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Florida Power Corporation

ENVIRONMENTAL REPORT

Crystal River Unit 3
Nuclear Generating Plant

The Power to Please!

FLORIDA POWER CORPORATION

ENVIRONMENTAL PROGRAM

Florida Power Corporation has instituted an environmental program at its Crystal River Plant where a 855 MWe pressurized water reactor nuclear addition is currently being constructed. Florida Power Corporation is fully committed to several federal, state and local agencies and, even more important, to the public to initiate and execute this program. The total project has been subdivided into the four areas more fully described below. The following descriptions define these four areas and document their status as of January 1, 1969. Future briefing and documentation will be accomplished by a Monthly Environmental Status Report.

Site Meteorology Program

This program is a requirement of the AEC and its primary purpose is to provide information about wind direction, wind speed and atmospheric stability conditions so that the transport of radioactivity under normal and abnormal operating conditions can be calculated. Now in existence is a Model 120 Bendix Aerovane wind direction and velocity transmitter installed atop a 150 foot Rohn tower located in the southwest portion of the site. The signals from the aerovane are inputed into a NUS Model 7010 wind variance computer and into a NUS Model 7011 dual strip chart monitoring recorder. The dual chart recorder continuously logs wind speed and wind direction. The variance computer is designed to accept the output signals from the aerovane transmitter and convert these signals into digital code; the data are accumulated over a pre-selected period of time (15 minutes in our case) and the average wind speed, average wind direction and the variance of the wind direction over the averaging time are recorded in digital form on perforated tape. The resulting tape is then used directly as the input to another computer for further reduction. The aerovane is suitable for wind speeds up to 120 MPH, but the recording equipment is limited to 75 MPH.

The data reduction is currently being done by NUS Corporation. The tapes and the charts are sent to NUS about every two weeks. The weather station is checked every Monday, Wednesday and Friday. NUS will reduce the data and send us a report on an annual basis. We are to soon receive these reports quarterly with an annual summary.

The data acquisition for this program was begun on August 23, 1968, and with but a few exceptions has been continuing satisfactorily.

Marine Ecological Program

This study is the result of our commitment to the AEC that we would fully comply with the recommendations of the U.S. Department of Interior Fish and Wildlife Service as set forth in its letter of February 12, 1968, to Mr. Harold L. Price, Director of Regulation, AEC. The purpose of the program is to study the effects, if any, of the plant's heated water discharge on the marine ecosystem in the Gulf of Mexico near the plant site.

On October 30, 1968, the Florida Board of Conservation formally accepted a Florida Power Corporation grant of $25,000. This grant is to be used by the Board of Conservation for the purpose of performing this ecological survey. The grant is for the first year of a four year program and is expected to be renewed annually. The project is under the direction of Mr. Robert M. Ingle, Assistant Director of the Florida Board of Conservation and Director of Research. The facilities of the Marine Research Laboratory located in St. Petersburg will be utilized as required.

The program was officially initiated on January 2, 1969, when Mr. Ingle and several of his associates toured the Crystal River site. There are currently two people working full time on this project for the Board of Conservation; Mr. P. R. (Rod) Parrish, Project Leader, and Mr. James Moore, Marine Biologist, are assigned to the site and now have office quarters in our construction office. At this point in time, they are making plans and requisitioning equipment so that actual field work can commence.

There are still several details that need to be resolved in this area of our environmental program. The frequency of the field surveys and their subsequent documentation is one of these items. It appears logical that the surveys should be quarterly to correspond with the seasons and that reports should be similarly scheduled. A second item of concern is that one of the stipulations of the grant is that the Board of Conservation provide us with the necessary marine life samples so that the behavior of radioactive and stable chemical discharges to the water environment may be determined and predicted in the future. Therefore, the Board of Conservation schedule must be correlated with the requirements of the Sample Collection and Analysis Program which is covered below. However, as the program progresses these areas of concern can easily be resolved.

