 STEAM & AIR CONDITIONING		
	KILOWATTS			KILOWATTS		
	SPRING & FALL	SUMMER	WINTER	SPRING & FALL	SUMMER	WINTER
LSU:						
Residence Hall	3	3	6	110	211	0
Medical School	6	6	13	416	686	224
TULANE:						
Medical School	34	45	34	284	475	280
Hospital	0	0	0	739	1,559	731
Env. Medicine	0	0	0	37	86	0
CHARITY	127	127	127	388	612	388
VETERANS HOSPITAL	8	8	16	533	1,029	280
C.E.M.T.	0	0	0	56	175	45
TOTALS	178	189	196	2,563	4,833	1,948
CURRENT COMPOSITE AVG. DEMAND	11,428	14,352	9,469	11,428	14,352	9,469
DIFFERENCE	11,250	14,163	9,273	8,865	9,519	7,521
PEAK RATIO - SUMMER/WINTER CURRENTLY		1.52			1.52	
ICES		1.52			1.27	

1.9 CONCLUSIONS AND RECOMMENDATIONS

Plant System-4 (Power, Steam, Cooling) is recommended as the ICES Demonstration System for this program. Analyses presented in the foregoing material indicate that this plant system shows a higher level of thermal efficiency than the other candidate system, Plant System-3. Plant System-4 also produces annual revenues to cover owning and operating costs and an estimated surplus of approximately \$740,000 per year; whereas, Plant System-3 analysis indicates an annual owning and operating deficit.

Foot note: These conclusions and recommendations were presented to ERDA representatives at the midterm status reports. ERDA concurred in the selection of Plant System-4 (Power, Steam, Cooling) as the ICES Demonstration System for this program.

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1-9-2

TASK II

PRELIMINARY INSTITUTIONAL ASSESSMENT

2.0. PRELIMINARY INSTITUTIONAL ASSESSMENT

The HEAL Complex, consisting of State, Federal and private institutions, is subject to regulation, primarily by the City of New Orleans. Each element of the HEAL Complex also operates under its institutional authority, which is either a State, Federal or private organization. Since the Demonstration System will be constructed and operated primarily outside the property confines of the individual institutions and only interfacing therewith, their individual authority regulations regarding construction and operations will have minimal impact. All individual institutions will, however, be involved in review and approval of design criteria to assure that all standards and institutional requirements are met.

Phase II will require a systematic, scheduled, step-by-step review process throughout the system planning and design stage, assuring input and cooperation by the HEAL institutions, regulatory bodies and citizens' interest groups.

Specific milestones will be established for review by specific agencies to obtain required acceptance, approvals, endorsements, permits or franchises. Environmental issues will be presented publicly to local interest groups to confirm that all requirements are being met and that minimal or no adverse environmental impact

will occur with implementation of of the system.

The standards and procedures for fulfilling all institutional requirements essential to the design and construction of the Demonstration System are discussed in the following sections.

2.1 INSTITUTIONAL SURVEY

A survey has been conducted to determine which existing statutes, codes, ordinances and regulations would severely restrict or prohibit the construction and operation of the Demonstration System. Particular attention has been devoted to the City of New Orleans' Zoning Ordinance and State and EPA environmental regulations pertaining to air quality and noise pollution standards.

The following paragraphs describe the organizations contacted or visited, their administrative responsibilities, extent of regulation and possible problem areas.

2.1.1 City of New Orleans

Design drawings and specifications for the proposed ICES project must be presented to the following authorities for review and approval. Most of these submittals and reviews can be concurrent.

(1) Planning Advisory Committee (PAC)

This committee is composed of representatives of the city regulatory and administrative departments, such as Parks and Parkways, Streets, Property Management, Utilities, Fire, Police, Health, Regulatory Inspections, Sewerage and Water Board, NOPSI, City Planning Commission, Sanitation, Recreation, Welfare, School Board, Housing Authority, Regional

Planning Commission and Community Improvement Agency. The function of the committee is to stay abreast of and to coordinate member activities regarding proposed new projects. The purpose is to minimize conflicts with proposed projects and city functions. The PAC meets weekly and is administered by the staff of the City Planning Commission.

(2) New Orleans City Planning Commission

The commission consists of nine private citizens appointed by the Mayor and supported by a professional staff of thirty planners in all disciplines - economics, sociology, environmental, etc., including architects and clerical. The commission has jurisdiction in zoning requirements and is presently preparing a zoning ordinance for a Growth Management Plan for the Central Business District.

Preliminary investigation indicates that the CBD-2 area zoning for the proposed plant site allows "Electric Utilities Facilities" and would not be contrary to the Growth Management Plan. There is a requirement that the project use and aesthetics be complementary to the Superdome and NEAL Complex. A combined-use building, e.g., a parking garage, has been suggested as a possibility for assuring compatibility with the existing area.

(3) Department of Safety and Permits

This department is responsible for enforcement of the Building Code of the City of New Orleans, which pertains to structural, mechanical, electrical and fire and health safety design and construction requirements. There are no requirements, beyond good engineering design and construction, which would affect the ICES project. Chapter 51 - Smoke Prevention and Inspection, requires that the design include a means for prevention of smoke; however, State Board of Health and EPA requirements, which exceed Chapter 51 requirements, will be met. Chimney height, related to adjacent structures locations and heights, is prescribed in Chapter 51 also, but presents no unusual problem. The Fire Prevention Ordinance requirements, also administered by this Department, concern required type of construction according to location in the city, fire exits, fire extinguishing equipment, etc., all factors which pose no restraints to the ICES project.

(4) Sewerage and Water Board of New Orleans

This administrative authority exercises control and operation of the sewerage, water and drainage systems of the City.

The published Rules of the Sewerage and Water Board of New Orleans, governing use of sewerage, water, drainage

systems and plumbing contain no unreasonable constraints to implementation of the proposed ICES. There are, however, rules (Section 16) regarding temperature, concentration, B.O.D. & C.O.D. loadings, etc., of certain wastes that can be discharged into the sanitary sewer and storm drainage systems. The discharge to the sewer system of boiler and cooling tower blowdown and any storm drainage from the coal storage area, etc., will possibly require pretreatment before entering the city systems. Equipment, if required, is available to provide the needed pre-treatment. Details of the pre-treatment process must be submitted to the Sewerage & Water Board for approval and permit. The Sewerage & Water Board sewage treatment plant effluent is required to meet Louisiana State and Federal (EPA) requirements.

(5) Department of Utilities

This department is charged with the regulation of utilities firms holding franchises with the city and acts in a staff capacity to the City Council, advising and recommending rates for utilities services. It supervises franchised operations to insure compliance with franchise conditions set by the City Council. No problems concerning the ICES project are expected.

(6) Department of Streets

Requirements pertaining to trucking of coal to the plant

site and ashes from site include use of standard weight trucks with covers over the load. Any overhead street crossings must have 15-foot to 18-foot vertical clearance, depending on class of street. Heavy duty streets provide access to the proposed ICES Central Plant site vicinity. Depending on final plant site location and the design and condition of existing secondary streets, a few blocks of street surfacing may have to be upgraded for continuous truck duty, with the cost charged to the ICES project.

(7) Commission Council of the City of New Orleans

The elected members of the Commission Council, together with the Mayor, constitute the governing body for the City of New Orleans. The Council has final approval authority concerning the ICES project. There are no impediments anticipated to such approval.

(8) Mayor's Advisory Committee on Aesthetics

The City of New Orleans has appointed a committee that is supported by professional staff to advise the Mayor and Commission Council on the aesthetics of public development and improvements. The committee performs its function by reviewing and commenting on the design of proposed projects. The advisory committee's staff has been informed of the ICES Project and will be available to advise and counsel during the design process of Phase II if desired.

2.1.2 State of Louisiana

The Louisiana State Department of Health has control of noise pollution and has been authorized to administer the Louisiana Air Control Commission requirements regarding air pollution control. The office of the Fire Marshal of the State of Louisiana has jurisdiction over the fire safety design of building construction. The following paragraphs outline their requirements and functions.

(1) Louisiana State Board of Health

The Louisiana Air Control Commission, administered by the Louisiana State Board of Health, has authority over maintaining the purity of the air resources of the state, consistent with the protection of the health and physical property of the people, maximum employment and the full industrial development of the state. The Commission has established rules and procedures for controlling emissions from new stationary plants such as the ICES. The plant emissions and fugitive dust due to coal handling will have to meet Air Control Commission requirements to prevent degradation of existing air quality in the area and to meet the required ambient air quality standards. The Federal EPA air quality standards are similar and, where more stringent, must be met.

The new ICES Project will contribute to pollutants in the

atmosphere, but these will be offset in some degree by phased elimination of the existing boiler plants at various HEAL institutions.

Application to the Commission for operation of a new stationary source of emissions must include data on existing air quality in the area and expected amounts of pollutants to be introduced, together with details of equipment and methods to keep additional pollutant quantities from exceeding total allowable values. Details of the environmental impact of the proposed ICES plant are included herein in later sections of this report. It is anticipated that the Commission and/or EPA requirements can be met with existing technology and present no constraint on the feasibility of implementing an ICES plant.

In similar manner, the Board (and EPA) requires assessment of expected noise pollution and approval of abatement procedures to meet proposed standards. It is felt that equipment containment design or baffling can solve any noise problems expected to be encountered and that the results will also meet OSHA occupational noise standards.

The Stream Control Commission of the Board and EPA have certain requirements regarding waste discharges to receiving waters. In the case of the ICES plant, liquid wastes will be processed by the treatment plant of the

Sewerage & Water Board before release to the receiving stream and therefore no constraint to implementation of an ICES plant is foreseen.

(2) Fire Marshal of the State of Louisiana

The Fire Marshal is concerned with protection for life safety in building design and construction, covering such matters as number of building exits, exit signs, means for egress, fire alarms and fire extinguishing, exit stair specifications, boiler rooms and air conditioning installations, as well as investigation of fires and preventive inspections. Plans for the proposed ICES plant must be submitted for approval by this agency. To meet the requirements, good engineering design is required and no constraints are foreseen.

(3) Louisiana Rating and Fire Prevention Bureau

This organization is concerned with the insurance ratings of buildings and structures and as such would present no constraint to implementation of the ICES project.

(4) Louisiana State Bonding Commission

This agency would have to approve the financing by HEAL for the project and sell the bonds. (Financing is covered in detail in Task IV, Section 4.3.)

2.1.3 Federal Agencies

The Federal Agencies that appear to be concerned or have regulations regarding an ICES-type project are the SEC, EPA and OSHA.

(1) Securities and Exchange Commission (SEC)

As a member of a public utility holding company system (Middle South Utilities), NOPSI is subject to the provisions of the Public Utility Holding Company Act of 1935, which limits operations to a single integrated public-utility system (electricity). An application would have to be filed by NOPSI with the SEC to determine whether it is permissible for NOPSI under the provisions of the Act to engage in the operation of a thermal system. The estimated time for these proceedings would be a minimum of three months. There are members of electric utility holding company systems that presently operate steam systems in connection with their electric generating facilities, consequently it is felt that a favorable decision would be obtained.

(2) U.S. Environmental Protection Agency (EPA)

The ICES project must comply with the Federal standards of performance for new stationary sources of air pollution, as well as those for the state, the more stringent of the

two being applicable. Proposed noise levels and abatement requirements must also satisfy the applicable standards. No problems that cannot be solved by present technology are expected.

(3) U.S. Occupational Safety and Health Act (OSHA)

Design, construction and operational aspects of the ICES project must meet regulations of OSHA. Review of such regulations reveals no constraints to implementation of the proposed system.

2.3.4 Citizens' Groups

Preliminary contacts have been made with the American Lung Association of Louisiana and the Ecology Center of New Orleans in order to present the ICES concept to them and to solicit their cooperation and advice in furtherance of the project and to avoid any conflicts with their concerns.

(1) American Lung Association of Louisiana, Inc.

This organization is the state unit of a national non-profit, tax-exempt, volunteer health association, supported by contributions and grants, administered by a 50-member citizens' board of directors, whose function is educational in reduction of lung disease. The local coordinator for the organization has indicated interest in the ICES concept and has asked to be kept

abreast of developments so that mutual problems can be resolved.

(2) Ecology Center of New Orleans

The Ecology Center is a non-profit, tax-exempt organization supported by public contributions, foundations and Federal grants, and its function is to conduct reviews and make investigations of the effects to the environment regarding public improvements. Its primary interest is in urban planning and air and noise pollution control. The Center has a small permanent staff of professionals and is supplemented by technical assistance from the local academic institutions. Its board of advisors includes private citizens, legislators and officials of the State Board of Health.

The Center has expressed interest in working closely as a sub-consultant in the development of the ICES project concerning siting, building aesthetics and pollution control.

2.1.5 Taxes

Since HEAL, as the owning authority of the ICES plant, is a non-profit state agency, it is exempt from payment of city, state and federal taxes. NOPSI, as the operating entity, would lease the facilities from HEAL and would pay no direct personal property or ad valorem taxes.

Normal taxes on payroll, supplies, etc., would be levied as on any other enterprise.

2.1.6 Labor

Sufficient numbers of skilled workers are available in the area to provide construction forces required. The operating forces would be provided by NOPSI from its existing staff of workers experienced in power plant operations. NOPSI operators have a local association which comprises the bargaining unit in contract negotiations with NOPSI management. It is expected that the same bargaining unit would represent the operators at the new ICES plant. No problem areas with labor are foreseen.

2.2 OBSERVATIONS AND CONCLUSIONS REGARDING INSTITUTIONAL ASSESSMENT

Local limited central plant operations with chilled water and steam distribution piping systems are already in existence at some of the buildings within the Demonstration Community, as is the electric grid provided by NOPSI. It is not anticipated, therefore, that the introduction of the ICES will pose significant problems.

However, documentation in the form of preliminary site plans, outline proposals and oral explanation of the proposed ICES project was presented at meetings with the regulatory authorities, advisory groups and political elements as described in the foregoing paragraphs of Section 2. From information gleaned from such meetings and inspection of all pertinent published regulations, ordinances, codes, etc., it appears that there are no significant constraints to implementation of the ICES that presently available technology cannot overcome.

There are no industrial end-users planned for inclusion in the proposed Demonstration Community. The surrounding area adjacent to the site consists of the Superdome, hotel and office building complexes and the Civic Center, consisting of City and State offices, courts and the Public Library.

The master plan just completed for the CBD proposes expansion of office buildings and hotels around the Superdome. Emphasis has been placed on returning apartment and high density residential development to the CBD. All major industrial activities that are associated with the CBD are near the river and port facilities.

It was considered prudent to enlist the cooperation and support of local citizens' groups, particularly those involved in ecological and environmental considerations. The two major groups contacted were most interested and cooperative in offering their assistance in the further implementation of the ICES project.

2.3 DISSEMINATION OF INFORMATION PROGRAM

The objective of the consortium's efforts in this program will be to conduct only that which will be necessary to support the construction and operation of the Demonstration System (including the handling, storage and burning of coal). This will require the preparation and the presentation of informational material that will best demonstrate the following:

- (a) The equipment and facilities recommended to be installed as part of the system will eliminate all of the environmental concerns associated with coal as the primary fuel.
- (b) The operations of the system will be mechanically controlled and sufficiently monitored to assure that all environmental standards and/or requirements can be maintained.

It is anticipated that the informational material will be illustrative drawings that are capable of serving as exhibits at public hearings and can be reduced, printed and published as informational hand-outs and newspaper advertisements and/or included in technical reports or bulletins.

2.3.1 Program Approach

Of primary importance among the questions that must be publicly answered in order to enlist the support of local

environmental groups are the amounts and types of air pollutants the central energy plant will emit into the lower atmosphere. Answers can be readily provided; however, they would mean little to the average man in the street. He must be convinced that what is recommended is good or that all will continue to be as good as it has been in the past. If the Consortium tells Mr. Average Man in the Street that all is well, he will not believe what he has been told. If the local environmentalists say that all is well, Mr. Average Man in the Street will be more inclined to believe that it is true. It is with this theory in mind that the Consortium recommends the enlistment of the major local environmental group, the Ecology Center, to assist in preparing the environmental assessment and impact statement in Phase II of the Project.

Also, the issue of noise and the impact that the facility will impose on and within the hospital (quiet zone) area will have to be addressed and resolved. This will require extensive investigations as to existing noise levels and noise frequencies, the time-of-day occurrences of adverse noise and assurances that the effects of present noise levels will not be substantially increased by the additional noise of the Demonstration System. The Ecology Center will be of great assistance to the Consortium in attesting to the fact that there will not be any substantial increase.

The Consortium recommends that a survey be conducted by the Ecology Center to collect existing noise levels and the sources of noise within and around the Demonstration Community. The noise survey will establish the predominant sources of noise, their intensity, duration and frequency levels, and the basis for which to compare the effects of the Demonstration System.

Finally, the Consortium will utilize the Mayor's Advisory Committee, on a non-reimbursable basis, to provide review and counsel to the aesthetic design of the Demonstration System. Particular emphasis will be placed upon beautification of the central plant to assure visual compatibility with the adjacent areas and upon the overhead distribution system to provide attractive pedestrian concourses from building to building as a concurrent part of the distribution system.

The informational program will be presented to the public in the following manner:

(1) Television Public Informational Announcements

The local television stations will be requested to provide a few free public information announcements on behalf of the subject of energy conservation and management. The announcements will consist of 60-second displays of the ICES Demonstration System as an example of the efficient

use of fuel in balance with the environment and providing for the vital needs of the Demonstration Community.

Free service is available with each of the three (3) television stations in New Orleans. Available time for public service announcements is at the discretion of each individual station and will not be of our choice.

A local public relations consultant firm will be utilized to assist the Consortium in preparing the announcements and in obtaining full cooperation of the television stations.

(2) Newspaper Articles and Advertisements

It will be possible to utilize the two major daily newspapers and three weekly newspapers in presenting news articles on the ICES Demonstration System. This will be accomplished with the assistance of the public relations consultant and a message similar to the television announcements, but more informative, will be prepared. Possibly three articles will be prepared for news release: one article will be issued for publication in the Sunday Energy Section, the other two will be issued for publication in the daily and weekly papers early in Phase II and just prior to the conduct of the the public hearings.

In addition to the prepared news releases, the Consortium recommends that a series of advertisements be prepared announcing the intent to conduct a public hearing on the proposed project. The series should begin two weeks prior

to the date of the public hearing.

(3) Public Hearings

At least one public hearing will be conducted on the project during Phase II, to obtain public comment and acceptance. Should a second public hearing be required, it will be conducted within 30 days after the first hearing. Because of the magnitude of the project it may be more beneficial to conduct two hearings devoting one to the technical aspects of the project and the second to the environmental issues. The merit to the two hearings is that the first hearing will provide evidence as to the public's concern regarding environmental issues, a subject which can be better addressed at the second hearing.

(4) Project Presentations

In the course of obtaining approvals from the various agencies and organizations within the New Orleans area many presentations will be made as to the proposed system. These presentations will provide the opportunity to inform the civic leaders as to the energy conservation and management objectives of the Project. Presentations will be made to numerous organizations, among which will be:

- The New Orleans Chamber of Commerce's Central Business District Growth Management Plan.
- Young Men's Business Club (YMBC)

- Central Area Development District (CADD)
- The New Orleans Planning Advisory Committee (PAC)
- The Regional Planning Commission for Jefferson, Orleans, St. Bernard and St. Tammany Parishes (Metropolitan Clearinghouse)
- The New Orleans City Planning Commission
- The New Orleans City Council
- The Mayor's Advisory Committee on the Aesthetic Environment
- The State of Louisiana, Office of Conservation
- The Health Education Authority of Louisiana and Member Institutions

Most of the above organizations conduct their business meetings publicly, allowing interested citizens and the newsmedia to attend. Press coverage of these meetings is usually provided by the major newspapers, thereby presenting additional means of informing the public of the objectives of the Project.

(5) Program Implementation

The public information program will be conducted primarily in Phases II and III of the Demonstration Program. There will be a follow-up or concluding effort during Phase V summarizing the results of the Start-Up Tests & Performance Tests of the System.

The tasks/sub-tasks evolving around the implementation of the public information program will consist of three

major elements: 1) collection of existing data and information; 2) preparation of materials for public dissemination; and 3) dissemination of public information. The following outline is provided to illustrate the work to be performed within the three major elements.

Task 2.3.1 - Collection of Existing Data and Information

- (a) Obtain existing noise level and noise frequency data.
- (b) Obtain feasibility data and information resulting from other work tasks and define pertinent data for public information.
- (c) Obtain review and comments from institutional agencies.
- (d) Obtain and document comments resulting from public hearings.

Task 2.3.2 - Preparation of Materials for Public Dissemination

- (a) Prepare television public informational announcements
- (b) Prepare newspaper articles and advertisements.
- (c) Prepare presentational materials for public hearings.

Task 2.3.3 - Dissemination of Public Information

- (a) Prepare overall schedule for release of informational materials.

(b) Distribute informational materials in accordance with schedule.

