STEAM AND CHILLED WATER SUB-ELEMENT

1. Data Requirements

1.a Existing Steam and Chilled Water Distribution System Inventory: There is no existing central steam, or chilled water utility service on the FAU Treasure Coast site. Since there is no existing steam generation plant, chilled water plant, or distribution system on the FAU Treasure Coast campus; this data requirement does not apply because the data does not exist.

1.b Existing Steam and Chilled Water Distribution System Data: There is no existing central steam, or chilled water utility service on the FAU Treasure Coast site. Since there is no existing steam generation plant, chilled water plant, or distribution system on the campus; this data requirement does not apply because the data does not exist.

2. Analysis Requirements

2.a Facility Capacity Analysis:

Chilled Water

1. The existing 15,000 sq.ft. building is served by a 4-zone, split system heat pump. This system is adequate for the existing facility, and has no capacity surplus, or deficiency.

2. The next planned facility is located 1,200 feet from the existing building. The existing system should not be considered as an origin for a central system, nor as a potential connection to a new central system, because, it is small, and remotely located. The new joint use building will have a total load of 300 tons, of which part will serve FAU, and the other part will serve IRCC. The new building will be served by the IRCC chiller plant.

3. The future development of the FAU Treasure Coast campus will include an additional 100,000 sq.ft. This additional space will be in the form of five or six buildings, averaging 15 to 20,000 sq.ft. in size. The buildings will be added one at a time, which makes implementing a central chiller plant difficult. The current IRCC central chiller plant is a combination of air-cooled chillers. This plant is not a good base for a central chiller plant. There is no surplus capacity in the existing IRCC chillers. If expanded, these chillers are not large enough or efficient enough to offset the energy and first cost

of the lengthy transport system required to serve the FAU buildings.

If a new central chiller plant is installed as part of the new joint use facility, it would minimize maintenance costs, make provisions for adequate redundancy simpler, decrease the energy cost, and possibly offset the cost of transport piping compared to providing standalone chillers at each building.

Before the next facility is added, a study should be performed to analyze chilled water options available. At a minimum, the study should examine:

- Providing standalone chillers at each new building.
- Connecting to the air-cooled chiller plant at IRCC, with the intent that it will be converted to a high efficiency water-cooled plant.
- Connecting to the air-cooled chiller plant at IRCC, with the intent of disconnecting at a future date and installing an FAU central plant.

Steam

1. There is no existing, nor any future demand for Steam on this campus.

2.b Performance of Existing Steam / Chilled Water Facilities: There is no existing central steam, or chilled water utility service on this site. Since there is no existing steam generation plant, chilled water plant, or distribution system on the campus; this data requirement does not apply because the data does not exist.

2.c Opportunities Available to Reduce Energy Consumption:

The largest mechanical system energy consumers are the chillers, and condensing units. The use of high efficiency air-cooled chillers, and condensing units can provide significant energy savings. Each standalone chilled water system can be equipped with variable speed pumps to provide only the chilled water flow required.

High efficiency air handling equipment should be used to reduce energy consumption. This can be accomplished by providing Variable Air Volume Air Handling Units, with Variable speed drives on the fan motors, to provide the minimum CFM of airflow required to cool the facility.

ELECTRIC POWER AND OTHER FUELS SUB-ELEMENT

1. Data Requirements

1.a Existing Power Distribution: The existing building is fed by an FP&L pad mounted transformer located adjacent to the building. The transformer is fed by an FP&L underground line which is fed from an FP&L overhead line running along University Boulevard. The overhead line is 23 kV. The existing service is 120/240 single phase 3 wire.

1.b Existing Fuel Storage or Distribution: There is no existing fuel storage or distribution system on the campus.

1.c Electrical Power Distribution System Facilities Data:

1.c.1 Florida Power and Light is the Electrical Utility responsible for the existing power distributions system.
1.c.2 The existing feeder serves one building on the existing campus
1.c.3 The existing feeder has the capacity to serve approximately 8,000 Kva
1.c.4 The current load on the feeder from the University is about 15 Kva
1.c.5 The existing service to the facility is 120/240 volt, single phase, 3 wire.

2. Analysis Requirements

2.a Facility Capacity Analysis

2.a.1 The existing facility has adequate capacity to meet the current demand.

2.a.2 Future capacity can easily be provided to the site from the existing FP&L substation, which is located between Peacock Street and I-95 and is less than 1 mile from the campus. Distribution to the campus buildings will be via the 23Kv feeder. It is recommended that FPL provide the 23Kv distribution system and the building transformers. This will alleviate the campus from the responsibility of maintaining a 23Kv distribution system. FPL primary rate structures are such that they will reduce the energy cost to the facility by about the cost of the primary cable installation but provide no reduction to cover the maintenance of the primary feeder. It will be necessary to provide a 12' easement around the campus for the

FPL feeder. Other utilities can share this easement.