Marine Thermal Plume Program

The purpose of this study is to determine the variation of water temperature and the geographical extent of this variation due to the plant discharge of heated effluent. We are also concerned with flow patterns and current velocity measurements.

This part of the program is closely associated with the Marine Ecological Program previously discussed. Here, however, we are specifically concerned with the physical aspects of temperatures, heat transfer coefficients, velocities, etc., whereas the ecological program is concerned with the effect of these parameters. Thus, it can be seen that these two programs are closely coupled.

Cornell Aeronautical Laboratory was contacted on December 18, 1968, about their capability of performing this type of study using their aerial mapping techniques. They were interested and are to submit a proposal to us before the end of January.

Another company, HRB-Singer, has similar capabilities. This company is associated with the University of Pennsylvania and has contacted both Orlando Utilities and Florida Power & Light. HRB-Singer will be contacted to discuss their interests and capabilities.

The initiation of this program is required so that measurements could be taken during the March outage of Crystal River #1. The Board of Conservation intends to make extensive temperature measurements as part of their study; however, we will independently acquire temperature data also.

Sample Collection and Analysis Program

The purpose of this program is to sample and analyze those items deemed necessary to develop radioactivity concentrations and levels before and after initial operation of the nuclear unit in order to ascertain the effect, if any, of the nuclear unit. Samples to be collected and analyzed are air, ground, flora, fauna, well water, sea water, marine organisms, etc.

The basic requirements for this program have been determined and the final details will be resolved early in February 1969. The intent is to use the consultant services of NUS in this area.

FLORIDA POWER CORPORATION

MONTHLY ENVIRONMENTAL STATUS REPORT

JANUARY 1969

Site Meteorology Program

On-site data collection and processing by NUS Corporation is continuing with a minimum of problems.

No work has been accomplished this month in amending the NUS contract in order to provide quarterly reports in addition to an annual report.

Marine Ecological Program

A preliminary design for the structures in the discharge canal was completed and prints were sent to the Florida Board of Conservation for comments.

Comments on the discharge canal structures were submitted by the Florida Board of Conservation and the design is currently being revised.

Equipment was purchased by the Florida Board of Conservation for the field survey.

The field survey was initiated by the Florida Board of Conservation. They have completed preliminary transits of the area and have begun to collect specimens.

Marine Thermal Plume Program

Cornell Aeronautical Laboratory has of yet not submitted a proposal for this study. A proposal was expected before the end of January, but it now appears it will be the first part of February.

Plans have been made to attend the thermal mapping demonstration scheduled for Tampa on February 11, 1969, by the Aerospace Systems Division of Bendix Corporation.

Sample Collection and Analysis Program

NUS Corporation submitted a proposed program in mid-January and it is currently being reviewed.

FLORIDA POWER CORPORATION

MONTHLY ENVIRONMENTAL STATUS REPORT

FEBRUARY 1969

Site Meteorology Program

On-site data collection and processing by NUS Corporation is continuing.

A failure in one of the recorders in the NUS Model 7011 dual strip chart monitoring system was experienced; however, no apparent data was lost because of the parallel operation of the NUS Model 7010 Wind Variance Computer.

Plans have been made to have NUS Corporation visit the site in March to inspect and recalibrate, if necessary, the above equipment.

Marine Ecological Program

On February 21, Florida Power granted an additional $25,000 to the Florida Board of Conservation to help underwrite the program costs for 1969. This recent grant brings the total to $50,000 for the years 1968 and 1969.

The first Progress Report, dated January 31, 1969, for the Crystal River Thermal Addition Ecological Study was received this month from the Florida Board of Conservation. The on-site studies are being conducted by Crystal River Field Laboratory, P. O. Box 276, Crystal River, Florida 32629.