2-3-8

TASKS	PHASE II - MONTHS							PHASE III - MONTHS											
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10	11	12
COLLECT NOISE DATA	■	■																	
DEFINE PUBLIC INFORMATION DATA		■	■																
INSTITUTE REVIEW & COMMENT						■	■	■									■	■	■
PUBLIC HEARING COMMENTS						■	■		■	■								■	■
PREPARE T.V. ANNOUNCEMENTS				■	■														
PREPARE NEWS ARTICLES				■	■														
PREPARE PRESENTATIONS FOR PUBLIC HEARINGS				■	■	■													
PREPARE PUBLIC INFORMATION DISSEMINATION SCHEDULE					■	■										■	■		
DISTRIBUTE INFORMATION MATERIALS					■	■	■	■	■								■	■	

NOTE: For Environmental Impact Statement Schedule
see Manpower Schedules

DEMONSTRATION PROGRAM - SCHEDULE FOR DISSEMINATION OF INFORMATION

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2-3-10

2.4 LEGAL MATTERS

The attached letters, listed as follows, present legal opinions concerning participation and responsibilities of HEAL and NOPSI in the grid-connected ICES program:

Exhibit 2.4.a - May 10, 1977 letter from Kiefer, Glorioso & Fleming to HEAL, relative to construction, operation and ownership.

Exhibit 2.4.b - May 3, 1977 letter from Foley, Judell, Beck, Bewley & Martin to HEAL, relative to financing.

Exhibit 2.4.c - April 12, 1977 letter from NOPSI to de Laureal Engineers, Inc., relative to lease, ownership and operation.

(Refer to Sections 4.4 and 4.6 for statements of commitment among the members of the Demonstration Team.)

Kiefer, Glorioso & Fleming

ATTORNEYS AT LAW

801 FRENCHMEN STREET

NEW ORLEANS, LOUISIANA 70116

PHONE (504) 543-3301

May 10, 1977

GEORGE G. KIEFER
ANTHONY L. GLORIOSO
ROBERT F. FLEMING, JR.

WILSON H. GREENBERG, III
THOMAS J. FORB, JR.

Mr. Vernon D. Selfert, Executive Director
Health Education Authority of Louisiana
Room 213 - State Office Building
325 Loyola Avenue
New Orleans, Louisiana 70112

Dear Mr. Selfert:

In our capacity as Counsel for the Health Education Authority of Louisiana (HEAL), we have been asked to provide an opinion relative to the proposed Integrated Community Energy System (ICES) sponsored by the Energy Research and Development Administration of the Federal Government. The following are comments relative to the construction, ownership and operation of this proposed system. It is proposed to utilize HEAL's bonding authority for this project, hence legal questions relative to the financing of the project have been referred to HEAL's Bond Counsel, Foley Judell Beck Bewley and Landwehr.

While HEAL has successfully utilized its bonding authority on two major hospital projects and a parking garage program, all structured through lease agreements, such as that proposed in this program, the introduction of a public utility firm as lessee and the provision of services normally construed as public utility services in this program raise legal questions peculiar to this particular project not found in previous financing programs of HEAL.

The following comments, therefore, are directed to the areas of potential legal difficulty this program may face.

POTENTIAL LEGAL PROBLEM

Discussion of the ERDA-ICES project to date have focused upon a plan whereby HEAL would finance and own the "demonstration system" and lease the plant to NOPSI. The system's primary function is to produce heat and chilled water to be used in the HEAL medical complex. It is now apparent that the system would produce, as a by-product, an incidental amount of electrical

energy. It is this by-product which may create difficulty in determining HEAL's legal status in the plan. This energy cannot be fed directly into the complex and must be placed on the NOPSI grid system and from this point, it is available for sale by NOPSI to its consumers, both public and private.

LEGAL STATUS OF THE SYSTEM

On the basis of the above facts, it is anticipated that the "demonstration system" may be defined by state law to be a "revenue producing public utility". LSA R.S. 9:152(9) defines the concept: "utility means any person who owns or operates, within the state, for public use, any plant, equipment, property, franchise or license for the transmission sale, delivery, or furnishing of electricity, water, steam or gas". If the system is to be defined as a "utility" the issue of ownership becomes significant.

HEAL IS OWNER OF THE SYSTEM

While there is no specific prohibition against HEAL owning the "public utility" there is also no specific grant of authority as well. The language of the Act establishing HEAL gives them broad powers to implement a "master plan" for the development of the "HEAL complex". Specifically, the Act defines HEAL as a "body corporate and public, constituting an instrumentality of the State of Louisiana exercising essential governmental functions". Thereafter, HEAL is empowered "to construct support facilities that are useful, necessary or convenient for the orderly conduct of the institutions".

A review of State Law indicates that "political subdivisions" of the State of Louisiana are given specific authority to own utilities. Article 6, Paragraph 44 (2) of the constitution defines a "political subdivision" as a parish, municipality and any other unit of local government, including a school board and a special district, authorized by law to perform governmental functions".

Under the old constitution, a Hospital Service District was specifically included as a political subdivision and thus capable of owning a "revenue producing public utility". Under the new constitution, a Hospital Service District has maintained its identity as a political subdivision, as it is a "special district".

Based on similar roles and functions there exists a basis for concluding that HEAL meets the requirements of a Hospital Service District. While the two entities are highly similar there are also areas of dissimilarity - most noticeable in the ability to tax.

Mr. Vernon D. Selfert

-3-

May 10, 1977

It is therefore suggested that in order to obviate any potential challenge to HEAL ownership of the system, an amendment be proposed to the HEAL Act clarifying HEAL as a Hospital Service District or a specific act granting HEAL the authority to own the system is advisable.

Assuming the problems of ownership of the system can be met with, title to the plant, under state law, is taken in the name of the authority and site acquisition may be obtained by expropriation within the geographical boundaries of the complex. Expropriation proceedings are not anticipated at this time although HEAL has been granted this power by specific Act of the Louisiana Legislature.

STATE REQUIREMENTS: CONCLUSION

HEAL is required to submit its contracts to the Commissioner of the Department of Administration, Executive Department, State of Louisiana, for review and approval. In addition, permits for a coal-burning plant may be required of the State Air Control Commission.

LOCAL REQUIREMENTS: CONSTRUCTION

At the local level, the authority is required to obtain standard building permits with approvals and inspection by the City of New Orleans and possible review by the City Planning Commission. Application for a franchise to operate the system would be made to the City Council of the City of New Orleans and take the form, when granted, of a City Ordinance.

HEAL CONTRACTS WITH NOPS1, de LAUREAL ENGINEERS, AND OTHERS

HEAL, as a State agency, must comply with the "Public Contract Bid Law" of the State of Louisiana. Basically, this law requires that contracts of the Authority are to be let to the "lowest responsible bidders". As this law relates to contracts with NOPS1, a state judicial determination has been made excepting contracts by state agencies and regulated Public Utilities from the public bid law. This decision was based, in part, on recognition of the expertise the utility company has in the area.

As the law relates to de Laureal Engineers, it must be considered, however, de Laureal, while working with ERDA in the formative stages of this project, is developing the necessary input to clearly single them out as the most responsible bidder and no major problem is anticipated at this time.

Respectfully submitted,

GEORGE E. KIEFER

GGK:mz

Exhibit 2.4.a.
2-4-4

FOLEY JUDELL BECK BEWLEY & MARTIN

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SUITE 400 225 BARDONE STREET

NEW ORLEANS, LA. 70112

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SUSAN WEEKS ANTHONY

OF COUNSEL
DURLEY C. FOLEY, JR.

May 3, 1977

Hr. Vernon D. Seifert
Executive Director
Health Education Authority of Louisiana
Room 213, State Office Building
325 Loyola Avenue
New Orleans, Louisiana 70112

Re: Health Education Authority of Louisiana
Thermal Energy Project

Dear Mr. Seifert:

This is to confirm our telephone conversation today in which we gave you our comments on your proposed financing plan and advised you that the two basic conditions of any plan of finance for the captioned project for the Health Education Authority of Louisiana ("HEAL") should include the following:

1. that HEAL is legally authorized under the act creating HEAL to undertake such a project and to issue revenue bonds to finance the same; and

2. that any revenue bonds issued by HEAL will be tax exempt under applicable income tax laws.

The first point involves the requirement that the project provide support facilities for the use of primary or participating institutions in the medical complex. The establishment of the tax exempt status of such revenue bonds is a fairly complicated question and involves the type of energy produced, the nature of the agreement between HEAL and HOPSI and several other factors. These details must be worked out before a definite conclusion can be reached on the tax exemption question.

If you should desire any additional information or if we can be of further assistance, please do not hesitate to call us.

Very truly yours,

Susan Weeks Anthony

SMA:jdp

cc: Mr. Streuby L. Drumm, Sr., President, Board of Directors of HEAL

Exhibit 2.4.b
2-4-5

NEW ORLEANS PUBLIC SERVICE INC.

POST OFFICE BOX 60340

NEW ORLEANS, LOUISIANA 70130

W. D. NELSON
VICE PRESIDENT,
GENERAL COUNSEL
&
SECRETARY

April 12, 1977

AMLS 0002 040 000-1210
JIT BUREAU OF STAFF

de Laureal Engineers, Inc.
1312 International Trade Mart
No. 2 Canal Street
New Orleans, Louisiana 70130

Attention: Mr. W. D. de Laureal, Sr.

Dear Sirs:

Subject: ERDA "ICES" Project

In connection with the subject project and pursuant to Mr. John E. Morrison's March 24, 1977 letter to Mr. C. Robert Carter of New Orleans Public Service Inc. ("NOPSI") and the understandings reached at the meeting on April 4, 1977 among representatives of de Laureal Engineers, Inc., the Health Education Authority of Louisiana ("HEAL") and NOPSI regarding the extent of NOPSI's participation in the above project and the legal ramifications resulting from such participation, we wish to advise as follows:

1. NOPSI's participation in the project would be for it to lease (as lessor), operate and maintain the Central Plant and the steam and chilled water piping from the Plant to institutions in the HEAL Complex. Any electricity produced by the Plant would be fed into the NOPSI electric system and NOPSI would own, operate and maintain all electric distribution facilities. The Plant and steam and chilled water piping would be owned by HEAL, but the steam, chilled water and electricity produced by the Plant would be owned by NOPSI. The steam and chilled water service furnished by NOPSI would be restricted to institutions located within the HEAL Complex and would be rendered pursuant to private contracts independently negotiated by NOPSI with each such institution. The value to NOPSI of the electric energy produced by the Central Plant will be credited to the charges made for the steam and chilled water service. Under no circumstances will NOPSI permit its participation in the project to place any burden on its electric and gas customers.
2. Under its Articles of Incorporation, restated September 30, 1969, NOPSI has the right to enter into the type of lease arrangement contemplated by No. 1 above and to participate in and carry on the business activities referred to therein.
3. It is our opinion that under the arrangements set forth in No. 1 above NOPSI's participation in the steam and chilled water phase of the project would not constitute a public utility operation in that

Exhibit 2.4.c

AN INVESTOR-OWNED UTILITY COMPANY--MEMBER OF THE NICHOLS SERVICE SYSTEM
2-4-6

de Laureat Engineers, Inc.
Page 2
April 13, 1977

there is no dedication of the facilities producing the steam and chilled water to use by the public at large. See Gulf States Utilities Co. v. Louisiana Public Service Commission, 222 La. 132, 62 So. 2d 250 (1952). Moreover, in view of the above conclusion, it is our further opinion that the aforesaid participation by NOPSI in the project would not be subject to the jurisdiction of its regulatory authority, the Council of the City of New Orleans, inasmuch as such participation would be a private, non-utility business activity. As in the past, the City Council will continue to have regulatory jurisdiction over NOPSI's retail electric rates including those applicable to electric sales made to customers located within the HEAL Complex.

4. As an electric utility subsidiary company of Middle South Utilities, Inc., a registered holding company under the Public Utility Holding Company Act of 1935 ("Act"), NOPSI is subject to the jurisdiction of the Securities and Exchange Commission ("Commission") and the provisions of the Act. Since the aforesaid participation in the project by NOPSI would appear to result in an acquisition by it of an interest in a non-utility business, it is our opinion that Sections 9(a)(1) and 10 of the Act would be applicable and it will be necessary for NOPSI to make certain filings with and receive the authorization from the Commission prior to entering into any commitments with respect to its participation in the project.

If we can be of further assistance regarding any legal questions which may arise with respect to NOPSI's participation in the proposed project, please contact us.

Very truly yours,

NEW ORLEANS PUBLIC SERVICE INC.

By

WCH/edh
cc: Messrs. Strusby L. Drumm
George G. Kiefer

Exhibit 2.4.c

2-4-7

2.5 ENVIRONMENTAL IMPACT

The Draft Environmental Impact Statement (assessment) and the Final Environmental Impact Statement are proposed to be prepared during Phases II and III respectively. For the purpose of indicating the items or concerns of significance, the following assessment is provided with the proviso that each item listed should be and will be addressed in detail as required by the National Environmental Policy Act of 1969; the Guidelines of the Council on Environmental Quality, 1973; the Federal Water Pollution Control Act Amendments of 1972; the Noise Control Act of 1972 and the Clean Air Act of 1974.

For the present, this following assessment of the project is provided to illustrate the issues to be addressed in later Phases of the Demonstration Program. In making an environmental assessment the following factors must be considered:

2.5.1 Summary Assessment:

- (1) Environmental Policies: The construction of the project will impact favorably the area's economic conditions, the programs of other agencies, the future land utilization of the area and will impact adversely with dust control methods and noise precautions only during the construction phases of the Program. The adverse impact is considered temporary and not of any permanent significance.

The operations of the plant will require a controlled program of ash disposal that will conform with the requirements of EPA. Such a program is not complex, however, periodic assurances, in the form of reports, will be provided to EPA that the ash disposal is conducted in an acceptable manner.

The disposal of plant ashes will be accomplished by contract. The contractor will be allowed to sell the fly ash to local building product industries such as cement block manufacturers. The remaining clinker ashes will be disposed of at one of the three sanitary land fill areas within the metropolitan area.

- (2) Transportation: The proposed project will not impact the existing or future transportation system or services in any manner.
- (3) Clean Air: Construction and operation of the proposed project can and will impact the existing clean air environment; however, any adverse impact will be kept to a minimum. However, to do so will require the investigation of all possible corrective alternatives as part of the activities set out in Phases II & III. In any case, all standards and/or requirements will be complied with to assure minimal impact and to prevent degradation of the existing air quality.

- (4) Noise: To what extent noise from construction and operation of the proposed project will impact the environment is yet to be determined in Phase II. Presently, it is anticipated that neither will be of any significance.
- (5) Water Pollution: The only adverse impact that the project will impact on the area is the disposal of waste water into the sewerage system. This will be corrected by treating the water prior to disposal into the system, thereby eliminating the adverse condition.
- (6) Land Use & Zoning: Presently the project will not impose any adverse impact on the environment. However, the design of the facility must be compatible to and with the land use and the visual aesthetics of the surrounding area. This can only be determined during Phases II & III of the Program.
- (7) Fire and Other Safety Measures: Compliance with existing standards and regulations will assure no adverse impact to the environment.

	Source & Availability of Data:	Project Impact & Significance
I. ENVIRONMENTAL POLICIES		
A. Existing Conditions		
1. <u>Geological Elements</u> such as general topography of the area, minerals, paleontology items (fossils), and other related items such as soils, erosion and aquifers.	Historical data available from a variety of sources. Will not require additional survey work	None
2. <u>Hydrological elements</u> such as rivers, marshes and other related items as turbidity, pollutants, aquifer recharge areas, flooding; and design rainfall criteria.	Data available from U.S. Corps of Engineers, New Orleans District	None
3. <u>Climatic elements</u> such as precipitation, temperature and prevailing winds.	Data on hand (See Appendix)	None
4. <u>Botanical elements</u> - trees, shrubs, aquatic plants, microflora, unique species, seasonal color, mature stands of timber, vegetative zone and unique plant communities	Data on hand	None
5. <u>Zoological elements</u> - mammals, birds, fish, a macrofauna, migration routes, breeding areas and effect on endangered species.	Data on hand	None

	Source & Availability of Data	Project Impact & Significance
6. <u>Archaeological - Historical - Cultural elements</u> such as ruins, artifactual sites, battlefields, cemeteries, scientific and/or scenic areas. Detailed surveys and maps to be provided of affected areas.	Data available from Regional Planning Commission for Jefferson, Orleans, St. Bernard & St. Tammany Parishes	None
7. <u>Economic Conditions - Social Relationship and Human Well-being</u> - population trends, settlement, educational resources, employment, land values, taxation, economic trends, health aspects, aesthetics.	Data on hand	Yes - non-adverse, very significant.
8. <u>Miscellaneous elements</u> as parks, wildlife refuges, contemporary human features, buildings, existing transportation systems, etc.; private and public clubs.	Data on hand	None
9. <u>Programs of other agencies</u> federal, local and private individuals in the area as highways, airports, housing developments, industrial and commercial developments, parks and playgrounds.	Data on hand	Yes - non-adverse, not significant, local & private.
10. Future activities such as population growth, industrial and land use changes proposed and their impacts under existing conditions.	Data on hand	Yes - non-adverse, not significant, Land Use.

	Source & Availability of Data	Project Impact & Significance
B. <u>Should the Proposed Action be Implemented:</u>		
1. <u>Short-term Impact</u>		
a. Alterations to land forms, stream and drainage patterns.	N/A	None
b. Erosion Control Measures required	N/A	None
c. Extent to which area water courses will be affected by siltation and sedimentation. Effect on debris an impediment to flow in flood stage.	N/A - However minimum requirements for condensate water disposal will have to be adhered to, as per M.O. Sewerage & Water Board regulations.	Yes, not significant
d. Precautions to be taken to avoid injury to cover vegetation including trees	N/A	None
e. Precautionary measures to protect the area environment where clearing involves use of herbicides, cutting or burning.	N/A	None
f. Final disposal method for spoil of all types	To be determined in Phase II activities	Presently unknown
g. Where acquisition of land required state number of people to be relocated	Area presently vacant	None

	Source & Availability of Data	Project Impact & Significance
h. Land Acquisition - Condemnation, purchase, easement and effect on adjacent land values.	N/A	Unknown, non-adverse
i. Effect on drainage and utilities (present and future).	To be fully determined in Phase II.	Yes - beneficial impact on utilities
j. Dust control methods	Construction of facility will require minimal controls.	Yes - adverse, insignificant
k. Identify areas likely to be affected by construction.	Areas within two block radius will be affected.	Yes - not significant
l. Noise and precautions to be taken to protect area residents and wildlife from such noise.	Presently unknown	Yes - temporary, sporadic, not significant.
m. Measures to be taken to minimize vehicular and pedestrian traffic disruption.	To be fully determined in Phase II as required by M.O. Streets Dept.	Yes - non-adverse, not significant.
n. Night work effect on the area environment	N/A	None
o. Safety provision to protect public during construction	As required by OSHA	None

	Source & Availability of Data	Project Impact & Significance
2. Long-Term Impact:		
a. Type and amount of land that will be affected by Project Construction.	43 acres of Central Business District to be directly affected by Project Construction	Yes - non adverse, not significant.
b. Describe beneficial uses of land that will be eliminated by project construction	Project construction will not eliminate existing land uses & will enhance existing medical functions.	Yes - highly beneficial to existing area
c. Change in natural or present character of area.	N/A	None
d. Degree to which the proposed project will interfere with or obstruct natural views.	N/A	None
f. Landscaping to be provided.	Landscaping will be provided as part of Phase III activities.	Yes - non adverse
g. Relationship between residences and businesses, the project, and prevailing wind patterns	To be determined in Phase II. Recently compiled wind roses for the area available.	Yes - adverse, not significant
h. Effect on historic sites, recreational areas, or natural preserves - both present and proposed	Not any known impact	None

	Source & Availability of Data	Project Impact & Significance
i. Effect on insect populations and control programs; effect of use of insecticides on ground and water areas.	N/A	None
j. Effect on wildlife, birdlife and aquatic habitats.	N/A	None
3. <u>Secondary Impacts of Proposed Action</u>		
a. Degree to which project will ultimately affect residential, industrial or commercial development	To be fully determined in Phase II	Yes - non adverse, not significant.
b. Ultimate effect of the project on the character of the area	To be fully determined in Phase II	Yes - positive non adverse
c. Relationship between the project's effect on growth and type of growth desired by area residents.	To be fully defined in Phase II activities	Yes - excellent relationship, non adverse
11. <u>TRANSPORTATION</u>		
A. <u>Type and character of transportation presently in use.</u>	Highway and bus transit presently serving entire Demonstration Community	None

	Source & Availability of Data	Project Impact & Significance
B. <u>Effect on area transportation needs.</u>	Data on hand	None
C. <u>Effect on Existing Street System</u>	Data on hand	None
D. <u>Effect on Existing Transit System</u>	Data on hand	None
E. <u>Effect on Proposed Transportation System</u>	Data on hand	None
III. <u>CLEAN AIR</u>		
A. <u>Existing Conditions</u>		
1. Relationship between residences and businesses, the project and prevailing winds.	To be fully determined in Phase II. Recently compiled wind roses for area are available.	Yes - adverse, not significant
2. Identify possible odor sources. Effect on area.	To be fully determined in Phase II. See also Appendix C.2	Yes - adverse, not significant with appropriate controls
3. Identify current level of pollution from automobiles, residences, commercial and industrial activities in area.	To be collected/determined in Phase II. Traffic and land use data is available from municipal agencies. See also Appendix C.2	Yes - unknown The impact due to this project will be insignificant.
4. Compliance with State Air Quality Standards.	Currently complies as required well within max. tolerances	Yes - adverse, not significant

	Source & Availability of Data	Project Impact & Significance
5. Short Term vs. Long Term Effects.	To be determined in Phases II & III.	None
8. Project Conditions if Implemented		
1. Present realistic and comprehensive assessment of the project's potential air pollution problems	To be fully determined in Phase II. Pollutant emission rates for the emission-controlled boiler and stack can be determined.	Yes. Adverse, not signifi- cant
2. Conformation with regional and area wide plan for meeting Air Quality Standards of State and Federal Agencies.	Definite conformance will be provided as part of Phases II & III. Existing technology is available to meet all existing stan- dards.	Yes. Unknown, not signifi- cant.
3. Programs to meet State and Federal Standards	Data on hand. The standards will be met over the entire life of the project.	Yes. To be Determined.
4. Effect of night operations on area standards.	N/A	Yes. Unknown
5. Short Term vs. Long Term effects.	To be fully determined in Phase II. Meeting the Secondary Ambient Air Quality Standards will assure that there are no short term or long term effects on clean air.	None
6. Alternate solutions	Data on hand	Yes. Adverse, significant.