YEAR	AMPS	LOAD (KVA)
1999	1	15
2009	25	1000

Assuming that a single feeder will be provided to the campus; there should not be any problem providing full electrical capacity on the feeder to the university through the year 2009. The electric utility company will have to decide how to size their feeders. They may not want to provided full capacity at this time for a future load in 2009.

2.b Existing Electrical Power & Other Fuels Analysis:

The existing underground FP&L electrical line should be adequate to provide power to all future buildings. The University may want to consider receiving power from a second FP&L line as the campus grows. This would provide a backup feeder to the campus. Most likely, they would both originate from the same FP&L substation. The university should also consider upgrading the existing buildings power service from 120/240 volt single phase to either 277/480 volt three phase or 120/208 volt three phase. This could be done at the first major renovation to this facility. There are no other fuels on the campus.

2.c Opportunities Available to Reduce Energy Consumption:

The largest energy consumers in any facility are lighting and the air conditioning equipment. The use of fluorescent fixtures with energy saving lamps and electronic ballasts should be used where possible. Areas requiring accent and down lighting should use PL lamps. Daylighting should be considered in every facility to reduce the number of lighting fixtures required. Sensors can be used to dim or turn off lights in areas with adequate daylighting. Room sensors can be used to turn off fixtures in unoccupied spaces. Minimal ambient lighting should be provided and task lighting should be used to illuminate specific areas where lighting is required. For example, rather than provide 75 foot-candle illumination throughout a facility, provide enough light to illuminate the space and provide task lights at the work surfaces.

The use of a central utility plant can provide significant energy savings. See the discussion

of these concepts in the Steam / Chilled Water Sub-Element.

TELECOMMUNICATIONS SUB-ELEMENT

1. Data Requirements

1.a **Existing Telecommunications Systems:** The existing service comes from a remote terminal at the Mets Baseball Stadium, which is about a ½ mile west of the university. The remote terminal is fed by a fiber optic line. The remote terminal converts the fiber optic carrier to copper conductors for distribution to their customers including the university.

1.b **Existing Electromagnetic Fields:** There do not appear to be any sources of electromagnetic fields on the campus. The university may want to have readings taken by a communications firm to determine if there are any existing fields and to determine if there are any microwave links passing over the campus.

2. Analysis Requirements

2.a Facility Capacity Analysis:

2.a.1 The service to the existing university building is underground copper cable, direct buried from the remote terminal which is located about a ½ mile away at the Mets Baseball Stadium. The capacity of the existing telephone system is adequate to handle the existing telephone service.

2.a.2 In the future, BellSouth could locate a remote terminal in a university building and provide the university with fiber optic or any other service the university may desire. ISDN service is available from BellSouth and could be provided to the campus in the future.

T-1 service is available from BellSouth and could be provided to the campus in the future.

Future fiber optic service would most likely be fed overhead.

BellSouth should be notified during the design process of any future buildings so that they may have their telephone requirements incorporated into the facility design.

BellSouth will require a 10' easement for their telephone service. They might share that easement with FPL and the Cable TV Company. They require a 12" separation from the power lines.

Their service will be 18" to 24" deep. In the roads they will be 36" deep.

Pavement cannot be provided over the BellSouth easement. Pavement crossings must be provided with 2-4" conduits.

Telephone service from a central location to each building could be provided via fiber optics or twisted pair copper cables. The location of the central telephone service must be determined if desired.

Data Service: A fiber optic campus wide data network should be implemented. This data network could carry data, energy management, fire alarm and security systems. A location for the central equipment for all these services must be determined.

Cable TV: A fiber optic or coaxial cable backbone should be provided for a campus wide cable TV network. The location for the head-end for this equipment needs to be determined.

Conduit and Duct bank: A system could be designed to accommodate the growth of the campus until 2009 and hopefully beyond. The duct bank system would connect the Central Equipment Location to all of the campus buildings.

2.b Existing Data Analysis: The existing building has a small local area network which is connected to the Main Boca Raton Campus via modems and copper telephone lines. The existing telephone and data system seems adequate for the existing facility.

2.c Opportunities Available to Reduce Electromagnetic Hazards:

The primary sources for electromagnetic energy are Overhead Transmission Lines, Computers, Transformers, Cellular Phones, Microwave Transmitters and Satellite Dishes.

The primary source on this campus is the 23Kv utility distribution line that runs overhead along University Drive and then underground to the only building on the campus. There has been a lot of literature on the effects of electromagnetic energy on humans with no definitive results to the best of our knowledge. Although the 23Kv line is a relatively high voltage, it is defined as a "medium voltage" and therefore is not as potentially dangerous as a "high voltage" transmission line which could be 10 times the distribution voltage.

Care should be taken to avoid the other electromagnetic energy sources mentioned. Buildings and walkways should not be located in the path of microwave or satellite dishes. Thought should be given to purchasing low emitting PC's.

The modern world is full of electromagnetic energy sources which our bodies are absorbing everyday. Broadcast TV, Radio, Satellite TV, Cellular Phone Systems, Microwave telephone communications, Radar, etc. It is believed that these are low energy sources and are not harmful to living things.