The following are excerpts from this first Progress Report:

"The purposes of this study are:

1. To establish and maintain sampling procedures designed to reflect the abundance and composition of certain planktonic, pelagic and benthic marine organisms in the vicinity of the Florida Power Corporation (FPC) Crystal River electrical generating plant.

2. To establish and maintain sampling procedures designed to reflect certain chemical and physical properties of the water, soil and air in the vicinity of the plant.

3. To conduct laboratory experiments in temperature control rooms at the St. Petersburg Marine Laboratory to determine the effects of increased temperature on selected marine organisms.

4. To provide representative marine organisms to a designated agency for the purpose of determining levels of radioactivity.

5. To provide oyster and water samples for trace metal analyses in cooperation with Joe Quick, St. Petersburg Laboratory."

"Much of the first month was spent in planning and procuring supplies and equipment. One is amazed at the amount of material necessary to begin a project of the scope of this study. Because of the lack of equipment, little collecting was done. However, a considerable amount of hydrographic data was taken."

"Twenty-one sampling stations have been established in areas of different ecological conditions, at varying distances from the point of discharge. These include stations north of the Cross Florida Barge Canal and south of the intake canal which will act as controls, providing a comparison with the area more likely to be affected by the thermal addition. Sampling (where appropriate) will be by trawl, gill net, rotenone, seine, plankton tow, dredge, night light, and hook and line. Scuba and free diving will be used to survey the area visually and photographically and to collect specimens."

"Water chemistry data will include temperature, salinity, dissolved oxygen content, carbon dioxide content, and pH. Temperature will be recorded at the surface and bottom, and if thermal stratification is observed, readings will be taken at intermediate depths. Air temperature and general weather conditions will be recorded. Wind direction and velocity, rainfall and tidal data will be obtained from FPC sources."

It is Florida Power's intention to routinely excerpt statements of interest and information from the Florida Board of Conservation's Progress Reports and include them in this status report.

Marine Thermal Plume Program

Cornell Aeronautical Laboratory (CAL) submitted a proposal on February 12 to investigate the thermal patterns in the vicinity of Crystal River. Florida Power reviewed and evaluated the proposed program and concluded that it was not in total agreement with the requirements of the marine thermal plume program. Therefore, CAL was requested to re-submit a proposal based upon semi-annual air flights for gathering temperature data. These semi-annual flights will be planned to coincide with those periods of time when the ambient water temperatures are at the extremes; hence one series of flights will be in the winter, while the other will be in the summer. This new proposal is to be submitted for evaluation in March.

Two members of the Florida Power staff attended a seminar held by the Aerospace Systems Division of Bendix Corporation on February 11 in Tampa, Florida. The technique used is aerial mapping with infrared imagery. Bendix is interested in selling the "black box" equipment for use in customer's own airplane. Florida Power does not own an airplane and the problems associated with modifications to an airplane for installation of this equipment essentially preclude renting or leasing an airplane.

Sample Collection and Analysis Program

The proposed program submitted by NUS Corporation in mid-January has been reviewed. However, at this time the specifics and details have not developed sufficiently for initiation of the program.

FLORIDA POWER CORPORATION

MONTHLY ENVIRONMENTAL STATUS REPORT
MARCH 1969

Site Meteorology Program

On March 12 a representative of NUS Corporation visited the plant site to inspect and recalibrate the wind monitoring equipment.

The aerovane was removed from the tower and was found to be in good condition; it was also found to be correctly calibrated.

The optical encoder in the variance computer was found to be defective and was subsequently replaced. This apparently explains the cause of some erratic data that was recorded earlier. The system was returned to service and is currently operating properly.

A proposal to provide maintenance and calibration services for the wind recording station at semi-annual intervals was received from NUS Corporation this and is currently being evaluated.

Marine Ecological Program

Final design of the proposed sample station structures in the discharge canal was completed and approved by the Florida Board of Conservation. These structures are currently being fabricated and will be installed soon. The Florida Board of Conservation will use these structures as study sites in their effort of developing an understanding of the effects of a heated effluent on marine ecosystems.