	Source & Availability of Data	Project Impact & Significance
7. Measures proposed to control dust during construction and to protect workmen as well as area residents	As may be required	Yes - non adverse - not significant
C. <u>Economics</u>		
1. Project effect on existing area	To be determined in Phase II	Yes - non adverse - highly beneficial
2. Project effect on area development - present and future plans.	N/A	Yes - non adverse - highly beneficial
3. Cost of meeting Air Quality Standards	To be determined in Phase II	Yes - non adverse
4. Cost of not meeting Air Quality Standards	To be determined in Phase II	Yes - adverse, significant
5. Summarize beneficial and adverse effects of project on area.	Feasibility determin- ations of Phase II will provide answers needed here.	Unknown
IV. <u>NOISE</u>		
A. <u>Existing Conditions:</u>		
1. Identify existing sources of noise.	To be obtained in Phase II - See section 2.3 of report and Appendix C.1	Yes - adverse not significant

	Source & Availability of Data	Project Impact & Significance
2. Identify permissive and non-permissive noise.	To be defined as part of Phase II	Yes - adverse not significant
3. Compare with Federal and/or State Guidelines.	To be determined in Phase II	Unknown
4. Effect on residential and other developments.	N/A	None
5. Effect on wildlife.	N/A	None
6. Short-Term vs Long-Term effects.	To be determined in Phase II	Unknown
<u>B. If Project is Implemented:</u>		
1. Identify areas affected by project.	To be determined by survey in Phase II	Yes - adverse, not significant
2. Specify precautions to be taken to protect residents and wildlife during construction. After construction.	To be determined in Phase II	Unknown
3. Effect of night work on the area environment.	To be determined in Phase II.	Unknown
4. Short-Term Impact vs. Long-Term Impact	To be determined in Phase II.	Unknown

	Source & Availability of Data	Project Impact & Significance
5. Specify precautions to be taken to protect workmen on project.	N/A	None
6. Identify permissible limits of noise.	See Appendix	N/A
7. Identify impact on contiguous areas not immediately adjacent to project.	To be determined in Phase II	Unknown
8. Present a realistic and comprehensive assessment of project's potential noise problems.	To be determined in Phase II	Unknown
9. Alternate solutions.	To be determined in Phase II	Unknown
10. Effect on areas, residential, commercial, and industrial development.	N/A	None
11. Alternates to project implementation.	To be determined in Phase II	Unknown
C. Economics		
1. Cost in terms of project cost, if project is implemented.	To be fully determined in Phases II & III.	Unknown
2. Cost in terms of cost to area during and after project construction.	To be fully determined in Phases II & III.	Unknown

	Source & Availability of Data	Project Impact & Significance
3. Cost in terms of area development	To be fully determined in Phases II & III	Unknown
V. <u>WATER POLLUTION</u>		
1. State whether project conforms to regional and area plan meeting water quality standards.	At present time project conforms to area plan	None
2. Effect of project on present water quality.	N/A	None
3. Beneficial adverse effects of project on aquatic and wildlife.	N/A	None
4. Effect of project on groundwater depletion and quality.	N/A	None
5. Will project result in diversion of flows between water courses? Effect on area drainage?	There will not be diversion of water courses nor any effects on area drainage.	None
6. Effect on vegetation and tree growth of area.	N/A	None

	Source & Availability of Data	Project Impact & Significance
7. Indicate project's physical relation to area flood plains. Project's effect on movement of flood waters and measures proposed to be taken to protect the project area from flooding.	N/A	None
8. Effect of water pollution on ultimate residential, commercial, and industrial development.	To be validated in Phase II	None
9. Methods of handling project drainage.	Treatment of disposal waste water	Yes - non adverse, not significant
10. Effect of project drainage on existing facilities; and area water courses and the effect on siltation and sedimentation.	None	None
11. Effect on insect population. Control methods.	N/A	None
12. Cost effects.	N/A	None
13. Alternate solutions.	To be determined in Phase II.	Unknown
a. Positive	To be determined in Phase II.	Unknown

	Source & Availability of Data	Project Impact & Significance
b. Negative	To be determined in Phase II.	Unknown
14. Ultimate effect on the character of the area.	None	None
VI. LAND USE AND ZONING		
A. <u>Short-Term Impact:</u>		
1. Existing Land Use and Zoning Area.	Existing L.U. & Zon- ing allows for construc- tion of Project. Data available from N.O. City Planning Commission	None
2. Effect of existing land-use and zoning on area development.	None	None
3. If land acquisition is required for project, specify number of people who will have to be relocated. Plans for orderly relocation and prevention of hardships.	There will not be any relocation of people	None
4. Method of land acquisition - condem- nation, easement, etc.	To be determined in Phase II	None

	Source & Availability of Data	Project Impact & Significance
5. Project effect on land values in area and adjacent thereto.	To be determined in Phase II	Yes - non adverse, not significant
6. <u>Long-term Impact:</u>		
1. Specify type and amount of land that will be affected by project construction.	To be determined in Phase II	Yes - non adverse - not significant
2. Describe beneficial uses of land that will be eliminated by the project construction.	To be determined in Phase II.	None
3. How will the natural or present character of the area be changed?	To be determined in Phase II	Yes - non adverse - not significant
4. Will the natural view be obstructed by the construction of the project?	No changes are anticipated.	None
5. Changes required by project construction in zoning area.	None	None
6. Degree to which project will ultimately affect residential or other development	N/A	None

	Source & Availability of Data	Project Impact & Significance
7. Estimate the ultimate effect of the project on the character growth of the area.	To be determined in Phase II	Unknown
B. Explain if project is being used to implement land use planning	To be determined in Phases II & III.	Unknown
VII. FIRE AND OTHER SAFETY MEASURES		
A. Existing:		
1. Present Area protection	Adequate	None
a. Sufficient	To be determined in Phases II & III	Unknown
b. Insufficient	To be determined in Phases II & III	Unknown
c. OSHA requirements.	To be determined in Phases II & III. See Section 2.3 of report	Yes - non adverse, not significant
B. Short Term Impact	To be determined in Phases II & III	Yes, non adverse, not significant

	Source & Availability of Data	Project Impact & Significance
C. <u>Long Term Impact</u>	To be determined in Phases II & III	Yes, non adverse, not significant

TASK III
CONCEPTUAL DESIGN

3.0 DEMONSTRATION SYSTEM

Plant System-4 which will produce electrical power, steam and chilled water for air conditioning, has been selected, with ERDA concurrence, as the grid-connected ICES Demonstration System for this program.

3.1 PROCESS FLOW DIAGRAMS

Process flow diagrams appear in Section 1.5 -- identified as HE Nos. 7, 8 and 9 -- and indicate the flow values for maximum heating day, maximum cooling day and average annual load, respectively, along with a summary of these values.

3.2 SYSTEM SCHEMATIC

System schematic, one-line diagram indicating flows and major equipment sizing, is included in this section of the report as Flow Diagram, drawing No. 1.

3.3 DISTRIBUTION NETWORK

The one-line distribution diagram is included on the above-mentioned drawing No. 1 and indicates the thermal service demands for the five HEAL community institutions.

3.4 CENTRAL PLANT LAYOUT

The central plant site plan and plant layouts are included in this section of the report and are identified as Site Plan, drawing No. 2; Ground Floor Plan, drawing No. 3; Operating Floor Plan, drawing No. 4; and Upper Level Plan, drawing No. 5.

3.5 COST AND PERFORMANCE ESTIMATES

These estimates as developed for the selected system, Plant System-4, have been included in Section 1.5. A summary of the values for Plant System-4 follows:

Cost of Construction	\$25,566,500
Annual Revenue	7,100,730
Annual Owning and Operating Cost	6,359,108
Surplus	741,622

Energy Evaluation: Output/Input = 0.78

3.6 ANALYSES, METHODS AND ASSUMPTIONS

3.6.1 Construction Cost Estimates

The construction cost estimates for the major items of equipment were obtained from equipment manufacturers; plant pumping and piping costs were projected as percentages of the cost of the equipment being served. The percentages were derived from construction costs of similar plants built over the past several years. Building construction costs were calculated on the basis of \$1.50 per cubic foot of building volume.

The utility distribution system costs were developed in consultation with a local construction firm competent in this field of construction.

Allowances for contingencies and escalation were assumed at 10% each.

3.6.2 Performance Estimates

- (1) Annual Owning and Operating Costs Assumptions used as bases for developing these estimates are listed in Section 1.5, immediately preceding the schedule of owning and operating costs. Specific costs estimated for fuel and electricity were projected through the end of the year 1977.
- (2) Revenues The selling prices for steam and cooling were estimated from sales contracts presently utilized by successful operating central plants in the midwest and eastern parts of the country. The values used represent an average of the contracts investigated and are as follows:
 - Steam sales, \$3.75 per 1000 pounds
 - Cooling sales, \$0.12 per ton hour
 - The resale value of electric energy was set at 2¢ per KWH, with NOPS1 in agreement.

It is anticipated that the above unit sales prices will change at a later date as sales agreements are developed and separated into demand and consumption charges, and for large and small users.

- (3) Energy Evaluation

The demonstration plant, Plant System-4, provides an annual average ratio of energy output to energy input, as follows:

$$\frac{131.27 \times 10^6 \text{ BTU/hour}}{168.32 \times 10^6 \text{ BTU/hour}} = 0.78.$$

which, as demonstrated in Section 1.5, paragraph 1.5.7 (3) is more favorable than either of the other two plant systems that were examined.

3.7 EXPANSION SCHEDULE

The HEAL Master Plan includes a program for Phase 2 expansion, to add the following building areas:

<u>Year</u>	<u>Square Feet</u>
1990	682,150
1992	1,723,300
1995	<u>762,000</u>
Total Addition	3,167,450

In order to accommodate this planned expansion, it is estimated that in 1988 one additional steam boiler, rated at 225,000 lbs/hour, and one additional 5,000-ton centrifugal refrigeration machine, with auxiliaries, would be added to the ICES central plant system.

3-0-6

POYDRAS

ROBERTSON

PERDIDO

FRERET

SITE PLAN
GRAPHIC SCALE

HE LAUREL ENGINEERS, INC.
CONSULTING ENGINEERS
NEW ORLEANS, LA 8 GULFPORT, MISS

HEAL CENTRAL FACILITY
NEW ORLEANS, LOUISIANA
C.E. SCHLESINGER & ASSOCIATES, INC.
CONSULTING ENGINEERS
2221 EAST HENNEPIN AVE.
MINNEAPOLIS, MINNESOTA 55413

DWG. NO. 2 OF 3

GROUND LEVEL PROPOSED PLANT

GRAPHIC SCALE

88 LUMINAL ENGINEERS, INC.
CONSULTING ENGINEERS
NEW ORLEANS, LA. 70112

H.E.A.L. CENTRAL FACILITY
NEW ORLEANS, LOUISIANA
DRS. SCHREINER, WATSON
& ASSOCIATES, INC.
CONSULTING ENGINEERS
1021 1st. BIRMINGHAM AVE.
BIRMINGHAM, ALA. 35203
DWG. NO. 5 OF 5

3-0-8

OPERATING LEVEL PROPOSED PLANT

DE LAUREAL ENGINEERS, INC.
CONSULTING ENGINEERS
NEW ORLEANS, LA. 80170007, 8000.

H.E.A.L. CENTRAL FACILITY
NEW ORLEANS, LOUISIANA
OEE SCHEEN HAYSON
& ASSOCIATES, INC.
CONSULTING ENGINEERS
2021 EAST BENNEPIN AVE.
MINNEAPOLIS, MINNESOTA 55412

SWS. NO. 4 OF 5

[illegible]

H.E.A.L. CENTRAL FACILITY
NEW RELEASE LOANERS
ONE SCHULEN MAYERSON
B ASSOCIATES, INC.
CONSULTING ENGINEERS
2071 1432 HENDRICKS AVE.
MINNEAPOLIS MINNEAPOLIS 55415
P.O. NO. 2 OF 2

TASK IV

FIRMING-UP OF COMMITMENTS

4.0 FIRMING-UP OF COMMITMENTS - GENERAL

The commitments confirming the role relationships of HEAL, HOPSI, de Laurel Engineers, Inc. and Orr-Schelen-Hayeron & Associates, Inc. are included herein, in the appropriate sections, by reference to letters from each party. All other important and pertinent aspects of the project have been considered and are also included.

4.1 SITE SELECTION

Five sites were selected for consideration as possible locations for the ICES plant. (Refer to attached location and site plans, Exhibits 4.1.a thru 4.1.f) Verification of availability of the selected sites was pursued by Drumm and Associates, Inc., a property acquisition and development company. Availability was confirmed on three of the five sites. The order of preference of the available sites is as follows:

Site #1, Subdivision lot No. 373; and

Site #2, Subdivision lot No. 365.

Site #5, Subdivision lot No. 368 although available for purchase is not large enough for the ICES plant.

Each of the two preferred sites could be acquired for somewhere between \$50.00 and \$60.00 per square foot. Refer to the attached letter, including backup data, from Drumm and Associates dated May 11, 1977 (Exhibits 4.1.g and 4.1.h).

DEMONSTRATION COMMUNITY
COMPOSITE SITE PLAN

EXHIBIT 4.1.a

SITE 1

IM-4A SCALE 1"=50'

EXHIBIT A.1.C
4-1-4

SITE 2

IM-4A SCALE 1"=50'

1M-4A SCALE 1" = 50'

SITE 3

IM-5A SCALE 1" = 60'

[illegible]IM-5A SCALE 1st:

Drumm and Associates, Inc.

ACQUISITION, DEVELOPMENT AND MANAGEMENT OF INCOME PRODUCING PROPERTY
SUITE 2960, 1010 COMMON STREET
NEW ORLEANS, LOUISIANA 70112
504/522-6431

May 11, 1977

Mr. Elton E. Foster
de Laureal Engineers, Inc.
1512 International Trade Mart
New Orleans, Louisiana 70130

Dear Mr. Foster:

With respect to your request for information regarding the availability and prices of various sites in the H.E.A.L. area, the following information is provided:

1. Brochures are attached covering Sites 1 and 2. Based on the comparables provided in the brochure on Site 1 and the asking price for Site 2 it would be my judgment that after suitable negotiations those sites could probably be acquired for somewhere between \$50.00 and \$60.00 a square foot.
2. Approximately 2/3rds of Site 3 is occupied by the Schott & Company, Inc., meat packers. In a conversation with the president of this company we learned that this property is not for sale.
3. Site 4 consists of a number of small ownerships. In my judgment the probability of acquiring all of these individual properties within a reasonable period of time and at a reasonable price would be extremely difficult. Other institutions in the area who have assembled parcels similar to this have had to pay as much as \$100.00 a square foot for some of the individual properties needed.
4. Site 5 is under the control of A. L. Jung. In a conversation with Mr. Jung he informs us that the property is for sale. However, he had not put a specific sales price on the property but indicated he would be willing to discuss seriously any offer at a price that could be shown to be a fair market price for the property.

If I can be of further assistance please let me know.

Very sincerely,

Streuby L. Drumm, Jr.

SLD:MW
Encl.

Exhibit 4.1.g
4-1-8

a man's home is his castle

STAN WEBER AND ASSOCIATES, INC.

TWX: S WEBER MRE 810—951-5199

ADMINISTRATIVE OFFICE: 3841 VETERANS BLVD., SUITE 202, METAIRIE, LA. 70002 • 888-1777

REALTORS

BRANCH OFFICES

EAST JEFFERSON
3841 VETERANS BLVD.
METAIRIE, LA. 70002
888-1400

EAST JEFFERSON
1823 WILLIAMS BLVD.
KENNER, LA. 70002
729-4563

EAST JEFFERSON
3804 WILLIAMS BLVD.
KENNER, LA. 70002
443-6464

EASTERN NEW ORLEANS
8001 CHEF MENTEUR
NEW ORLEANS, LA. 70188
242-9900

EASTERN NEW ORLEANS
10100 MORRISON RD.
NEW ORLEANS, LA. 70127
246-4700

ST. BERNARD
9113 W. JUDGE PEREZ DR.
CHALMETTE, LA. 70043
279-6344

LAKEFRONT—GENTILLY—BELOW CANAL
8244 ARCONNE BLVD.
NEW ORLEANS, LA. 70124
488-8581

UPTOWN—ABOVE CANAL
2101 S. CARROLLTON AVE.
NEW ORLEANS, LA. 70118
685-1181

WEST BARK
3836 GEN. MEYER
NEW ORLEANS, LA. 70114
382-9900

WEST BARK
5100 WESTBANK EXPY.
HARRIS, LA. 70072
340-8948

SLIDELL
1308 GAUSE BLVD.
SLIDELL, LA. 70459
N. O. DIAL 924-3739
SL. DIAL 841-1499

SLIDELL
4022 OLD SPANISH TRAIL
SLIDELL, LA. 70459
N. O. DIAL 588-1008
SL. DIAL 841-8842

COMMERCIAL—INVESTMENT—LAND
3841 VETERANS BLVD.
METAIRIE, LA. 70002
887-2288

Exhibit 4.1.h.

Source: _____

INDUSTRIAL _____ X _____
ACREAGE _____
RESIDENTIAL _____

Reg. Comm.
Listing Number Land #42/518 Address 1501 Poydras St.
Area Dome Stadium Subdivision Orleans Parish
Lot(s) _____ Unit _____ Square(s) 365 Section _____
Township _____ Range _____ Zoned Commercial-Indust.
Bounding Streets Freret, LaSalle, Perdido
Near (Pinpoint the location) Dome Stadium
Listing Agent Joe Eyster, M. Beaupre, J. Raspanti Phone Number 887-2298
Measurements per Lot 197'4"X118'2"X193'10"X114.9&822 Total 32,047.6 sq. ft.
Total Square Footage 32,047.6 sq. ft. Traffic Count _____ Fill Needed? No

Paid by Purchaser	Paving	Sewerage	Taxes
Paid by Seller	Paving X	Sewerage X	Taxes X
Amount Due & When			
Will Owner Finance	Other Financing

6% Commission on 1st \$100,000.00 - 4% on balance

Located On: Poydras St.

Subdivision

Price \$2 170 237

S I T E # 2

IM-4A SCALE 1" = 1'

STAN WEBER and ASSOCIATES, INC.
Suite 103 • 3841 Veterans Boulevard
Metairie, La. 70002

FOR SALE
32,047 Sq. FT

1501 POYDRAS ST.
GUDAHY FOODS CO.

4-1-12

Highway Traffic Routes to Poydras Street Complex

EXHIBIT 4.1.1

EXHIBIT 4.1.h

Comparable Poydras Street Properties

The following comparables are either adjoining or in the immediate area of The Poydras Street Complex. All properties mentioned have recently been involved in a sale or negotiation relating to a sale of the property, and the values reflect the worth of the property at the time the related transactions took place.

Pan American Life Insurance Co.:

This property is bounded by Poydras, Camp, Commercial Alley, and St. Charles Avenue, and is located in Square 173 of the 1st Assessment. It consists of a large assemblage of many tracts. The last parcel had a value of \$50.39 per square foot.

Langford Land Company:

This property comprises portions of Square 165 totaling some 23,505 square feet. These transactions have transpired within the past several years and have involved portions on this unimproved land ranging from \$48.61 per square foot to \$51.78 per square foot. It is bounded by Poydras, Camp, Natchez and Magazine Streets.

These comparables represent some of the most recent transactions or offers to negotiate in the immediate area of the Superdome on Poydras Street. It should be noted that there are currently negotiations and sales that have not yet been recorded for property along Poydras Street which in most cases amount to at least \$60.00 per square foot, and because of the economic impact of the Superdome, these land values should continue to escalate.

EXHIBIT 4.1.h

Illinois Central Gulf Railroad:

This property is located adjacent to The Poydras Street Property and has 202' 6" frontage on Poydras Street. It is located in Square 400 of the 1st Assessment and is bounded by Perdido St., Robertson, Poydras, and Clara Streets. Its total area is 55,243 square feet and it is also located directly across from the Superdome. In December, the Illinois Central offered to sell this property for \$3,250,000, or \$57.97 per square foot.

Cudahy Co. and Main Corporation:

This property is located in Square 365 of the 1st Assessment and is bounded by Poydras, LaSalle, Perdido, and Freret Streets. This property has a 197' 4" front on Poydras Street and adjoins a portion of The Poydras Street Property located in this square. The total square footage of this property is 30,980 and it has been offered for \$68.00 per square foot, or \$2,106,640.

Shell Oil Company:

This property is that which was utilized by the Shell Oil Company to construct the new One Shell Square Building. Shell purchased the entire Square 221 in the 1st Assessment for this project on March 31, 1970. It has a 340' front on Poydras Street and is bounded by Perdido, Carondelet, and St. Charles Avenue on its other side. This property consists of 105,456.89 square feet and was purchased on the above mentioned date for \$4,500,000, or \$42.67 per square foot.

EXHIBIT 4.1.h

Uses For The Property

HOTEL OR MOTEL

Obviously, an attraction of the magnitude of the Superdome will need thousands of first-class hotel or motel rooms to support the giant crowds attending sports events and conventions. New Orleans, even with its current hotel rooms, existing and abuilding, will still be short thousands of rooms.

CONDOMINIUMS

Comfortable units, reasonably priced, located in this strategic spot, so convenient to all the downtown attractions of New Orleans, would be another of the first-consideration uses for the tract.

OFFICE BUILDINGS

High-rise office buildings, skillfully designed in an attractive complex of structures, would be a natural combination with the magnificent sports and convention stadium. These could be built-in phases, as the momentum for "close-in" office space accelerates with the popularity of the Dome.

PARKING BUILDING

Likewise, there will always be a need for additional convenient parking at the stadium site. A multi-level parking building, coupled with shops, auto sales and service space on the ground floor, and with a walkway across Poydras connected to the stadium, should be a winner.

Blank

4-1-18

4.2 RIGHTS-OF-WAY.

Probable difficulties that might arise in providing right-of-ways on property owned by one institution to accommodate the service distribution systems that may cross over the property of another institution were considered, and it was concluded that no problems existed other than routine matters. (Refer to Exhibits 4.2.a through 4.2.e for verification by each institution. Note that these documents are repeated as exhibits in Section 4.5 with respect to their contents relative to thermal product cost levels.)

EDWIN EDWARDS
Governor
JEREMY L. ORUM
Deputy Governor

State of Louisiana
HEALTH EDUCATION AUTHORITY OF LOUISIANA
ROOM 303 • 201 LEVEE AVENUE • STATE OFFICE BUILDING
NEW ORLEANS, LOUISIANA 70112

May 11, 1977

Mr. Elliott Roberts, Director
Charity Hospital
1532 Tulane Avenue
New Orleans, La. 70112

Dear Mr. Roberts:

One of the requirements to be fulfilled in completing the "Phase I" stage of our proposed Integrated Community Energy System demonstration project is to determine reasonably accurate, current and projected costs for the production of hot and chilled water on the part of the institutions participating in this study.

We have found that it is difficult, if not impossible, to obtain data with sufficient comparability with which to make reasoned determinations relative to these cost levels. We have also found, however, that very complete cost data has been maintained at the Veterans Administration Hospital, as a part of a Nationwide study on this particular subject conducted by the Veterans Administration.

Attached is a copy of a letter from Mr. Kadrovach relative to their cost determination studies, along with current and projected cost estimates.

In order to fulfill our requirements under Phase I of the "ICES" project, we have suggested that this data be used as a reasonable projection of future costs to provide this service within the institutions of the Medical Complex at the time that the proposed centralized system will go into operation. This conclusion is based on the assumption that generating plants of a comparable nature, using common fuel sources in a common community, would operate at reasonable consistent cost levels.

On another matter relative to the ICES project, we have discussed probable difficulties that might arise in providing right-of-ways on property owned by your institution in order to accommodate the service distribution systems

Mr. Elliott Roberts

-2-

May 11, 1977

to your institution. These discussions lead us to the conclusion that no problems other than routine matters will be presented in providing such right-of-ways.

Should you agree with the above conclusions, we would very much appreciate your so indicating in the space provided below.

Your agreement with these conclusions should not serve to alter your previous Letter of Intent relative to this project. (Copy attached)

Your cooperation along with that of many of your staff, throughout this program has been absolutely outstanding, for which we are most grateful. Successful completion of this project can have profound benefits to the institutions throughout the Louisiana Medical Complex, and ultimately to the people of our State. We thank you sincerely for your very great help.

Cordially,

Vernon D. Belfert
Executive Director

VDS:mz
Enclosure

I agree with the above conclusions.

Signature:

Date: 5/11/77

Exhibit 4.2.a.

4-2-3

GEORGE EDWARDS
Governor
STANLEY L. BRUNN
Attorney General

State of Louisiana
HEALTH EDUCATION AUTHORITY OF LOUISIANA
ROOM 112 • 601 LOUISIANA AVENUE • STATE OFFICE BUILDING
NEW ORLEANS, LOUISIANA 70112

May 11, 1977

Dr. John Walsh, Chancellor
Tulane Medical Center
1430 Tulane Avenue
New Orleans, La. 70112

Dear Dr. Walsh:

One of the requirements to be fulfilled in completing the "Phase I" stage of our proposed Integrated Community Energy System demonstration project is to determine reasonably accurate, current and projected costs for the production of hot and chilled water on the part of the institutions participating in this study.

We have found that it is difficult, if not impossible, to obtain data with sufficient comparability with which to make reasoned determinations relative to these cost levels. We have also found, however, that very complete cost data has been maintained at the Veterans Administration Hospital, as a part of a Nationwide study on this particular subject conducted by the Veterans Administration.

Attached is a copy of a letter from Mr. Kadrovach relative to their cost determination studies, along with current and projected cost estimates.

In order to fulfill our requirements under Phase I of the "ICES" project, we have suggested that this data be used as a reasonable projection of future costs to provide this service within the institutions of the Medical Complex at the time that the proposed centralized system will go into operation. This conclusion is based on the assumption that generating plants of a comparable nature, using common fuel sources in a common community, would operate at reasonable consistent cost levels.

On another matter relative to the ICES project, we have discussed probable difficulties that might arise in providing right-of-ways on property owned by your institution in order to accommodate the service distribution systems

Exhibit 4.2.b.

4-2-4

Dr. John Walsh

-2-

May 11, 1977

to your institution. These discussions lead us to the conclusion that no problems other than routine matters will be presented in providing such right-of-ways.

Should you agree with the above conclusions, we would very much appreciate your so indicating in the space provided below.

Your agreement with these conclusions should not serve to alter your previous Letter of Intent relative to this project. (Copy attached)

Your cooperation along with that of many of your staff, throughout this program has been absolutely outstanding, for which we are most grateful. Successful completion of this project can have profound benefits to the institutions throughout the Louisiana Medical Complex, and ultimately to the people of our State. We thank you sincerely for your very great help.

Cordially,

Vernon D. Sargent
Executive Director

VDS:mz
Enclosure

I agree with the above conclusions.

Signature: *John F. Walsh*
Date: 5/11/77

Exhibit 4.2.b.
4-2-5

EDWIN EDWARDS
Governor
STANLEY L. BRUSH
Comptroller

State of Louisiana

HEALTH EDUCATION AUTHORITY OF LOUISIANA
ROOM 214 • 222 LIPOLA AVENUE • STATE OFFICE BUILDING
NEW ORLEANS, LOUISIANA 70112

May 11, 1977

Mr. Charles Mross, Administrator
EENT Hospital
145 Elk Place
New Orleans, La. 70112

Dear Mr. Mross:

One of the requirements to be fulfilled in completing the "Phase I" stage of our proposed Integrated Community Energy System demonstration project is to determine reasonably accurate current and projected costs for the production of hot and chilled water on the part of the Institutions participating in this study.

We have found that it is difficult, if not impossible, to obtain data with sufficient comparability with which to make reasoned determinations relative to these cost levels. We have also found, however, that very complete cost data has been maintained at the Veterans Administration Hospital, as a part of a Nationwide study on this particular subject conducted by the Veterans Administration.

Attached is a copy of a letter from Mr. Kadrovach relative to their cost determination studies, along with current and projected cost estimates.

In order to fulfill our requirements under Phase I of the "ICES" project, we have suggested that this data be used as a reasonable projection of future costs to provide this service within the Institutions of the Medical Complex at the time that the proposed centralized system will go into operation. This conclusion is based on the assumption that generating plants of a comparable nature, using common fuel sources in a common community, would operate at reasonably consistent cost levels.

On another matter relative to the ICES project, we have discussed probable difficulties that might arise in providing right of ways on property owned by your Institution in order to accommodate the service distribution systems to your Institution. These discussions lead us to the conclusion that no problems other than routine matters will be presented in providing such right of ways.

Should you agree with the above conclusions, we would very much appreciate your so indicating in the space provided below.

Exhibit 4.2.c.

4-2-6

(2)

Your agreement with these conclusions should not serve to alter your previous letter of intent relative to this project (copy attached).

Your cooperation along with that of many of your staff, throughout this program has been absolutely outstanding, for which we are most grateful. Successful completion of this project can have profound benefits to the institutions throughout the Louisiana Medical Complex, and ultimately to the people of our State. We thank you sincerely for your very great help.

Cordially,

Vernon D. Saffert
Executive Director

VDS/daw

Enclosure

cc Mr. S. L. Drum
Mr. M. D. DeLaureal

I agree with the above conclusions.

Signature:

Date:

5-11-77

Exhibit 4, 2, c.

4-2-7

EDWIN EDWARDS
Governor
STANLEY L. DEUNN
Comptroller

State of Louisiana
HEALTH EDUCATION AUTHORITY OF LOUISIANA
ROOM 111 • 225 LUYOLA AVENUE • STATE OFFICE BUILDING
NEW ORLEANS, LOUISIANA 70112

May 11, 1977

Dr. Allen Copping, Chancellor
LSU Medical Center
Canal-LaSalle Building
1440 Canal Street
New Orleans, La. 70112

Dear Dr. Copping:

One of the requirements to be fulfilled in completing the "Phase I" stage of our proposed Integrated Community Energy System demonstration project is to determine reasonably accurate, current and projected costs for the production of hot and chilled water on the part of the institutions participating in this study.

We have found that it is difficult, if not impossible, to obtain data with sufficient comparability with which to make reasoned determinations relative to these cost levels. We have also found, however, that very complete cost data has been maintained at the Veterans Administration Hospital, as a part of a Nationwide study on this particular subject conducted by the Veterans Administration.

Attached is a copy of a letter from Mr. Kadrovach relative to their cost determination studies, along with current and projected cost estimates.

In order to fulfill our requirements under Phase I of the "ICES" project, we have suggested that this data be used as a reasonable projection of future costs to provide this service within the institutions of the Medical Complex at the time that the proposed centralized system will go into operation. This conclusion is based on the assumption that generating plants of a comparable nature, using common fuel sources in a common community, would operate at reasonable consistent cost levels.

On another matter relative to the ICES project, we have discussed probable difficulties that might arise in providing right-of-ways on property owned by your institution in order to accommodate the service distribution systems

Exhibit 4.2.d.
4-2-8

Dr. Allen Copping

-2-

May 11, 1977

to your institution. These discussions lead us to the conclusion that no problems other than routine matters will be presented in providing such right-of-ways.

Should you agree with the above conclusions, we would very much appreciate your so indicating in the space provided below.

Your agreement with these conclusions should not serve to alter your previous Letter of Intent relative to this project. (Copy attached)

Your cooperation along with that of many of your staff, throughout this program has been absolutely outstanding, for which we are most grateful. Successful completion of this project can have profound benefits to the institutions throughout the Louisiana Medical Complex, and ultimately to the people of our State. We thank you sincerely for your very great help.

Cordially,

Vernon D. Seifert
Executive Director

VDS:mz
Enclosure

I agree with the above conclusions.

Signature: Allen Copping

Date: 5/11/77

Exhibit 4.2.d
4.2-9

VETERANS ADMINISTRATION
HOSPITAL
1601 PERNONCE STREET
NEW ORLEANS, LOUISIANA 70146

May 12, 1977

IN REPLY
REFER TO: 629/138

DeLaureal Engineers, Inc.
ATTN: Mr. Walker Sullivan
1512 International Trade Mart
No. 3 Canal Street
New Orleans, Louisiana 70130

Dear Sir:

A question has arisen regarding availability of right-of-ways for the purpose of accommodating the ICES System on Veterans Administration property. If the system is constructed, we do not anticipate any problem of securing the necessary right-of-ways other than routine matters normally encountered in similar situations regarding other types of utilities.

You may be assured that we will cooperate to the fullest extent possible.

Sincerely yours,

William O. Edgar
for DAN G. KADROVACH
Director

Exhibit 4.2.e.

"To care for him who shall have borne the battle, and for his widow, and his orphan." - ABRAHAM LINCOLN
4-2-10

4.3 FINANCING

The complete procedure for financing the ICES Demonstration System, including a time schedule, is included in the Financing Plan (Exhibits 4.3.a and 4.3.b). This plan sets forth the steps necessary to secure financing in accordance with the "General Resolution Providing for the Issuance of Revenue Bonds of HEAL" (Exhibit 4.3.c) and a sample prospectus (Exhibit 4.3.d) relating to the issuance of revenue bonds for the Tulane University Medical Center, a similarly financed, owned and leased project. (See Appendix D for Exhibits 4.3.c and 4.3.d).

GEORGE STEWART
Governor
STRENUOUS L. ORANGE
Chairman

State of Louisiana

HEALTH EDUCATION AUTHORITY OF LOUISIANA
ROOM 208 • 225 LOUISIANA AVENUE • STATE OFFICE BUILDING
NEW ORLEANS, LOUISIANA 70112

May 11, 1977

GRID CONNECTED ICES PROJECT

FINANCING PLAN

Financing of this proposed central thermal energy production facility will be possible through the use of the Health Education Authority of Louisiana's (HEAL), tax-free bonding authority, should the following conditions prevail:

1. That HEAL will be able to establish its position as a nonprovider of public utility services in accordance with State and Federal law. That the Authority will be legally identified as a vehicle through which this facility is financed, designed and constructed, owned by the Authority, and leased to New Orleans Public Service Inc. (NOPSI) for the specific provision of thermal energy to member Institutions that qualify as Primary or Participating Institutions within the Medical Complex.

Thermal energy will not be produced for sale to the general public, and the incidental production of electrical energy as a by-product of the thermal energy production process will serve only as an incidental available source to NOPSI, in total volume approximately 25% of the normal electrical demand of the user Institutions served by the New Orleans Public Service, Inc.

2. That competent financial feasibility study will demonstrate that through the operation of this centralized program, thermal and electrical energy will be supplied to the user Institutions within the Medical Complex at costs at least equal to or lower than the projected future costs for such services either produced within their own facilities or purchased elsewhere.

3. That a long-term series of supply contracts will be, negotiated between NOPSI, (as lessee) and the user Institutions within the Medical Complex, ad-

Financing Plan

(2)

equates to assure sufficient flow of revenue to meet the operation and debt retirement costs of the project.

4. That the revenue bond issue established by HEAL will be marketable and in accordance with all provisions of HEAL'S General Resolution under date of March 6, 1974; the specific series resolution created for this financing project; and all appropriate supplemental resolutions, lease agreements, etc.
5. That the tax-free status and legality of this proposed bond issue is established and not successfully challenged.

Please see legal counsel letter, attached also note copies of Act 112 of 1968 (La.); General Resolution dated March 6, 1974 and Typical Bond Prospectives attached.

PLAN OF PROCEDURE

The financing plan will begin during the conduct of Phase II of this project and extend beyond the completion of Phase II through the design, construction and start-up of operations of the central facility. It is anticipated that total expenditures will run in the range of 33 to 35 million dollars, with a revenue bond issue in a similar range.

DURING PHASE II OF PROJECT

1. Completion of preliminary facility design.
2. Make decisions on primary and secondary fuel sources.
3. Complete detailed financial feasibility.
4. Draft long-term thermal energy supply contracts, begin preliminary negotiations between NOPSI and user institutions.
5. Draft lease agreement between HEAL and NOPSI.
6. Option the land. (one of four known alternatives)
7. Complete research on all legal questions and obtain necessary opinions

Exhibit 4.3.a

4-3-3

Financing Plan

(3)

relative to status of HEAL, the user Institutions and NOPSI under the general organizational and financing plans, as set forth in the Phase I report and related instruments.

FOLLOWING COMPLETION OF PHASE I OF PROJECT

8. Complete negotiations between NOPSI and user Institutions, create and execute final supply contracts between user Institutions and NOPSI, or HEAL.
9. Complete negotiations between HEAL and NOPSI, create and execute lease agreement between HEAL and NOPSI.
10. Draft series resolution and related instruments. Obtain approval of the Board of Trustees of HEAL, present to the Louisiana State Bond Commission, create offering prospectives and negotiate sale of the bonds.
11. Prepare supplemental resolutions, obtain necessary approvals and sell the bonds.
12. Appoint a Trustee in accordance with requirements of the resolution and establish the necessary bank accounts and reserve funds as required.
13. Complete facility design, obtain bids for construction and begin construction. It is our understanding that this phase is to be under the management control of NOPSI, as lessee of the facility, and under the engineering control of DeLaurel Engineers, Inc., as consulting engineers, whose services will be reimbursed on the basis of standard engineering fee curves.
14. Complete construction of the facility and distributions system.
15. Start-up of operations; provide services to the user Institutions.

CONCLUSION

See attached time phase schedule. It is anticipated that completion of Phase II of the project will require seven months. Additionally, approximately three to

Financing Plan

(4)

three and one-half years will be required to finance, complete design and construct the facility. Start-up operations should be accomplished within approximately four years from start of Phase II.

Vernon O. Seifert
Executive Director

4-3-6

EXHIBIT 4.3.1

4.4 OWNERSHIP

The relationship and roles of HEAL and NOPSI concerning the ownership and operation are set forth in HEAL's letter to ERDA, dated May 10, 1977 (Exhibit 4.4.a). NOPSI's confirmation of commitment is contained in NOPSI to HEAL letter dated May 11, 1977 (Exhibit 4.4.b).

EDWIN EDWARDS
Governor
STANLEY L. BRUNN
Comptroller

State of Louisiana
HEALTH EDUCATION AUTHORITY OF LOUISIANA
ROOM 219 • 225 LEPOLLA AVENUE • STATE OFFICE BUILDING
NEW ORLEANS, LOUISIANA 70112

May 10, 1977

U. S. Energy Research and
Development Administration
8800 South Cass Avenue
Argonne, Illinois 60439

Attention: Mr. J. C. Rodousakis

Gentlemen:

Subject: ERDA "ICES" Project

The following is designed as a general statement setting forth the role of the Health Education Authority of Louisiana (HEAL) and its relationship with New Orleans Public Service Inc. (NOPSI) and de Laureal Engineers, Inc. with respect to participation in the proposed Integrated Community Energy System demonstration project sponsored by the U. S. Energy Research and Development Administration. An expression of HEAL's intent to proceed with this project, subject to all pertinent laws and adequate resolution of all remaining legal questions, is hereby submitted.

INTRODUCTION:

Under the subject project, it is proposed that a grid-connected Integrated Community Energy System (ICES), in the form of a centralized thermal energy plant (Plant), is to be located directly within the Louisiana Medical Complex, in New Orleans. The Complex will comprise the basic Demonstration Community for this project.

The Plant will provide the steam and chilled water adequate to satisfy the known present and near-future demands of the Primary and Participating Institutions within the Louisiana Medical Complex, with provisions for future expansion. de Laureal Engineers, Inc. and associated firms will design the Plant.

The Institutions, their present requirements, and projected future requirements are generally as set forth in the published "Phase I" report of this project as prepared by de Laureal Engineers, Inc.

EXHIBIT 4.4.a

4-4-2

Another consideration in the design and operation of this proposed Plant is the provision of a steam driven turbine for the generation of electric power, which will be fed into the electric system of NOPSI as a by-product of the operation.

HEAL will serve as the prime contractor on Phase II, and subsequent phases of this project, if it proves feasible. Resources of NOPSI, de Laureat and, as necessary, associated firms will be drawn upon in the design, architectural and engineering phases of this project. Should this project go forward to conclusion the costs of such services covering all phases of such work are to be included in cost reimbursement agreements with ERDA and/or included in the final financing structure to be financed through HEAL revenue, tax free bonds. NOPSI has committed itself to cooperate with HEAL through Phase II of the subject project, and to participate with HEAL in the implementation of the project if the Phase II study indicates to its satisfaction that the project is feasible. In this connection, we attach a copy of a May 11, 1977 letter from NOPSI to HEAL which sets forth the above referenced commitments of NOPSI.

OWNERSHIP AND OPERATION:

The relationship and roles of HEAL, NOPSI and de Laureat Engineers, Inc. pertaining to the financing, design, construction, ownership and operation of the ICES facility shall be as follows:

1. The facility will be constructed on land acquired and owned by HEAL.
2. HEAL's revenue bonding authority will be used so as to include the generation of funds adequate for the acquisition of land, and for the design and construction of the project, with all design, architectural, financing and administrative expenses essential to the successful completion of the project included.
3. Ownership of the Plant and steam and chilled water piping will rest with HEAL and shall be leased to NOPSI under arrangements hereinafter referred to.
4. A lease agreement will be executed between HEAL and NOPSI extending over that period set forth in the bond instruments offered for sale to the general public.
5. All work in connection with the financing of this project will be in accordance with the established bonding procedures of HEAL and the State of Louisiana. All bonds offered will be tax-free revenue

May 10, 1977

bonds, offered for the specific purpose or purposes set forth in the series and special resolutions issued in connection with this project.