A Progress Report, dated February 28, 1969, for the Crystal River Thermal Addition Ecological Study was received from the Florida Board of Conservation.

The following are excerpts from this report:

> "Collections were made at 16 of the 21 sampling stations. Poor weather, Jim Moore's incapacitation for almost two weeks, and the loss of a trawl caused this incomplete sampling. A 24-hour sampling at the Unit 1 screens yielded an interesting representative sample of the organisms present in the intake canal. A number of fish not previously taken were collected, as well as a surprisingly large number of squid, Lolliguncula brevis."

> "The washing, sorting, and identifying of specimens collected will cause at least a one month lag in the reporting of them. Attached are lists of invertebrates and algae collected in January. We thank Bill Lyons and his Invert Section and Jack vanBreedveld, St. Petersburg Lab, for their help in identifying these our first specimens. (The fish are currently being identified by Rod Parrish.) It is apparent that there is a diverse flora and fauna in the area, even in midwi[illegible]."

Marine Thermal Plume Program

Cornell Aeronautical Laboratory (CAL) submitted a second proposal to Florida Power Corporation this month. This proposal was thoroughly reviewed and evaluated, and was subsequently accepted. The following succintly describes the scope of the activities CAL will perform:

> "The Cornell Aeronautical Laboratory, Inc. (CAL) will furnish engineering and support effort over a period of 12 months to perform two sets of aerial IR radiometric measurements of the surface temperature of the Gulf of Mexico in the area of the existing Florida Power Corporation's power facility at Crystal River. Each set will consist of about four flights and will be performed at two mutually agreeable periods of the year. Isothermal plots will be provided after each set of flights along with descriptions of the data obtained."

The intent is to perform these measurements at those two times of the year when the ambient water temperature are at, or near, the extremes. The first set of measurements is currently scheduled for later in the month of April; although this period does not correspond to a time when the water temperature is at minimum, there are good reasons for initiating the program now. The first reason is that, as of this date, the Gulf waters have not become significantly warmed. The second and more important reason is that Crystal River Unit #1 is currently not operating due to its planned shutdown for repairs and preventative maintenance, and is not scheduled to be restarted until April 18. Therefore, an opportunity exists, somewhat fortuitously, to study thermal patterns in the vicinity of the site with no power plant units in operation. The intention is to take measurements before and after Unit #1 restarts.

The following is a brief description of the method CAL will use to obtain data:

> "A Barnes Model PRT-5 Radiation Thermometer has been mounted in CAL's Aztec aircraft to provide a capability for measuring ground and water surface temperatures remotely. Four Hasselblad Model 500EL cameras, also mounted in the aircraft, and aligned with the Barnes unit, are used to obtain aerial photographs of the surface area under study in order to permit the surface temperature data to be correlated with ground position. The calibrated output signal from the radiometer is recorded on a strip chart recorder, along with a pulse which is synchronous with the camera exposure."
>
> "The radiometer has field of view 2.5 milliradians. It uses an immersed thermistor detector which compares the infrared 8 to 14 micron radiation from the target surface to that from a controlled reference source mounted in the instrument. The instrument has an inherent accuracy of $\pm$ 0.5°C and can be used to record surface temperature data with an absolute accuracy of at least $\pm$ 1°C when

operated from a flight altitude of 500 feet or less. For collecting data from higher altitudes, a limited amount of ground temperature information must be collected so that the radiation temperature measured by the instrument can be converted to actual surface temperature. The ground measured temperature control data can be used to correct radiometer data to an accuracy of $\pm$ 0.7°C for altitudes up to 500 feet, and to $\pm$ 1°C for altitudes up to 2000 feet. The instrument has a sensitivity of $\pm$ 1°C and can be used to measure radiation temperatures in the - 20°C to + 75°C range."