6. de Lauroal Engineers, Inc. will be retained by HEAL (subject to competitive bids) to provide all engineering consulting services required to design, build and test the ICES project. The design and construction of the project will be under the supervision and control of the lessee (NOPSI). HEAL will be kept informed of all steps taken during design and construction. HEAL will approve all contracts, agreements and understandings entered into during the design and construction phases of the project.
7. The selection of Trustee and the establishment of all appropriate accounts and reserve funds will be in accordance with the requirements of the General Resolution adopted by the Authority under date of March 5, 1974.
8. Under the lease arrangement between HEAL and NOPSI, it will be made clear that NOPSI shall be the owner of all steam, chilled water and electricity produced by the Plant as well as all electric distribution facilities located within the Louisiana Medical Complex and that nothing in the lease shall be construed to place HEAL in the position of a public utility.
9. The establishment of HEAL's legal, unchallenged right to use its present bonding authority for the issuance of required bonds for this project as well as the retention of its tax-free bond status will be based upon the final contractual agreements reached between HEAL and NOPSI, and between NOPSI and the Primary and Participating Institutions (the user Institutions). (Refer to HEAL legal opinion letters dated May 3 and 10, 1977, ~~HEAL's legal opinion dated May 3, 1977, and NOPSI's legal opinion dated May 10, 1977, and the agreement between HEAL and NOPSI dated May 10, 1977.~~) Copies of which are attached. The resolution of this essential legal question will be accomplished as soon as possible following the completion of Phase II of the project. In view of the above, it is anticipated that present commitments between HEAL, NOPSI and other entities will be formalized as soon as possible following the resolution of the aforesaid legal question permitting the issuance by HEAL of its tax-free bonds. Further, HEAL will include in the lease agreement, provisions which will obligate NOPSI to operate the Demonstration System as necessary in order to allow ERDA to perform long-term Demonstration evaluations and will grant ERDA free access, with no interference to the NOPSI operation, to the Demonstration Site throughout the long-term evaluation period.

Letter of Intent

-4-

May 10, 1977

The relationships and roles set forth above are subject to completion of the final facility design and a determination of the financial feasibility of the project.

HEAL hereby commits itself in accordance with the above to promote this project in all appropriate ways, consistent with the opportunities and limitations placed upon it by law, staff availability and program development financing.

Very truly yours,

HEALTH EDUCATION AUTHORITY
OF LOUISIANA

By
Streuby L. Drumm

Title Chairman

cc: Mr. W. D. de Launeal, Sr.
de Launeal Engineers, Inc.

Mr. C. J. Sinnott
New Orleans Public Service Inc.

Attachments:

NOPSI letter: May 11, 1977

HEAL letters: May 3, 1977
May 10, 1977

EXHIBIT 4.4.8

4-4-5

FOLEY JUDELL BECK HEWLEY & MARTIN

ATTORNEYS AND COUNSELLORS AT LAW

SUITE 2000 ONE BARBONNE STREET

NEW ORLEANS, LA. 70112

TELEPHONE (504) 588-1848

HAROLD B. JUDELL
WILLIAM H. BECK, JR.
LEONARD L. HEWLEY
J. MARTIN MARTIN
DANIEL GRANT SCHULTZ
SUSAN WEEKS ANTHONY

OF COUNSEL
GEOFFREY S. FOLEY, JR.

May 3, 1977

Hr. Vernon D. Seifert
Executive Director
Health Education Authority of Louisiana
Room 213, State Office Building
325 Loyola Avenue
New Orleans, Louisiana 70112

Re: Health Education Authority of Louisiana
Thermal Energy Project

Dear Hr. Seifert:

This is to confirm our telephone conversation today in which we gave you our comments on your proposed financing plan and advised you that the two basic conditions of any plan of finance for the captioned project for the Health Education Authority of Louisiana ("HEAL") should include the following:

1. that HEAL is legally authorized under the act creating HEAL to undertake such a project and to issue revenue bonds to finance the same; and
2. that any revenue bonds issued by HEAL will be tax exempt under applicable income tax laws.

The first point involves the requirement that the project provide support facilities for the use of primary or participating institutions in the medical complex. The establishment of the tax exempt status of such revenue bonds is a fairly complicated question and involves the type of energy produced, the nature of the agreement between HEAL and HOPS1 and several other factors. These details must be worked out before a definite conclusion can be reached on the tax exemption question.

If you should desire any additional information or if we can be of further assistance, please do not hesitate to call us.

Very truly yours,

Susan Weeks Anthony

SWA:jp

cc: Mr. Strauby L. Drumm, Sr., President, Board of Directors of HEAL

Exhibit 4.4.a
4-3-6

Kiefer, Glorioso & Fleming

ATTORNEYS AT LAW

604 FRENCHMEN STREET

NEW ORLEANS, LOUISIANA 70116

PHONE (504) 543-3331

May 10, 1977

GEORGE D. RUYER
ANTHONY L. GLORIOSO
ROBERT F. FLEMING, JR.

FLOREN H. GREENBAUM &
THOMAS J. FORB, JR.

Mr. Vernon D. Seifert, Executive Director
Health Education Authority of Louisiana
Room 213 - State Office Building
325 Loyola Avenue
New Orleans, Louisiana 70112

Dear Mr. Seifert:

In our capacity as Counsel for the Health Education Authority of Louisiana (HEAL), we have been asked to provide an opinion relative to the proposed Integrated Community Energy System (ICES) sponsored by the Energy Research and Development Administration of the Federal Government. The following are comments relative to the construction, ownership and operation of this proposed system. It is proposed to utilize HEAL's bonding authority for this project, hence legal questions relative to the financing of the project have been referred to HEAL's Bond Counsel, Foley Judell Beck Bewley and Landwehr.

While HEAL has successfully utilized its bonding authority on two major hospital projects and a parking garage program, all structured through lease agreements, such as that proposed in this program, the introduction of a public utility firm as lessee and the provision of services normally construed as public utility services in this program raise legal questions peculiar to this particular project not found in previous financing programs of HEAL.

The following comments, therefore, are directed to the areas of potential legal difficulty this program may face.

POTENTIAL LEGAL PROBLEM

Discussion of the ERDA-ICES project to date have focused upon a plan whereby HEAL would finance and own the "demonstration system" and lease the plant to NOPSI. The system's primary function is to produce heat and chilled water to be used in the HEAL medical complex. It is now apparent that the system would produce, as a by-product, an incidental amount of electrical

Exhibit 4.4.a
4.4.7

energy. It is this by-product which may create difficulty in determining HEAL's legal status in the plan. This energy cannot be fed directly into the complex and must be placed on the NOPSI grid system and from this point, it is available for sale by NOPSI to its consumers, both public and private.

LEGAL STATUS OF THE SYSTEM

On the basis of the above facts, it is anticipated that the "demonstration system" may be defined by state law to be a "revenue producing public utility". LSA R.S. 9:152(9) defines the concept: "utility means any person who owns or operates, within the state, for public use, any plant, equipment, property, franchise or license for the transmission sale delivery, or furnishing of electricity, water, steam or gas". If the system is to be defined as a "utility" the issue of ownership becomes significant.

HEAL IS OWNER OF THE SYSTEM

While there is no specific prohibition against HEAL owning the "public utility" there is also no specific grant of authority as well. The language of the Act establishing HEAL gives them broad powers to implement a "master plan" for the development of the "HEAL complex". Specifically, the Act defines HEAL as a "body corporate and public, constituting an instrumentality of the State of Louisiana exercising essential governmental functions". Thereafter, HEAL is empowered "to construct support facilities that are useful, necessary or convenient for the orderly conduct of the institutions".

A review of State Law indicates that "political subdivisions" of the State of Louisiana are given specific authority to own utilities. Article 6, Paragraph 44 (2) of the constitution defines a "political subdivision" as a parish, municipality and any other unit of local government, including a school board and a special district, authorized by law to perform governmental functions".

Under the old constitution, a Hospital Service District was specifically included as a political subdivision and thus capable of owning a "revenue producing public utility". Under the new constitution, a Hospital Service District has maintained its identity as a political subdivision, as it is a "special district".

Based on similar roles and functions there exists a basis for concluding that HEAL meets the requirements of a Hospital Service District. While the two entities are highly similar there are also areas of dissimilarity - most noticeable in the ability to tax.

Mr. Vernon O. Seifert

-3-

May 10, 1977

It is therefore suggested that in order to obviate any potential challenge to HEAL ownership of the system, an amendment be proposed to the HEAL Act clarifying HEAL as a Hospital Service District or a specific act granting HEAL the authority to own the system is advisable.

Assuming the problems of ownership of the system can be met with, title to the plant, under state law, is taken in the name of the authority and site acquisition may be obtained by expropriation within the geographical boundaries of the complex. Expropriation proceedings are not anticipated at this time although HEAL has been granted this power by specific Act of the Louisiana Legislature.

STATE REQUIREMENTS: CONCLUSION

HEAL is required to submit its contracts to the Commissioner of the Department of Administration, Executive Department, State of Louisiana, for review and approval. In addition, permits for a coal-burning plant may be required of the State Air Control Commission.

LOCAL REQUIREMENTS: CONSTRUCTION

At the local level, the authority is required to obtain standard building permits with approvals and inspection by the City of New Orleans and possible review by the City Planning Commission. Application for a franchise to operate the system would be made to the City Council of the City of New Orleans and take the form, when granted, of a City Ordinance.

HEAL CONTRACTS WITH NOPS!, de LAUREAL ENGINEERS, AND OTHERS

HEAL, as a State agency, must comply with the "Public Contract Bid Law" of the State of Louisiana. Basically, this law requires that contracts of the Authority are to be let to the "lowest responsible bidders". As this law relates to contracts with NOPS!, a state judicial determination has been made excepting contracts by state agencies and regulated Public Utilities from the public bid law. This decision was based, in part, on recognition of the expertise the utility company has in the area.

As the law relates to de Laureal Engineers, it must be considered, however, de Laureal, while working with ERDA in the formative stages of this project, is developing the necessary input to clearly single them out as the most responsible bidder and no major problem is anticipated at this time.

Respectfully submitted,

GEORGE S. KIEFER

GGK:mz

Exhibit 4.4.8
4-4-9

NEW ORLEANS PUBLIC SERVICE INC.

POST OFFICE BOX #0340

NEW ORLEANS, LOUISIANA 70140

CHARLES J. SINNOTT
VICE PRESIDENT

AREA CODE 504 586-2114
317 BARRAGE STREET

May 11, 1977

Health Education Authority of Louisiana
Room 213 Louisiana State Office Building
325 Loyola Avenue
New Orleans, Louisiana 70112

Attention: Mr. Vernon D. Seifert

Gentlemen:

Subject: ERDA "ICES" Project

In a number of recent meetings on the subject project, the question of New Orleans Public Service Inc.'s commitment to this project has been raised. The extent of our commitment was expressed in a March 17, 1977 letter from the undersigned to Mr. W. D. de Laureal, Sr. of de Laureal Engineers, Inc. which states in pertinent part as follows:

"As we have observed several times in the past, both NOPSI and HEAL [Health Education Authority of Louisiana] are being asked to "Firm-up Commitments" and to furnish data and information concerning a project for which the final design concept has yet to be formulated. With so little information available at this time, it is not possible for NOPSI to make commitments of any firm nature, to apply for permits, to develop rates, or to negotiate contracts. We believe these must wait for the study to develop further and produce factual information which can serve as a basis for proceeding with some of the actions requested.

"We have indicated in our several meetings and past communications that our Company is committed to participating in the ERDA "ICES" study. However, the results of the study will have to serve as the basis for determining the nature of our ultimate participation in the project."

More recently, on April 12, 1977, in a letter from Mr. W. C. Nelson, our Vice President and General Counsel, to de Laureal Engineers, Inc., expressing a legal opinion on certain aspects of the project, it was stated as follows:

"NOPSI's participation in the project would be for it to lease (as lessee), operate and maintain the Central Plant and the steam and chilled water piping from the Plant to institutions in the HEAL

EXHIBIT 4.4.b

AN INVESTOR-OWNED COMPANY--MEMBER OF THE NIDELCO SYSTEM

4-4-10

Health Education Authority of Louisiana
Page 2
May 11, 1977

Complex. Any electricity produced by the Plant would be fed into the NOPSI electric system and NOPSI would own, operate and maintain all electric distribution facilities. The Plant and steam and chilled water piping would be owned by HEAL, but the steam, chilled water and electricity produced by the Plant would be owned by NOPSI. The steam and chilled water service furnished by NOPSI would be restricted to institutions located within the HEAL Complex and would be rendered pursuant to private contracts independently negotiated by NOPSI with each such institution. The value to NOPSI of the electric energy produced by the Central Plant will be credited to the charges made for the steam and chilled water service. Under no circumstances will NOPSI permit its participation in the project to place any burden on its electric and gas customers."

The purpose of this letter is to confirm to HEAL our commitment within the framework of the above quoted paragraphs to cooperate with it through Phase II of the subject project, and to participate with HEAL in the implementation of the subject project if the Phase II study indicates to our satisfaction that the project is feasible. In the event we are satisfied that the project is feasible, we would anticipate that the lease referred to above would extend over the useful life of the Central Plant.

Sincerely,

CJS/edh
cc: Mr. W. D. de Laureat, Sr.
de Laureat Engineers, Inc.

EXHIBIT 4.4.b

4-4-11

4.5 TERMS OF GRID CONNECTION

As stated in the HEAL letter of intent dated May 10, 1977 (Exhibit 4.4.a.) "NOPSI's participation in the project would be for it to lease (as lessee), operate and maintain the Central Plant and the steam and chilled water piping from the Plant to institutions in the HEAL Complex. Any electricity produced by the Plant would be fed into the NOPSI electric system and NOPSI would own, operate and maintain all electric distribution facilities. The Plant and steam and chilled water piping would be owned by HEAL, but the steam, chilled water and electricity produced by the Plant would be owned by NOPSI. The steam and chilled water service furnished by NOPSI would be restricted to institutions located within the HEAL Complex and would be rendered pursuant to private contracts independently negotiated by NOPSI with each such institution. The value to NOPSI of the electric energy produced by the Central Plant will be credited to the charges made for the steam and chilled water service." This relationship is shown in the Exhibit 4.5.a. diagram.

NOPSI letter dated May 4, 1977 (Exhibit 4.5.b.) establishes representative values for the energy purchased by the institutions.

The requirement to determine reasonably accurate current and projected costs for the production of steam and chilled

water on the part of the institutions was based on the input from V.A. Hospital (VA letter dated May 11, 1977, Exhibit 4.5.c.) since very complete cost data has been maintained at the Veterans Administration Hospital, as a part of a Nationwide study on this particular subject conducted by the Veterans Administration and appropriate data was not available at any of the other institutions. The VA costs and projections of future costs were considered to be reasonable by all institutions and representative of their costs on the assumption that generating plants of a comparable nature, using common fuel sources in a common community, would operate at reasonably consistent cost levels. Accordingly, the remaining institutions -- Charity, L.S.U., Tulane and EENT -- have concurred with the rates established by V.A. Hospital. (Refer to letters from the institution, Exhibits 4.5.d. through 4.5.g.)

Each participating institution has indicated its plan to participate in the ICES project and intent to purchase the utilities produced. (Refer to Exhibits 4.5.h. through 4.5.m.)

GRID - CONNECTED ICES
OWNERSHIP & OPERATION

Exhibit 4.5.a.

NEW ORLEANS PUBLIC SERVICE INC.

POST OFFICE BOX 60340

NEW ORLEANS, LOUISIANA 70160

CHARLES J. SINNOTT
VICE PRESIDENT

May 4, 1977

APPROX. 4000 KVA 100-1000
617 GARDNER STREET

64 Laurel Engineers, Incorporated
1512 International Trade Mart
No. 2 Canal Street
New Orleans, Louisiana 70130

SUBJECT: ERDA "ICES" PROJECT

Dear Dave:

We have been asked through your firm to clarify the statement in our letter of April 26, 1977, concerning the value of the electrical energy that would be credited to the operating cost of the ICES system.

In numerous meetings with representatives of your company, HEAL and ERDA, we have stated our willingness, in the event the ICES system proves to be feasible, to utilize the extensive resources and capability of our electric system to absorb the electrical energy produced by the ICES system. Also, because of the miniscule capability and the erratic and unpredictable manner of production, the energy produced could in no way be considered reliable or dependable. However, we would give a value to the energy received equal to the most economical energy available to our system at the time energy is being absorbed from the ICES system. This could include energy produced by our own generation. We further indicated that, because of the constantly changing variables, the value would be in constant flux and adjustments would be made for each billing of the thermal energy to account for the fluctuation in giving credit for the energy produced.

At the present time it is possible, under certain circumstances, for us to purchase energy as low as 1.0¢/KWH; we would, therefore, suggest that the lower limit would be at this value. The average monthly cost for energy purchased for our system in 1976 was approximately 1.7¢/KWH, and the highest monthly cost in 1977 has been 2.3¢/KWH. These would be representative values for any energy that would have been absorbed had the ICES system been in operation during the above-mentioned period.

With regard to values at some future time, the present unsettled energy situation, aggravated by the political actions of the OPEC nations and our own country's unresolved energy programs, prevents any attempt to make meaningful predictions as to what future levels these values may reach.

Sincerely,

Charles J. Sinnett

CJS:dhw

cc: Messrs. H. J. Cade
W. C. Nelson
M. L. Harstall

Exhibit 4.5.b
4-5-4

VETERANS ADMINISTRATION
HOSPITAL
1901 PONDICH STREET
NEW ORLEANS, LOUISIANA 70146

May 11, 1977

IN REPLY
REFER TO: 629/001

Mr. Vernon Seifert, Executive Director
Health Education Authority of Louisiana
Room 213, State Office Building
325 Loyola Avenue
New Orleans, Louisiana 70112

Dear Mr. Seifert:

In response to your request to determine our costs for producing steam and chilled water for our use in the Veterans Administration complex, we enclose a listing of these monthly costs for the past year through April, 1977. These cost figures result from an internal cost accounting procedure which allocates all gas and electric utility costs and all manpower and maintenance expenses (including payroll costs and fringe benefits) but does not include overhead expenses or capital depreciation costs. The average current costs are calculated to be \$3.26 per 1,000 pounds of steam and \$0.158 per ton-hour (12,000 BTU) for chilled water.

Also, in response to your request we have projected these costs forward to the year 1982, the estimated year the proposed ICES project would begin operation, by using an estimated yearly inflationary cost increase of 10%. It is generally accepted that normal inflationary trends will add a minimum of 8% per year to present operating costs. The future costs of fuel are unknown and totally unpredictable. We have, therefore, used an inflated escalation factor of 10%. This projection indicates an estimated cost, in 1982, of \$3.23 per 1,000 pounds of steam and \$0.27 per ton-hour for chilled water.

At this point, we must refer to our letter of April 19, 1977, and reiterate that any commitment from the Veterans Administration will have to be approved by our Central Office in Washington, D.C. As stated in that letter, we are very interested in the outcome of your presentation of Phase I of the study for the Energy Research and Development Administration and the future success of the project.

If we can be of any further assistance, do not hesitate to contact us.

Sincerely yours,

DAN G. KADROVACH
Director

Enclosure

"To care for him who shall have borne the battle, and for his widow, and his orphan." - ABRAHAM LINCOLN

Exhibit 4.5.b.
4-5-5

VETERANS ADMINISTRATION HOSPITAL
New Orleans, Louisiana

COST OF STEAM AND CHILLED WATER FOR FY76-77

	<u>Steam Cost</u> <u>Per MCF</u>	<u>Chilled Water</u> <u>Per Ton-Hour</u>
October, 1976	\$ 2.95	\$.0733
November, 1976	3.92	.1641
December, 1976	3.29	.3201
January, 1977	2.74	.8694
February, 1977	2.94	.2800
March, 1977	3.54	.0688
April, 1977	3.13	.0602
September, 1976	4.51	.0550
August, 1976	3.31	.0530
July, 1976	3.18	.0450
June, 1976	3.19	.0501
May, 1976	<u>2.85</u>	<u>.0583</u>
	\$38.13	\$1.8875
 Average Cost/ Per MCF	 \$ 3.26	 Average Cost/ Per Ton-hour \$.158

Exhibit 4.5.c

4-5-8

EDWIN EDWARDS
Governor
STREVEY L. DRUMM
Comptroller

State of Louisiana

HEALTH EDUCATION AUTHORITY OF LOUISIANA
ROOM 212 • 220 LOYOLA AVENUE • STATE OFFICE BUILDING
NEW ORLEANS, LOUISIANA 70112

May 11, 1977

Mr. Elliott Roberts, Director
Charity Hospital
1532 Tulane Avenue
New Orleans, La. 70112

Dear Mr. Roberts:

One of the requirements to be fulfilled in completing the "Phase I" stage of our proposed Integrated Community Energy System demonstration project is to determine reasonably accurate, current and projected costs for the production of hot and chilled water on the part of the institutions participating in this study.

We have found that it is difficult, if not impossible, to obtain data with sufficient comparability with which to make reasoned determinations relative to these cost levels. We have also found, however, that very complete cost data has been maintained at the Veterans Administration Hospital, as a part of a Nationwide study on this particular subject conducted by the Veterans Administration.

Attached is a copy of a letter from Mr. Kadrovach relative to their cost determination studies, along with current and projected cost estimates.

In order to fulfill our requirements under Phase I of the "ICES" project, we have suggested that this data be used as a reasonable projection of future costs to provide this service within the institutions of the Medical Complex at the time that the proposed centralized system will go into operation. This conclusion is based on the assumption that generating plants of a comparable nature, using common fuel sources in a common community, would operate at reasonable consistent cost levels.

On another matter relative to the ICES project, we have discussed probable difficulties that might arise in providing right-of-ways on property owned by your institution in order to accommodate the service distribution systems

Exhibit 4.5.d.
4-5-7

Mr. Elliott Roberts

-2-

May 11, 1977

to your Institution. These discussions lead us to the conclusion that no problems other than routine matters will be presented in providing such right-of-ways.

Should you agree with the above conclusions, we would very much appreciate your so indicating in the space provided below.

Your agreement with these conclusions should not serve to alter your previous Letter of Intent relative to this project. (Copy attached)

Your cooperation along with that of many of your staff, throughout this program has been absolutely outstanding, for which we are most grateful. Successful completion of this project can have profound benefits to the Institutions throughout the Louisiana Medical Complex, and ultimately to the people of our State. We thank you sincerely for your very great help.

Cordially,

Vernon D. Selfert
Executive Director

VDS:mz
Enclosure

I agree with the above conclusions.

Signature:

Date: 5/11/77

Exhibit 4.5.d.
4-5-8

VETERANS ADMINISTRATION
HOSPITAL
1801 PERNANDO STREET
NEW ORLEANS, LOUISIANA 70146

May 11, 1977

IN REPLY
REFER TO: 629/001

Mr. Vernon Seifert, Executive Director
Health Education Authority of Louisiana
Room 213, State Office Building
325 Loyola Avenue
New Orleans, Louisiana 70112

Dear Mr. Seifert:

In response to your request to determine our costs for producing steam and chilled water for our use in the Veterans Administration complex, we enclose a listing of these monthly costs for the past year through April, 1977. These cost figures result from an internal cost accounting procedure which allocates all gas and electric utility costs and all manpower and maintenance expenses (including payroll costs and fringe benefits) but does not include overhead expenses or capital depreciation costs. The average current costs are calculated to be \$3.25 per 1,000 pounds of steam and \$0.158 per ton-hour (12,000 BTU) for chilled water.

Also, in response to your request we have projected these costs forward to the year 1982, the estimated year the proposed ICES project would begin operation, by using an estimated yearly inflationary cost increase of 10%. It is generally accepted that normal inflationary trends will add a minimum of 5% per year to present operating costs. The future costs of fuel are unknown and totally unpredictable. We have, therefore, used an inflated escalation factor of 10%. This projection indicates an estimated cost, in 1982, of \$5.25 per 1,000 pounds of steam and \$0.27 per ton-hour for chilled water.

At this point, we must refer to our letter of April 19, 1977, and reiterate that any commitment from the Veterans Administration will have to be approved by our Central Office in Washington, D.C. As stated in that letter, we are very interested in the outcome of your presentation of Phase I of the study for the Energy Research and Development Administration and the future success of the project.

If we can be of any further assistance, do not hesitate to contact us.

Sincerely yours,

DAN G. KADROVACH
Director

Enclosure

"To care for him who shall have borne the battle, and for his widow, and his orphan." - ABRAHAM LINCOLN

Exhibit 4.5.d.

4-5-9

VETERANS ADMINISTRATION HOSPITAL
New Orleans, Louisiana

COST OF STEAM AND CHILLED WATER FOR FY76-77

	<u>Steam Cost</u> <u>Per MCF</u>	<u>Chilled Water</u> <u>Per Ton-Hour</u>
October, 1976	\$ 2.95	\$.0733
November, 1976	3.52	.1861
December, 1976	3.29	.3201
January, 1977	2.74	.6894
February, 1977	2.94	.2600
March, 1977	3.54	.0668
April, 1977	3.13	.0602
September, 1976	4.51	.0550
August, 1976	3.31	.0530
July, 1976	3.16	.0450
June, 1976	3.19	.0501
May, 1976	<u>2.85</u>	<u>.0585</u>
	\$29.13	\$1.8975

Average Cost/
Per MCF \$ 3.26

Average Cost/
Per Ton-hour \$.150

EDWIN EDWARDS
Governor
STANLEY L. CRUM
Comptroller

State of Louisiana
HEALTH EDUCATION AUTHORITY OF LOUISIANA
ROOM 212 • 225 LOYOLA AVENUE • STATE OFFICE BUILDING
NEW ORLEANS, LOUISIANA 70112

May 11, 1977

Dr. Allen Copping, Chancellor
LSU Medical Center
Canal-LaSalle Building
1440 Canal Street
New Orleans, La. 70112

Dear Dr. Copping:

One of the requirements to be fulfilled in completing the "Phase I" stage of our proposed Integrated Community Energy System demonstration project is to determine reasonably accurate, current and projected costs for the production of hot and chilled water on the part of the Institutions participating in this study.

We have found that it is difficult, if not impossible, to obtain data with sufficient comparability with which to make reasoned determinations relative to these cost levels. We have also found, however, that very complete cost data has been maintained at the Veterans Administration Hospital, as a part of a Nationwide study on this particular subject conducted by the Veterans Administration.

Attached is a copy of a letter from Mr. Kadrovach relative to their cost determination studies, along with current and projected cost estimates.

In order to fulfill our requirements under Phase I of the "ICES" project, we have suggested that this data be used as a reasonable projection of future costs to provide this service within the Institutions of the Medical Complex at the time that the proposed centralized system will go into operation. This conclusion is based on the assumption that generating plants of a comparable nature, using common fuel sources in a common community, would operate at reasonable consistent cost levels.

On another matter relative to the ICES project, we have discussed probable difficulties that might arise in providing right-of-ways on property owned by your Institution in order to accommodate the service distribution systems

Exhibit 4.6.e.
4-5-11

Dr. Allan Copping

-2-

May 11, 1977

to your institution. These discussions lead us to the conclusion that no problems other than routine matters will be presented in providing such right-of-ways.

Should you agree with the above conclusions, we would very much appreciate your so indicating in the space provided below.

Your agreement with these conclusions should not serve to alter your previous Letter of Intent relative to this project. (Copy attached)

Your cooperation along with that of many of your staff, throughout this program has been absolutely outstanding, for which we are most grateful. Successful completion of this project can have profound benefits to the institutions throughout the Louisiana Medical Complex, and ultimately to the people of our State. We thank you sincerely for your very great help.

Cordially,

Vernon D. Seifert
Executive Director

VDS:mz
Enclosure

I agree with the above conclusions.

Signature: Allan Copping

Date: 5/11/77

Exhibit 4.5.e.

4-5-12

VETERANS ADMINISTRATION
HOSPITAL
1881 PERNONCE STREET
NEW ORLEANS, LOUISIANA 70146

May 11, 1977

ON REPLY
REFER TO: 629/001

Mr. Vernon Seifert, Executive Director
Health Education Authority of Louisiana
Room 213, State Office Building
325 Loyola Avenue
New Orleans, Louisiana 70112

Dear Mr. Seifert:

In response to your request to determine our costs for producing steam and chilled water for our use in the Veterans Administration complex, we enclose a listing of these monthly costs for the past year through April, 1977. These cost figures result from an internal cost accounting procedure which allocates all gas and electric utility costs and all manpower and maintenance expenses (including payroll costs and fringe benefits) but does not include overhead expenses or capital depreciation costs. The average current costs are calculated to be \$3.26 per 1,000 pounds of steam and \$0.158 per ton-hour (12,000 BTU) for chilled water.

Also, in response to your request we have projected these costs forward to the year 1982, the estimated year the proposed ICIS project would begin operation, by using an estimated yearly inflationary cost increase of 10%. It is generally accepted that normal inflationary trends will add a minimum of 8% per year to present operating costs. The future costs of fuel are unknown and totally unpredictable. We have, therefore, used an inflated escalation factor of 10%. This projection indicates an estimated cost, in 1982, of \$5.25 per 1,000 pounds of steam and \$0.27 per ton-hour for chilled water.

At this point, we must refer to our letter of April 19, 1977, and reiterate that any commitment from the Veterans Administration will have to be approved by our Central Office in Washington, D.C. As stated in that letter, we are very interested in the outcome of your presentation of Phase I of the study for the Energy Research and Development Administration and the future success of the project.

If we can be of any further assistance, do not hesitate to contact us.

Sincerely yours,

DAN G. KADROVACH
Director

Enclosure

"To care for him who shall have borne the battle, and for his widow, and his orphan" - ABRAHAM LINCOLN

Exhibit 4.5.e.
4-5-13

VETERANS ADMINISTRATION HOSPITAL
New Orleans, Louisiana

COST OF STEAM AND CHILLED WATER FOR FY76-77,

	<u>Steam Cost</u> <u>Per MCF</u>	<u>Chilled Water</u> <u>Per Ton-Hour</u>
October, 1976	\$ 2.95	\$.0733
November, 1976	3.52	.1661
December, 1976	3.29	.3201
January, 1977	2.74	.6894
February, 1977	2.94	.2600
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September, 1976	4.51	.0550
August, 1976	3.31	.0530
July, 1976	3.16	.0450
June, 1976	3.19	.0501
May, 1976	<u>2.85</u>	<u>.0585</u>
	\$39.13	\$1.8975
Average Cost/ Per MCF	\$ 3.26	Average Cost/ Per Ton-hour \$.158

Exhibit 4.5.e.

4-5-14

EDWIN EDWARDS
Governor

STREUBY L. DRUMM
Comptroller

State of Louisiana
HEALTH EDUCATION AUTHORITY OF LOUISIANA
ROOM 213 • 325 LOYOLA AVENUE • STATE OFFICE BUILDING
NEW ORLEANS, LOUISIANA 70112

May 11, 1977

Dr. John Walsh, Chancellor
Tulane Medical Center
1430 Tulane Avenue
New Orleans, La. 70112

Dear Dr. Walsh:

One of the requirements to be fulfilled in completing the "Phase I" stage of our proposed Integrated Community Energy System demonstration project is to determine reasonably accurate, current and projected costs for the production of hot and chilled water on the part of the institutions participating in this study.

We have found that it is difficult, if not impossible, to obtain data with sufficient comparability with which to make reasoned determinations relative to these cost levels. We have also found, however, that very complete cost data has been maintained at the Veterans Administration Hospital, as a part of a Nationwide study on this particular subject conducted by the Veterans Administration.

Attached is a copy of a letter from Mr. Kadrovach relative to their cost determination studies, along with current and projected cost estimates.

In order to fulfill our requirements under Phase I of the "ICES" project, we have suggested that this data be used as a reasonable projection of future costs to provide this service within the institutions of the Medical Complex at the time that the proposed centralized system will go into operation. This conclusion is based on the assumption that generating plants of a comparable nature, using common fuel sources in a common community, would operate at reasonable consistent cost levels.

On another matter relative to the ICES project, we have discussed probable difficulties that might arise in providing right-of-ways on property owned by your institution in order to accommodate the service distribution systems

Exhibit 4.5.f.
4-5-15

Dr. John Walsh

-2-

May 11, 1977

to your institution. These discussions lead us to the conclusion that no problems other than routine matters will be presented in providing such right-of-ways.

Should you agree with the above conclusions, we would very much appreciate your so indicating in the space provided below.

Your agreement with these conclusions should not serve to alter your previous Letter of Intent relative to this project. (Copy attached)

Your cooperation along with that of many of your staff, throughout this program has been absolutely outstanding, for which we are most grateful. Successful completion of this project can have profound benefits to the institutions throughout the Louisiana Medical Complex, and ultimately to the people of our State. We thank you sincerely for your very great help.

Cordially,

Vernon D. Spierert
Executive Director

VDS:mz
Enclosure

I agree with the above conclusions.

Signature: James F. O'Neal

Date: 5/11/77

Exhibit 4.5.f

4-5-16

EDWIN EDWARDS
Governor
STANLEY L. BRANN
Chairman

State of Louisiana
HEALTH EDUCATION AUTHORITY OF LOUISIANA
ROOM 213 • 126 LUYOLA AVENUE • STATE OFFICE BUILDING
NEW ORLEANS, LOUISIANA 70112

May 11, 1977

Mr. Charles Moss, Administrator
EENT Hospital
145 Elk Place
New Orleans, La. 70112

Dear Mr. Moss:

One of the requirements to be fulfilled in completing the "Phase I" stage of our proposed Integrated Community Energy System demonstration project is to determine reasonably accurate current and projected costs for the production of hot and chilled water on the part of the Institutions participating in this study.

We have found that it is difficult, if not impossible, to obtain data with sufficient comparability with which to make reasoned determinations relative to these cost levels. We have also found, however, that very complete cost data has been maintained at the Veterans Administration Hospital, as a part of a Nationwide study on this particular subject conducted by the Veterans Administration.

Attached is a copy of a letter from Mr. Kadrovach relative to their cost determination studies, along with current and projected cost estimates.

In order to fulfill our requirements under Phase I of the "ICES" project, we have suggested that this data be used as a reasonable projection of future costs to provide this service within the Institutions of the Medical Complex at the time that the proposed centralized system will go into operation. This conclusion is based on the assumption that generating plants of a comparable nature, using common fuel sources in a common community, would operate at reasonably consistent cost levels.

On another matter relative to the ICES project, we have discussed probable difficulties that might arise in providing right of ways on property owned by your Institution in order to accommodate the service distribution systems to your Institution. These discussions lead us to the conclusion that no problems other than routine matters will be presented in providing such right of ways.

Should you agree with the above conclusions, we would very much appreciate your so indicating in the space provided below.

Exhibit 4.5.g.
4-5-17

(2)

Your agreement with these conclusions should not serve to alter your previous letter of intent relative to this project (copy attached).

Your cooperation along with that of many of your staff, throughout this program has been absolutely outstanding, for which we are most grateful. Successful completion of this project can have profound benefits to the Institutions throughout the Louisiana Medical Complex, and ultimately to the people of our State. We thank you sincerely for your very great help.

Cordially,

Vernon D. Seffert
Executive Director

VDS/daw

Enclosure

cc Mr. S. L. Drumm

Mr. W. D. DeLaureal

I agree with the above conclusions.

Signature:

Date:

5-11-77

Exhibit 4.5.9.

4-5-18

VETERANS ADMINISTRATION
HOSPITAL
1981 PONDICHO STREET
NEW ORLEANS, LOUISIANA 70146

April 19, 1977

IN REPLY
REFER TO: 629/138

Mr. Vernon D. Seifert, Exec. Director
Health Education Authority of Louisiana
Room 213 - 325 Loyola Avenue
State Office Building
New Orleans, Louisiana 70112

Dear Mr. Seifert:

We regret that we cannot make a statement of commitment regarding the grid-connected integrated community energy system at this time. Any commitment from the Veterans Administration will have to be approved by our Central Office in Washington, D. C. Your letter of April 8, 1977, and the suggested format for a commitment is being forwarded to the appropriate office in VA Central Office.

We are very interested in the outcome of your presentation of Phase I of the study to the Energy Research and Development Administration and future success of the project. Please advise me if I or members of my staff may assist you with your future efforts in this regard.

Sincerely yours,

DAN G. KADROVACH
Director

RECEIVED

APR 21 1977

HEALTH EDUCATION AUTHORITY
OF LOUISIANA

"To care for him who shall have borne the battle, and for his widow, and his orphan." - ABRAHAM LINCOLN

Exhibit 4.5.h.

4-5-19

LOUISIANA HEALTH AND HUMAN RESOURCES ADMINISTRATION

DIVISION OF CHARITY HOSPITAL OF LOUISIANA AT NEW ORLEANS

1532 TULANE AVENUE

NEW ORLEANS, LOUISIANA 70140

504-568-2311

EDWIN EDWARDS
GOVERNOR

April 20, 1977

Mr. Vernon D. Seifert
Executive Director
State of Louisiana
Health Education Authority
Room 213
325 Loyola Avenue
State Office Building
New Orleans, Louisiana 70112

Dear Mr. Seifert:

Charity Hospital is aware and interested in the study of the Central Plant Energy Systems as represented by the grid-connected, integrated community energy system and its potential feasibility for an institution such as ours.

As a member of HEAL and with the knowledge that the HEAL community adopted the central plant concept as one of the basic features of the master plan in 1972, I am requesting that you accept this letter as this Hospital's intention to participate in this venture for the purpose of contracting for the purchase of utilities from this plant when the study has developed sufficient documentation to indicate that this would be economically advantageous to this institution.

With this in mind, I request that you keep me continuously informed of the progress of this study as it develops.

Sincerely,

A handwritten signature in dark ink, appearing to read "Elliott C. Roberts, Sr.".

Elliott C. Roberts, Sr.
Assistant Secretary
Charity Hospital of Louisiana at New Orleans

ECR:jn

Exhibit 4.5.1.

4-5-20

LOUISIANA STATE UNIVERSITY MEDICAL CENTER
SUITE 1510 - CANAL LA SALLE BUILDING
1440 CANAL STREET - NEW ORLEANS, LOUISIANA 70112

OFFICE OF THE CHANCELLOR

April 18, 1977

Mr. Vernon O. Selfert
Executive Director
State of Louisiana
Health Education Authority of Louisiana
325 Loyola Avenue Room 213
New Orleans, Louisiana 70112

Dear Mr. Selfert:

This institution is cognizant of the potential feasibility of central plant energy systems as represented by the grid-connected integrated community energy system presently under study for the medical institutions within the HEAL complex.

We are aware that the central plant concept was accepted by the HEAL community as one of the basic development features of the HEAL master plan as conceived in 1972.

We will plan to participate in such an enterprise and contract for purchase of the utilities to be produced at such a central plant when the study has developed factual data to demonstrate that it would be to our economic advantage to do so.

Sincerely,

Allen A. Cooping
Chancellor

AAC/dpg

RECEIVED

APR 20 1977

Exhibit 4.5.1.
4-5-21

TULANE UNIVERSITY

NEW ORLEANS, LA. 70112

Chancellor of
Tulane Medical Center
1630 Tulane Avenue

April 13, 1977

Mr. Vernon Seifert
Executive Director
Health Education Authority of Louisiana
Room 213, State Office Building
325 Loyola Avenue
New Orleans, Louisiana 70112

Dear Mr. Seifert:

In reply to your letter dated April 8, 1977, I wish to express Tulane's continuing interest in the development of a grid-connected integrated community energy system for institutions in the HEAL complex.

If it can be determined that the system would be economically advantageous, Tulane would be pleased to take advantage of the savings offered by such a central plant energy system.

Sincerely,

John A. Walsh, M.D.
Chancellor

JJW:sch

RECEIVED

APR 14 1977

HEALTH
EDUCATION
AUTHORITY
OF LOUISIANA

Exhibit 4.5.k.
4-5-22

EYE, EAR, NOSE & THROAT HOSPITAL

145 BLK PLACE
NEW ORLEANS, LA. 70112
(504) 581-3300

L. R. JORDAN
President
C. D. MROSS
Administrator

April 19, 1977

Mr. Streuby L. Drumm
Chairman
Health Education Authority of Louisiana
Room 213, 325 Loyola Ave.
State Office Building
New Orleans, La. 70112

Dear Mr. Drumm:

EENT Hospital has been well informed relative to the preliminary feasibility study regarding the development of a grid-connected integrated community energy system. We are also aware of the fact that this central plant concept was accepted by HEAL as one of the basic development features of its master plan as conceived in 1972.

Our hospital plans to participate in the central plant energy system and contract for utilities to be provided by such a system when the study has developed factual data to demonstrate that it would be to the hospital's economy advantage to do so.

Yours very truly,

CHARLES D. MROSS,
Administrator

CDM:ap
cc: Mr. L. R. Jordan

APR 21 1977

HEALTH EDUCATION AUTHORITY OF LOUISIANA

Exhibit 4.5.1.
4-5-23

A non-profit, charitable organization incorporated under the laws of Louisiana

ADON OCHSNER
MEDICAL FOUNDATION
1816 Jefferson Highway
New Orleans, Louisiana 70121
Phone 504/837-3000
Cable Address: OCHSNER

Ochsner

April 12, 1977

Mr. Streuby L. Drumm
Chairman
Health Education Authority of Louisiana
Room 213, 325 Loyola Avenue
State Office Building
New Orleans, Louisiana 70112

Dear Mr. Drumm:

This institution is cognizant of the potential feasibility of central plant energy systems as represented by the grid-connected integrated community energy system presently under study for the medical institutions within the HEAL complex.

We are aware that the central plant concept was accepted by the HEAL community as one of the basic development features of the HEAL master plan as conceived in 1972.

We will plan to participate in such an enterprise and contract for purchase of the utilities to be produced at such a central plant when the study has developed factual data to demonstrate that it would be to our economic advantage to do so.

Yours very truly,

L. N. Jordan
President
Eye, Ear, Nose & Throat Hospital

LBJ:gm

cc: Mr. C. D. Moss

Exhibit 4.5.m.
4-5-24

APR 14 1977

HEAL-6

4.6 FUEL AVAILABILITY

There is at present in excess of one million tons of coal passing through New Orleans by river barge. Much of this coal is received and transshipped at the New Orleans Public Bulk Terminal owned by the Board of Commissioners of the Port of New Orleans and leased to and operated by Atlantic & Gulf Stevedores Inc. This terminal is located on the Gulf Seaway approximately 8 to 10 miles east of the proposed ICES plant.

In addition to unloading barges and loading sea going barges destined for Tampa, Florida and other ports, the terminal offers additional services including stockpiling and loading. This terminal provides an excellent long-term storage facility for this project and allows for the elimination of ground storage at the plant site.

Investigation of availability of compliance coals to be used for this project has revealed two potential sources:

1. An Oklahoma coal from the Cromelburg seam with the following analysis:

Stoker Coal

Moisture	6-7%
Ash	6-7.5%
Sulphur	.6%

Fusion 2500°
B.T.U. 12,800-13,000/#

Offered by Energy Engineering, Inc.
River Forest, Illinois

2. An Eastern Kentucky coal with the following analysis:

Stoker Coal

Moisture 4%
Ash 5-6%
Sulphur 1%
Fusion 25-2700°
B.T.U. 13,500-14,000/#

Offered by Consolidation Coal Company
Rocky River, Ohio

These coals are available, and best estimates indicate the cost, FOB plant, is approximately \$1.40 to \$1.60 per million B.T.U.

CONSOLIDATION COAL COMPANY

INCORPORATED
20325 CENTER RIDGE ROAD
ROCKY RIVER, OHIO 44116
TELEPHONE (216) 333-7074

March 30, 1977

Mr. L. Whalen, Project Engineer
Orr-Scheley-Mayeron & Associates
2021 East Hennepin Avenue
Minneapolis, Minnesota 55413

Dear Mr. Whalen:

In answer to your request for a possible low sulphur coal for shipment in the future, we could furnish our Rendrix Stoker coal. Based on our present production and estimated sales over the next year, the availability would be 20-30,000 tons a year.

ANALYTICAL DATA:	Moisture	4%
	Ash	5-6
	Sulphur	1%
	Fusion	25-2700°
	Grind	54-55
	Btu	13,500-14,000
	Size	1 1/2" x 3/16"
	Kind of Coal	Elkhorn #3 & Hazard #4 Blend Washed, thermal dried, double Screened product

PRODUCTION DATA:	Producing Company	Beth-Elkhorn Corporation
	Shipping Point	Deane, Kentucky
	Railroad	C&O
	Annual Stoker	
	Production Capacity-	200,000-250,000 tons a year
Estimated Reserves	25-30 years	

FREIGHT DATA:	Freight rate to	
	Kenova or Huntington	\$3.29
	Barge Dumping Rate	.65 Jumbo .67 Standard
	Barge Rate to	
New Orleans	?	

RECEIVED

At present we are shipping this coal throughout the eastern part of the United States. Applications are numerous; i.e., schools, industrial, vessel fuel, domestic, etc.

CC 4. 4
APR 4 1977 P

Mr. L. Whalen, Project Engineer
Orr-Schelley-Mayeron & Associates

March 30, 1977
Page 2

Today's price is \$32.00 net ton mines. This would be subject to change based on forthcoming U.M.W. negotiations and market conditions. Our price is competitive in today's market and will remain so. If you have any further questions, please contact me.

Very truly yours,

CONSOLIDATION COAL COMPANY

C. H. Moore, Jr.

C. H. Moore, Jr., Manager
Lake & Southern Sales

QM:ca

Mr. Larry Whalen
 Orr-Schalen Hayeron & Associates
 2021 E. Hennepin
 Minneapolis, Minnesota 55413

Mr. Larry Whalen
 Orr-Schalen Hayeron & Associates
 2021 E. Hennepin
 Minneapolis, Minnesota 55413

Mr. Larry Whalen
 Orr-Schalen Hayeron & Associates
 2021 E. Hennepin
 Minneapolis, Minnesota 55413

Energy Engineering, Inc.
 Producers and Suppliers
 of Industrial Fuels

Corporate and Midwestern
 Regional Office
 Post Office Box 33
 7777 W. Lake Street
 River Forest, Illinois 60305
 Telephone 312 771-3550

April 7, 1977

Mr. Larry Whalen
 Orr-Schalen Hayeron & Associates
 2021 E. Hennepin
 Minneapolis, Minnesota 55413

Dear Mr. Whalen:

Per our conversation today, I am confirming the projected availability of our Oklahoma low sulphur stoker coal for your ERDA project in Louisiana. The price at this time would be approximately \$33-34.00 per ton, FOB port in New Orleans.

If you need any further information, please do not hesitate to call me.

Sincerely,

ENERGY ENGINEERING, INC.

Timothy J. Anderson
 Timothy J. Anderson
 Manager Steam Sales

TJA/ar

SEARCHED	INDEXED
SERIALIZED	FILED
APR 11 1977	
FBI - CHICAGO	

4.7 AIR POLLUTION LIMITATION

A letter from the Louisiana Air Control Commission is included as Exhibit 4.7.a, along with the referenced letter from de Laureal Engineers, Inc. as Exhibit 4.7.b. As pointed out in Section 2.5, Environmental Impact, the matter of all elements of environmental impact will be addressed in detail during Phases II and III of the program.

Louisiana Air Control Commission

State Office Building
Phone (504) 527-5115

P.O. Box 60630
New Orleans 70160

May 6, 1977

Mr. John E. Morrison
DeLaurel Engineers, Inc.
Consulting Engineers
1512 International Trade Mart
No. 2 Canal Street
New Orleans, Louisiana 70130

Re: Grid-Connected ICES for HEAL

Dear Mr. Morrison:

Your letter of April 28, 1977 did not contain enough information to determine the air pollution impact of this project. The use of coal will necessitate the use of particulate removal equipment and, depending upon the sulfur content of the fuel supply, flue gas desulfurization facilities. The project will create a significant solid waste disposal problem for a facility located in the central city.

Any such project must meet all Federal air requirements (i.e. New Source Performance Standards, National Emission Standards for Hazardous Air Pollutants, Significant Deterioration Criteria, Ambient Air Standards, Emission Offset Criteria, etc.) as well as applicable state regulations on solid and liquid waste disposal.

In the absence of more specific information on how all these problems will be satisfactorily resolved, it is not possible to give a preliminary opinion. Of course, if all the problems are resolved, a permit for such a project could be approved by the Air Control Commission.

Very truly yours,

James F. Coerver
Technical Secretary

OT/ylw

Exhibit 4.7.a

DE LAURÉAL ENGINEERS
INC.

CONSULTING ENGINEERS

4010 INTERNATIONAL TRADE MART • NO. 2 CANAL STREET • NEW ORLEANS 71302 • 524-6122

April 28, 1977

Mr. James F. Coerver, Technical Secretary
Air Control Commission
P. O. Box 60630
New Orleans, Louisiana 70160

SUBJECT: Grid-Connected ICES
for HEAL

de Laureal Project 7701

Dear Mr. Coerver:

de Laureal Engineers, Inc. has received an award from the United States Energy Research and Development Administration (ERDA) to prepare the initial phase of a six-phase demonstration program to analyze and evaluate the application of a grid-connected integrated community energy system to the thermal and electrical energy needs of a group of buildings identified as the Demonstration Community.

The Demonstration Community for the de Laureal program will be the Health Education Authority of Louisiana (HEAL), which includes hospitals and medical education facilities grouped closely within the central area of the city of New Orleans. The central plant system that will provide the thermal and electrical utilities for HEAL will utilize coal-fired steam generators to produce steam for turbine-driven electric generators, with the exhaust steam from the generator turbines being used at lower pressures as the energy source for turbine-driven chilled water generators in the plant. The chilled water will be distributed through a piping network to the different institutional buildings for use in the air conditioning systems. Exhaust steam from the generator turbines will also be distributed through a piping network to the same buildings.

Design and construction for this energy plant will include systems and components to insure compliance with applicable codes and regulations.

In order to fulfill the requirements of ERDA's scope of work for this project it is necessary that the report include an item to "Provide preliminary opinions/approvals from all cognizant regulatory officials concerned with air pollution

Exhibit 4-7-b
4-7-3

Mr. James F. Coerver
Air Control Commission

April 28, 1977

Page 2

control and other environmental aspects of coal utilization in ICES".

Yesterday we talked with Mr. Grey Tanner of your staff, and he recommended that a letter should be addressed to you requesting such a preliminary opinion/approval for this project. An early response, hopefully by return mail, would be appreciated. In order to meet the EROA schedule, our target date for receipt/preparation of all material to be included in this Phase 1 report is Friday, May 6, 1977.

Yours very truly,

DE LAUREAL ENGINEERS, INC.

John E. Morrison

JEM:mdb

Exhibit 4-7-b
4-7-4

4.8 SUPPLEMENTARY STATEMENTS OF COMMITMENT

This section pertains to engineering services for the ICES program and includes copies of letters from HEAL (Exhibit 4-8-a), de LaREAL Engineers, Inc. (Exhibit 4-8-b) and Orr-Schelen-Mayeron & Associates, Inc. (Exhibit 4-8-c).

EDWIN BOWARD
Governor
STANLEY L. DRUMM
Comptroller

State of Louisiana
HEALTH EDUCATION AUTHORITY OF LOUISIANA
ROOM 312 • 301 LYOULA AVENUE • STATE OFFICE BUILDING
NEW ORLEANS, LOUISIANA 70112

May 11, 1977

Mr. W. D. de Laureat, Sr.
de Laureat Engineers, Inc.
1512 International Trade Mart
No. Two Canal Street
New Orleans, La. 70130

Dear Mr. de Laureat:

We have very much appreciated the opportunity to work with you in the development of the "Phase I" elements in our proposed Integrated Community Energy System demonstration project sponsored by the U.S. Energy Research and Development Administration.

As a result of your very deep involvement in this project, in concert with your associated firm Orr-Scheler-Mayeron Associates, it would seem most appropriate for us to plan to continue to work with your firms in the future phases of this project, up through satisfactory completion of construction and start-up operations.

You are aware, of course, of the need to comply with all provisions of the public bid laws of the State of Louisiana. It will be necessary for the Authority to fulfill these requirements, however, there is reason to believe that the specific nature of this project will provide opportunities to fulfill these requirements while continuing to work with you and your associated firm, as outlined above.

We look forward to this opportunity with considerable enthusiasm.

Cordially,

Stanley L. Drumm

cc: Mr. George Klefer

EXHIBIT 4.8.3

4-8-2

DE LAURÉAL ENGINEERS
INC.

CONSULTING ENGINEERS

1818 INTERNATIONAL TRADE MART

NO. 2 CANAL STREET

NEW ORLEANS 10128

225-5122

May 10, 1977

Health Education Authority of Louisiana
213 State Office Bldg.
325 Loyola Avenue
New Orleans, La. 70112

ATTENTION: Mr. Streuby L. Drums, Chairman

Gentlemen:

SUBJECT: Grid-Connected ICES
for HEAL Community

The firm of de Laoreal Engineers, Inc. reaffirms its commitment to the continuity of the ERDA - sponsored grid-connected ICES program for the HEAL community and will participate in providing HEAL all necessary engineering services through all phases of the program.

Also, we will have Orr-Schelen-Mayeron and Associates, Inc. and any other needed consultants associated with us to work hand in glove with HEAL and NOPSI until completion of construction and the testing of the project.

Very truly yours,

DE LAUREAL ENGINEERS, INC.

W. David de Laoreal, Sr.
President

EXHIBIT 4.8.6

4-8-3

ORR-SCHELEN-MAYERON & ASSOCIATES, INC.

*Consulting Engineers
Land Surveyors*

May 3, 1977

Mr. Dave deLaureal
deLaureal Engineers, Inc.
1512 International Trade Mart
New Orleans, Louisiana 70130

Dear Mr. deLaureal:

This is to confirm our agreement as a subcontractor to deLaureal Engineers in regards to the Grid Ices Project.

OSM will continue to participate in the Demonstration of a Grid-Connected Integrated Community Energy System for U. S. Energy Resource and Development Administration for the Real Community in New Orleans from phase 2 through 6 as our services are required.

Yours very truly,

ORR-SCHELEN-MAYERON
& ASSOCIATES, INC.

C. E. Goldsmith, P.E.
Senior Vice President

CEG/jet

EXHIBIT 4.8.c

4-8-4

TASK V

DETAILED WORK MANAGEMENT PLAN

5.1 WORK MANAGEMENT PLAN

5.1.1 Individual Work Packages

Work will be accomplished and reports and deliverables furnished to ERDA for each phase subsequent to Phase 1, Preliminary Feasibility Analysis, in accordance with the following outline. Deliverables will be provided as indicated for each of the phases in the phase program schedule as shown in Section 5.1.3. (Parenthetical numbers indicate Work Task numbers on Manpower Schedules.)

(1) Phase 11 - Detailed Feasibility Analysis and Preliminary Design of the Demonstration System.

Perform a detailed feasibility analysis and preliminary design and prepare the necessary documentation for ERDA review. The Documentation Package will include all preliminary design analyses, engineering calculations, and schematic and block diagrams of the Demonstration System, its subsystems and components. Information to be provided will include layout, general arrangement, envelope drawings and site plans, materials and process specifications listing, applicable procurement specification listing, detailed procurement, delivery and installation schedules, appropriate equipment test requirements, preliminary mockups and models, updated program plans, procedures, and schedules, and an updated cost estimate of the Demonstration System.

(a) Deliverables to ERDA

Preliminary Design Report, including:

- Preliminary design and feasibility analysis and engineering calculations. (1)
- System layout, including general arrangement, envelope drawings, plant site plans and distribution system layout. (2)
- Schematics and block diagrams of the Demonstration System and its subsystems and components. (3)
- Material and process specification listings. (4)
- Listing of procurement specifications for major and long lead items. (5)
- Detailed procurement, delivery and installation schedules. (6)
- Component test requirements as applicable. (7)
- Preliminary mockups and models. (8)
- Updated plans, procedures and schedules. (9)
- Cost estimates, by individual work package. (10)
- Draft Environmental Statement. (11)

(2) Phase III(a) - Final Design

Complete the final design and construction working drawings and prepare a Final Design Documentation Package which will include, for ERDA review, all final design analyses, engineering calculations, detailed design drawings, detailed construction drawings, installation drawings of the subsystems and components, updated equipment layout

drawings, updated procurement, delivery and installation schedules, appropriate equipment test program, mockups, updated program plans, procedures, schedules and a final cost estimate of the Demonstration System.

(a) Deliverables to ERDA

Final Design Report, including:

- Detail construction working drawings (12)
- Construction specifications (13)
- Installation drawings (14)
- Design analyses and reports, including engineering calculations (15)
- Procurement specifications (16)
- Mockups and models (17)
- Updated program procedures and schedules (18)
- Construction cost budget - final cost estimate (19)
- Distribution system layouts and network drawings (20)

(3) Phase III(b) - Operation and Maintenance Procedures

Define and prepare operating and maintenance procedures required for the system and submit for ERDA approval a detailed operation and maintenance procedures manual a minimum of 90 calendar days prior to the major milestone signaling the start of the Plant Start-Up Test.

(a) Deliverables to ERDA

- Operation and maintenance procedures (21)
- Operation and maintenance manual (22)
- Final Environmental Statement (23)

(4) Phase IV(a) - Construction Management

Provide management for the construction of the Demonstration System. This task will include the planning, cost control and coordination of the various construction activities to ensure that the objectives are met and schedules are complied with.

Prepare a construction management plan, including procedures and schedules for accomplishing the procurement, installation and on-site construction activities.

Use the ERDA-designated procedure to control and maintain all drawings used on site, including means to reproduce the drawings, and to furnish a notice of all authorized as-built changes to ERDA.

(a) Deliverables to ERDA

- Construction management plan (24)
- Implement management plan (25)

(5) Phase IV(b) - Demonstration System Construction

Construct the ERDA-approved Demonstration System for the Demonstration Community, ensuring that it is constructed in accordance with ERDA-approved drawings and specifications. This will include equipment purchase, component fabrication, site work, on-site construction, installation and operation. Such operation will meet the requirements of site-specific performance specifications and the construction drawings and specifications.

(a) Deliverables to ERDA

- Evidence of the Demonstration System completion and compatibility. (26)

(6) Phase IV(c) - Construction Reports

Maintain and submit to ERDA records and reports of deliveries, installation and construction of the Demonstration System.

The records and reports will include all as-built changes to drawings and specifications, and 35mm slides of the construction site and plant. Changes in drawings will be submitted as accomplished. Slides and 8 x 10 prints indicating significant progress will be filed with the daily construction logs and reports. The number and type of photo records will be coordinated with the Government Technical Representative (GTR).

(a) Deliverables to ERDA

- Records and reports of deliveries, installation and construction of the systems, slides, photos, daily construction logs, and changes in drawings. (27)

(7) Phase V(a) - Demonstration System Installation Test

Perform an Installation Test to verify that equipment installation and interconnections have been made in accordance with approved drawings. The test plan will be performed in close cooperation with the GTR.

(a) Deliverables to ERDA

- Installation Test Plan (28)
- Testing, test reports and certification of installation in accordance with drawings and specifications. (29)

(8) Phase V(b) - Start-Up Test

Perform a start-up test in close coordination with the GTR to determine that the Demonstration System is functionally operative with normal or simulated consumers' loads. A detailed test plan for the start-up test will be developed and submitted to the GTR for approval at least thirty (30) calendar days in advance of the major milestone scheduled date for the test. The approved test plan will be adhered to during the test unless exceptions are granted in writing by ERDA and will be the basis for the test report to be submitted for ERDA approval. The approved test report will be used as a basis for interim acceptance of the plant. The GTR will be notified in advance of the start-up test so as to permit ERDA to witness the test.

(a) Deliverables to ERDA

- Start-up Test Plan (30)
- Testing, test report, including statement of probable conformance with the site-specific performance specification. (31)

(9) Phase V(c) - Monitoring Instrumentation Procurement and Installation

Provide instrumentation sensors, signal conditioners, and data acquisition system according to ERDA approved specifications.

Design and specify the Monitoring Instrumentation System (MIS) which will be used in the Performance Tests and for subsequent data collection. Provide and install the instrumentation and monitoring system according to these specifications and the design of the Demonstration System. Instrumentation sensors and wiring will be shown on all as-built drawings and other applicable construction records.

Provide interior space for the data Acquisition system and install and make operable the complete instrumentation and data acquisition system. Permit ERDA or its designee to perform a Monitoring Instrumentation Installation Test.

(a) Deliverables to ERDA

- MIS Design and Specifications (32)
- ERDA Approval (33)
- MIS-Procurement (34)
- MIS-Installation (35)
- ERDA Test (36)

(10) Phase V(d) - Performance Test

Make provisions for and assist ERDA in carrying out Performance Tests for a period of a minimum of one year after an acceptable level of occupancy in the Demonstration Community has been achieved to determine whether the performance of the Demonstration System satisfies the

site-specific performance specifications.

Operate the Demonstration System during this period; ERDA will collect the data from the Monitoring Instrumentation System and prepare the resultant evaluations and analyses. ERDA will be provided with adequate operating space and facilities during the performance tests.

Prepare a test report describing the operational maintenance and management aspects of the Demonstration System during the Performance Tests.

Grant ERDA or its designee the right to temporarily install, in designated end-use systems, portable monitoring instrumentation and recording devices to evaluate building services utilization, and the right to install other monitoring instrumentation located in designated end-use systems to accomplish recording of data at a central station. The selection of designated end-use systems and buildings will be made by the GTR.

Permit access of Federal Government personnel and their guests to the Demonstration Community and the Demonstration System throughout the contract period of performance.

(a) Deliverables to ERDA

- Report, including operating costs, operation and maintenance records, and management details of the Demonstration System throughout the Performance Test. (37)

(11) Phase VI(a) - Operation and Maintenance Management

Operate and manage the Demonstration System throughout the life of the contract, in accordance with the written operation and maintenance management system as approved by ERDA.

(a) Deliverables to ERDA

- Operation and maintenance performance reports (38)

(12) Phase VI(b) - Long-Term Demonstration Evaluation

In the event that ERDA exercises its option to conduct a long-term Demonstration Evaluation of the performance of the Demonstration System continuing throughout the contract period of performance, including the optional extension periods:

Manage, operate and maintain the system in accordance with the approved operation and maintenance manual during the Demonstration Evaluation period(s). Maintain cost records and operation and maintenance logs and prepare interim reports and a final report containing management procedures, operating costs, and operation and maintenance records. Coordinate scheduling and preparation of those reports with the GTR. Provide ERDA or its designee free access to the plant and designated buildings and such additional support as needed to allow observation of operating procedures, to permit maintenance of all elements of the MTS, and to obtain

cost and operational information as needed to conduct the long-term Demonstration Evaluation. Make provisions to allow ERDA to remove the data acquisition system and other major elements of the NIS at the conclusion of the Demonstration Evaluation.

(a) Deliverables to ERDA

- a Interim and final reports, including operating costs, operation and maintenance records, and management details of the Demonstration System throughout the Demonstration Evaluation period(s) (39)

(13) Phase VI(c) - Post-Contract Operation

Plan and prepare for continued satisfactory operation of the Demonstration Community and for good community relations concerning the Demonstration System after conclusion of the contract period of performance.

Formulate and submit for ERDA approval a comprehensive program plan detailing and scheduling tasks to assure that the Demonstration System will continue to furnish the designed services in as effective, safe, reliable and economic manner as demonstrated in the Demonstration Evaluation period under the contract.

In the Post-Contract Program Plan:

Provide means to inform and coordinate the activities of Demonstration Community occupants and consumers to

establish their support of the integrated community energy system concept.

Provide means for assuring compliance with federal laws relating to equal employment opportunity; develop and implement a plan to provide jobs, training and contracting opportunities for persons and local business concerns in the area of the site to the maximum extent feasible.

Establish liaison and programs necessary to maintain effective relations with local utility companies, regulating groups, zoning authorities, environmental groups and trade organizations.

Provide necessary liaison to establish and maintain effective relations with applicable levels of state and local government.

Provide continued reliable and adequate sources of fuel, supplies, and maintenance for the Demonstration System.

Provide means to assure that the operation and maintenance manual procedures established under the contract will be diligently followed after contract expiration to ensure continued environmental protection to the community as provided for in the design in accordance with the site-specific performance specifications.

Provide means for assuring adequate reimbursement

or income for the system to assure that the plant can continue to function in a viable economic manner.

Submit the Post-Contract Program Plan to the GTR for approval by ERDA not later than six (6) months after start of the Performance Test. Following ERDA approval of the Program Plan, implement, as scheduled, those tasks to be commenced within the contract period of performance.

(a) Deliverables to ERDA

- Program plan, including steps and procedures to assure viable Demonstration System operation after conclusion of the contract period of performance. (40)

(14) Installation and Start-up Report

Prepare a report covering the design, construction, installation and operation of the Demonstration System from the time of contract start through the completion of the Start-Up Test. Deliver to the GTR twenty (20) copies of a draft of this report, including findings and recommendations, within forty-five (45) calendar days after completion of the system Start-Up Test.

After GTR approval or comment on the draft report, which will be within thirty (30) days after receipt: Deliver twenty (20) copies of the report, plus one reproducible copy, incorporating the GTR comments within

thirty (30) calendar days after receipt of the GTR's approval or comments. This report format will adhere to the Government Printing Office style manual.

(a) Deliverables to ERDA

- Report (41)

5.1.2 PERT Charts

Three PERT network charts follow which show the time-task relationships which will be used to control and schedule work. One chart is for Phase II, one for Phase III, and the last for Phases IV through VI.

**PERT NETWORK
PHASE II
PRELIMINARY DESIGN & PROG PLAN**

- EARLIEST TIME (IN MONTHS)
- LATEST TIME (IN MONTHS)
- MILESTONE No.
- () MONTHS

PERT NETWORK

PHASE IIIa & IIIb

FINAL DESIGN

○ EARLIEST TIME-MOS

□ LATEST TIME-MOS

○ MILESTONE-MOS

() MONTHS

5.1.3 Demonstration Program Schedule

A bar chart schedule, included herein, serves as a milestone chart, indicating time phases for each work task to be performed under the various phases of the Demonstration Program.

GRID CONNECTED ICES DEMONSTRATION PROGRAM SCHEDULE

5.1.4 Cost Estimates

Cost estimates for each phase of the ICES project follow. The estimate for each phase shows manpower costs broken down by each work task and also line items for reimbursable direct expenses and outside consultants.

A Table of "Total Estimated Project Costs" appears at the end of this section and includes Construction Costs, Demonstration Program Costs and Requested ERDA Funding.

DEMONSTRATION PROGRAM

PHASE II

COST ESTIMATE

Man-month costs - (1) Work Task # 1 -	\$ 88,387	
2 -	151,031	
3 -	64,260	
4 -	19,116	
5 -	18,426	
6 -	17,087	
7 -	12,498	
8 -	9,303	
9 -	29,015	
10 -	34,622	
11 -	<u>8,665</u>	
Sub-Total		\$452,410

General Legal	\$ 3,000
Bond Counsel	3,000
Feasibility - Financial Consultant	3,000
Public Meetings & Communications (Public Relations)	15,000
Environmental Testing	32,000
Sub-surface Data	1,000
Travel	8,300
Per Diem	9,900
Reproduction and Printing	<u>6,000</u>

Phase II - Total Estimated Cost \$533,610

(1) Includes Demonstration Team Management, Engineering
and Technical Costs and Fees

DEMONSTRATION PROGRAM

PHASE III

COST ESTIMATE

Man-month costs - Work Task # 12 -	\$408,833
13 -	94,844
14 -	58,960
15 -	63,915
16 -	74,587
17 -	23,504
18 -	46,505
19 -	65,713
20 -	143,555
21 -	18,807
22 -	30,779
23 -	<u>20,633</u>

Sub-Total

\$ 1,049,635

General Legal	50,000
Bond Counsel	56,500
Public Meetings & Communications (Public Relations)	25,000
Topographic and Right-of-Way Surveys	25,000
Soils Investigation	5,000
Reproduction and Printing	23,000
Travel	11,800
Per Diem	<u>13,800</u>

Phase III - Total Estimated Cost \$ 1,259,735

DEMONSTRATION PROGRAM

PHASE IV

COST ESTIMATE

Man-month costs - Work Task # 24 -	\$ 36,128
25	421,650
26	55,048
27	<u>97,771</u>
Sub-Total	\$ 610,597
General Legal	9,000
Public Relations	2,000
Travel	4,800
Per Diem	5,400
Printing	<u>2,000</u>
Phase IV - Total Estimated Cost	\$ 633,797

DEMONSTRATION PROGRAM

PHASE V

COST ESTIMATE

Man-month costs - Work Task # 28 -	\$ 11,863
29	18,648
30	22,580
31	39,583
32,	25,642
33	1,149
34	7,439
35	16,187
36	5,928
37	<u>50,886</u>
Sub-Total	\$ 199,905
Travel	2,400
Per Diem	2,700
Environmental Tests	32,000
Printing	<u>3,500</u>
Phase V - Total Estimated Cost	\$ 240,505

DEMONSTRATION PROGRAM

PHASE VI

COST ESTIMATE

Man-month costs - Work Task # 38 -	\$20,822/year
39 -	16,716/year
40 -	<u>21,974/year</u>
Sub-Total	\$59,512/year
Printing	<u>5,000/year</u>
Phase VI - Total Estimated Cost	\$64,512/year

DEMONSTRATION PROGRAM
ADDITIONAL REPORT
COST ESTIMATE

Man-month cost' Work Task # 41 -	\$ 78,142
Printing	<u>10,000</u>
Total Estimated Cost	\$ 88,142

COST ESTIMATE SUMMARY

Phase II	\$ 533,610
Phase III	1,259,735
Phase IV	633,797
Phase V	240,505
Additional Report	<u>88,142</u>
Total	\$ 2,755,789
Phase VI (Indeterminate Length)	\$ 64,512 per year

TOTAL ESTIMATED PROJECT COSTS (1)

<u>PHASE</u>	<u>CONSTRUCTION</u>	<u>DEMONSTRATION PROGRAM</u>	<u>REQUESTED ERDA FUNDING</u>
II	\$ --	\$ 533,610	\$ 533,610
III	--	1,259,735	123,886
IV	25,566,500 (2) 725,000 (3)	633,797	736,200
V	100,000 (4)	240,505	274,400
VI	--	64,512 (5)	64,512 (5)
Installation & Start-Up Report	--	88,142	88,142
TOTALS	<u>\$26,391,500</u>	<u>\$2,820,301</u>	<u>\$1,820,750</u>

(1) Does not include land cost, estimated at \$4,000,000.

(2) Does not include ERDA - funded construction costs. See notes (3) and (4) below.

(3) Electrical grid-connecting subsystem estimated cost.

(4) MIS estimated cost.

(5) Estimated cost for one year; same estimated cost for each additional year.

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5-1-28

5.2 ORGANIZATIONAL PLAN

The organizational plan for management and scheduling of work on Phase II and following phases is outlined in the following sections. Organization charts for the management team and for each participating Demonstration Team organization are included to show titles and areas of responsibility of key personnel. Manpower schedules are included which show level of effort in man-months for each of the work tasks under each phase. Qualifications of key personnel participating in Phase II are included, as resumes, in Appendix E of Volume III.

5.2.1 Organization Charts

Following are five organization charts --

- (1) Project Management Team -- composed of key personnel
from each of the Demonstration Team participants
- (2) HEAL
- (3) NOPSI
- (4) deLaureal Engineers, Inc.
- (5) Orr-Schelen-Mayeron & Associates, Inc.

These charts define names, titles and responsibilities of
all key personnel participating in the ICES project.

5-2-3

GRID - CONNECTED ICES
PROJECT MANAGEMENT TEAM

GRID - CONNECTED ICES
ORGANIZATION CHART - HEAL

GRID-CONNECTED ICES
ORGANIZATION CHART - HOPS1

5-2-6

GRID - CONNECTED ICES
ORGANIZATION CHART - DE LAUREAL ENGINEERS, INC.

GRID - CONNECTED ICES
ORGANIZATION CHART
ORR-SCHELEN-MAYERON & ASSOCIATES, INC.

5.2.2 Key Personnel

Key personnel are listed on the Manpower Schedules in section 5.2.3 for each phase of the project. The Schedules also indicate level of effort for each task. Titles, responsibilities and levels of authority of such key personnel are indicated on the Organization Charts in section 5.2.1. Qualifications of key personnel are shown on resumes included in Appendix E of Volume III.

5.2.3 Manpower Schedules

The following six manpower schedules were developed to indicate estimated level of effort, in man-months, to be applied to each individual work task for each phase of the ICES project. Totals are given for each phase indicating total man-months by task number and for each of the key personnel.

DEMONSTRATION PROGRAM - MANPOWER SCHEDULE

PHASE II - DETAILED FEASIBILITY ANALYSIS & PRELIMINARY DESIGN

NAME	WORK TASK NO.											TOTAL MAN MONTHS
	1	2	3	4	5	6	7	8	9	10	11	
<u>HEAL</u>												
V. D. Seifert					.05	.05		.02	.02			.14
J. E. Wall	.05	.05		.05		.05		.02	.02	.02		.26
R. T. Sessums	.05	.2	.05				.05	.02	.02			.39
Project Manager	1.5	1.5	1.0	.2	.3	.3	.2	.2	.3	.5	.5	6.5
<u>HOPS!</u>												
H. E. Markel	2.0	.5	1.0			.5	.5		.5	1.0	.5	6.5
M. L. Huber		2.5	1.5	.5	.5							5.0
M. J. Maier		1.0	1.5	.5	.5							3.5
<u>DE LAUREAL ENGINEERS</u>												
W. D. de Laoreal	.05	.1	.1	.05	.05	.05	.05	.05	.1	.1		.7
H. W. Herbst	.1	.1		.1		.1		.05	.1	.2		.75
J. E. Morrison	1.6	1.5	1.0	.3	.5	.2	.2	.1	.6	.4	.1	6.5
G. R. Ketteringham	1.2	1.0	3.0	.2	.5	.2	.2	.05	.25	.4		7.0
M. Peterson		.5		.2					.2	.7		1.8
B. V. Dhume		3.0										3.0
T. W. Schnadelbach		2.3		.2		.2		.2		.1		3.0
S. G. Smith	1.2	1.7	.5	.1	.5	.3	.2	.1			.05	4.65
J. N. Henry									.1	.2	.3	.6
<u>DARR-SCHELEN-MAYEROW</u>												
C. H. Goldsmith	.2	.2	.1	.1	.1	.1	.1	.1	.1	.1		1.2
L. O. Whalen	1.4	1.4	.5	.2	.1	.1	.1	.2	.5	.5	.05	5.05
J. K. Kunde	.9	.7	.2	.2	.1	.1			.2	.2		2.60
G. L. Tosel	.7	.6	.2	.1	.05		.2			.2	.1	2.15
M. W. Koelsch	.5	.6	.3	.2	.05	.3	.1		.2	.2	.1	2.55
J. T. Elliott	.5	.5	.2	.2	.2	.1	.1	.1	.2	.3		2.4
L. V. Beling	.2	.2	.1		.1	.1		.1	.1	.3	.05	1.25
M. E. Clanton	.2	.7	.2	.1		.7	.1		.2	.1	.1	1.8
Technicians & Draftsmen	5.0	10.0	4.0	.5	.2	.4	.5	.2	2.0	1.0	.2	24.0
TOTAL MAN MONTHS	17.55	30.05	15.45	4.0	3.8	3.25	2.6	1.51	5.71	6.62	2.06	93.29

DEMONSTRATION PROGRAM - MANPOWER SCHEDULE
 PHASE III - FINAL DESIGN, OPERATION & MAINTENANCE PROCEDURES

NAME	WORK TASK NO.												TOTAL MAN MONTHS
	12	13	14	15	16	17	18	19	20	21	22	23	
<u>HEAL</u>													
V. D. Seifert						.02	.05	.05	.02				.14
J. E. Wall	.02	.05		.05	.05	.02	.1	.2	.1	.3	.1	.01	1.00
R. T. Sessums	.05	.05	.05	.05	.05	.02	.1	.2	.2	.1	.1	.03	1.00
Project Manager	3.5	2.5	.5	.5	1.0	.5	.5	1.0	1.0	.2	.3	.5	12.00
<u>NOPSI</u>													
H. E. Merkel	4.5	.5		1.0		.5	.5	3.0	.5	1.0	.5		12.00
O. K. Tucker	1.0	.25			.5				.5				2.25
H. C. McAfee	.5	.25									1.5	1.0	3.25
M. L. Huber (+ staff)	3.0		2.0	3.0	.75				4.0	1.0	2.0		15.75
M. J. Maier	3.0		2.0		.75					1.0	2.0		8.75
A. H. Jensen									1.0				1.00
<u>DE LAUREAL ENGINEERS</u>													
W. O. de Laureal	.3	.2	.1	.1	.1	.1	.2	.1	.3	.05	.05	.1	1.70
H. W. Herbst	.7	.5	.5	.2	.5	.1	.2	.1	.5	.05	.05	.1	3.50
J. E. Morrison	2.0	1.5	.3	1.5	1.5	.5	1.5	1.5	1.5	.05	.05	.1	12.00
G. R. Ketteringham	2.0	1.5	.5	1.5	1.0	.2	.3	1.0	.2	.05	.05		8.30
H. Peterson	1.0	.5	.5	.5	.5	.2	.2	.5	.5				4.40
B. V. Dhume	1.5	.5	.1	.1	.2	.5	.2	.5	.2				3.80
T. W. Schnadelbach	1.0	.5			.5	.2	.2	.2	.1			.3	3.00
S. G. Smith	.5	.5	.5	.5	1.0	.1	.3	.3	.5	.05	.05		4.30
J. M. Henry									.2	.2	.2	.4	1.00
<u>ORR-SCHELEN-MAYERON</u>													
C. H. Goldsmith	.3	.1	.05	.05	.05	.05	.1	.1	.1	.05	.05	.05	1.05
L. D. Whalen	1.5	1.0	.75	.75	1.0	.2	.5	.5	.5	.2	.2	.2	7.30
J. H. Kunde	.9	1.0	.25	.25	.5	.2	.2	.2		.1	.1	.2	3.90
G. L. Tosel	.9	.5	.3	.3	.25		.2	.2			.1	.2	2.95
M. W. Koelsch	1.0	.5	.25	.2	.3	.1	.5	1.1	.2	.05	.2	.2	4.60
J. T. Elliott	.7	1.0	.5	.2	.5		.3	.2		.1	.2	.1	3.80
L. V. Beling	.2	.5	.3	.2	.25	.05	.25	.2	.05	.1	.1	.1	2.30
M. E. Clanton	.4	.5	.3	.2	.2		.25	.1	.05		.1		2.10
Technicians & Draftsmen	73.8	1.0	2.0	.5	1.0	.5	.5	.5	25.00			.2	105.00
TOTAL MAN MONTHS	104.27	15.4	11.75	11.65	12.45	4.06	7.15	11.75	37.22	4.65	8.00	3.79	232.14

DEMONSTRATION PROGRAM - MANPOWER SCHEDULE
 PHASE IV - CONSTRUCTION & CONSTRUCTION MANAGEMENT

NAME	WORK TASK NO.				TOTAL MAN MONTHS
	24	25	26	27	
<u>HEAL</u>					
V. O. Seifert	.05				.05
J. E. Nail	.05	.02	.01	.01	.09
R. T. Sessums	.05	.05	.01	.01	.12
Proj. Manager	2.0	10.0	2.0	4.0	18.0
<u>NOPSI</u>					
H. E. Markel	1.0	2.0	1.0	1.0	5.0
M. L. Firmin (+ Constr. Div.)		60.0	3.0	2.0	65.0
M. L. Huber				2.5	2.5
M. J. Maier				2.5	2.5
<u>DE LAUREAL ENGINEERS, INC.</u>					
W. D. de Laureal	.5	.5	.3	.2	1.5
H. W. Herbst	1.0	1.0	.3	1.2	3.5
J. E. Morrison	.5	1.0	.5	.5	2.5
G. R. Ketteringham	.5	1.0	.5	.5	2.5
N. Peterson		.2	.1	.2	.5
R. E. Wright	.5	20.0	2.0	4.0	26.5
H. A. Schomaker		4.0	.5	1.0	5.5
G. J. Kelley		4.0	.5	1.0	5.5
<u>ORR-SCHELEN-MAYERON</u>					
C. H. Goldsmith	.05	.02	.02	.02	.11
L. D. Whalen	.35	.4	.5	.6	1.85
J. H. Kunde	.2	.1	.2	.1	.6
J. T. Elliott	.2	.3	.1	.1	.7
L. V. Belling	.1	.08	.08	.12	.38
M. W. Koeisch	.1	.1	.1	.06	.36
TOTAL MAN MONTHS	7.15	104.77	11.72	21.62	145.26

DEMONSTRATION PROGRAM - MANPOWER SCHEDULE

PHASE V - TESTS FOR INSTALLATION, START-UP, MTS & PERFORMANCE

NAME	WORK TASK NO.										TOTAL MAN MONTHS
	28	29	30	31	32	33	34	35	36	37	
<u>NEAL</u>											
Y. D. Selfert					.01				.01	.01	.03
J. E. Wall	.01	.01	.01	.01		.01	.01		.05	.01	.12
R. T. Sessums	.01	.01	.01	.02	.01	.01	.01	.01	.05	.01	.15
Project Manager	.2	1.0	.5	1.0	.2	.1	.1	.3	.1	1.5	5.0
<u>HOPST</u>											
H. E. Markel	.5	.5		.5						1.0	2.5
A. H. Jensen	.5	.5	1.0	5.5					1.0	5.0	14.5
M. L. Firmin								1.0			1.0
N. L. Huber			1.0								1.0
M. J. Maier			1.0		3.0		.5				2.5
<u>DE LAUREAL ENGINEERS</u>											
H. W. Herbst	.05		.1	.05	.05		.05			.1	.4
J. E. Morrison	.1	.1	.2	.1	.5					.5	1.5
G. R. Ketteringham	.1	.1	.2	.1	.5	.1	.2		.1	.5	1.9
R. E. Wright	.1	1.0	.1	1.0				1.0	.2	2.0	4.4
G. J. Kellay		.1		.1				.2		.5	.9
J. M. Henry		.1		.1				.2		.5	.9
<u>ORR-SCHELEN-WAYRON</u>											
C. H. Goldsmith	.01	.01	.05	.05	.05						.17
L. O. Whalen	.3	.15	.3	.3	.2		.2	.1		.15	1.7
J. H. Kunde	.2	.05	.2	.2	.2						.85
J. T. Elliott	.2	.02	.2	.2	.3		.3	.15		.1	1.47
G. L. Tosel			.2	.2	.2						.6
M. W. Koelsch	.04	.02	.05	.05	.05						.21
Technicians & Draftsmen					2.0						2.0
TOTAL MAN MONTHS	2.32	3.67	5.12	9.48	5.27	0.22	1.37	2.96	1.51	1.88	43.8

DEMONSTRATION PROGRAM - MANPOWER SCHEDULE

PHASE VI - OPERATION & MAINTENANCE MANAGEMENT, LONG TERM EVALUATION

NAME	WORK TASK NO.			TOTAL MAN MONTHS	
	38	39	40		
<u>HEAL</u>					
V. D. Seifert			1.0/yr	1.0/yr	
J. E. Wall	.5/yr	.5/yr	1.0/yr	2.0/yr	
R. T. Sessums					
Project Manager	1.0/yr	1.0/yr	1.0/yr	3.0/yr	
<u>NOPSI</u>					
A. H. Jensen (+ staff)	3.0/yr	2.0/yr	2.0/yr	7.0/yr	
<u>DE LAUREAL ENGINEERS</u>					
J. E. Morrison	.2/yr	.2/yr	.1/yr	.5/yr	
G. R. Ketteringham	.2/yr	.2/yr	.1/yr	.5/yr	
<u>ORR-SCHELEN-MAYEROM</u>					
C. M. Goldsmith	.25/yr	.1/yr		.35/yr	
J. H. Kunde	.15/yr	.15/yr	.1/yr	.4 /yr	
L. V. Beling	.1/yr	.1/yr	.05/yr	.25/yr	
TOTAL MAN MONTHS	5.40 per year	4.25 per year	5.35 per year	15.00 per year	

DEMONSTRATION PROGRAM - MANPOWER SCHEDULE
 ADDITIONAL REPORT - INSTALLATION & START-UP

NAME	WORK TASK NO.			
	41			
<u>HEAL</u>				
V. D. Seifert	.05			
J. E. Hall	.10			
R. T. Sessums	.05			
Project Manager	2.0			
<u>NOPSI</u>				
H. E. Merkel (+ staff)	9.0			
<u>DE LAUREAL ENGINEERS</u>				
M. W. Herbst	.5			
J. E. Morrison	.5			
G. R. Ketteringham	.5			
R. E. Wright	2.5			
<u>ORR-SCHELEN-MAYERON</u>				
C. H. Goldsmith	.05			
L. D. Whalen	.5			
J. H. Kunde	.2			
G. L. Tosel	.2			
J. T. Elliott	.05			
Technicians & Draftsmen	2.0			
TOTAL MAN MONTHS	18.2			

5.2.4 Key Personnel Qualifications

Qualifications of key personnel who will participate in Phase II are outlined in resumes included in Appendix E of Volume III.

The level of effort estimated for these key personnel is shown on Manpower Schedules under section 5.2.3.