Sample Collection and Analysis Program

This program is still in the development stage; however, finalization is expected to be completed before the first of June of this year. Meetings are tentatively scheduled in April with NUS Corporation and with the Division of Radiological Health, Florida State Board of Health.

The purpose of the proposed pre-operational monitoring program is to establish the pre-operational levels of radioactivity and radiation in the plant site environment against which operational contributions can be measured; in other words, the program will establish baseline levels.

The media to be sampled will include air, Gulf water, ground water, sediment from the plant discharge canal, soil from the plant periphery, beef thyroid, shellfish in or near the discharge canal, fish in or near the discharge canal, and background gamma radiation.

The sampling frequency of the pre-operational program will be based upon the expected frequency during the operational period. The sampling frequency in the operational period will be established by the concentration of radioactive materials being discharged from the plant; if the discharge activity increases, the sampling frequency will be increased, and correspondingly, if the discharge activity is low, a minimal sampling frequency will be followed.

FLORIDA POWER CORPORATION

MONTHLY ENVIRONMENTAL STATUS REPORT
APRIL 1969

Site Meteorology Program

On-site data collection and processing by NUS Corporation is continuing with a minimum of problems.

Marine Ecological Program

The collection, identification, and recording of marine biota is continuing under the auspices of the Florida Board of Conservation.

The services of the crew and boat of the Florida Board of Conservation's Crystal River Field Laboratory were used on April 17-23 to aid in the acquisition of "ground truth" temperature measurements while Cornell Aeronautical Laboratory was making several flights to gather data for thermal maps of the marine area in the site vicinity. Florida Power Corporation is very appreciative of this assistance.

In order to make their project reports more meaningful and complete, the Florida Board of Conservation has initiated quarterly progress reports in lieu of monthly reports. Therefore, this report will be presenting interesting and valuable excerpts of these reports on a similar schedule, probably with the next issue.

Marine Thermal Plume Program

On April 20-23, two members of the Florida Power Staff attended the Atomic Industrial Forum's "Workshop on Thermal Effects of Cooling Water Discharge" in Carefree, Arizona. The primary purposes of this seminar were (1) to provide timely information concerning the subject matter, and (2) to provide a meaningful and valuable dialogue between participants from electric utilities, state and federal agencies, and concerned members of the scientific community.

On April 17-23, Cornell Aeronautical Laboratory team made several aerial IR radiometric measurements of the marine waters adjacent to our site. This data will be reduced, interpreted, and presented in a format of isotherm plots. There are two variables of interest in this initial study. The first is that measurements were taken while Unit #1 was shutdown for an annual maintenance outage, and then again after the unit was restarted; therefore, data acquisition was accomplished with and without the effect of the plant. The second variable was high and low tides; measurements were taken at both these conditions.

Sample Collection and Analysis Program

This program is still being developed with the assistance of NUS Corporation. It is the intent of Florida Power to initiate this program two years prior to Crystal River Unit #3 operation; hence, we will begin data collection in the Spring of 1970.

A meeting was convened by the Division of Radiological Health, Florida State Board of Health, on April 30, in Jacksonville, Florida, concerning their Pre-Operational Sampling Program to be conducted for our nuclear plant. The purpose of this meeting was to discuss the objectives of the Division of Radiological Health's pre-operational sampling program, sample design, and other matters of interest to concerned agencies. In attendance were one or more representatives of the Florida State Board of Health, the Florida Board of Conservation, the Florida Game and Fresh Water Commission, the Florida Air and Water Pollution Control Commission, the U.S. Public Health Service, NUS Corporation, and Florida Power Corporation.

FLORIDA POWER CORPORATION

MONTHLY ENVIRONMENTAL STATUS REPORT
MAY 1969

Site Meteorology Program

On-site data collection and processing by NUS Corporation continued throughout most of this month with a minimum of problems; however, on May 28, the variance computer that is used to reduce the data experienced a failure. Unfortunately, one of the small strip chart recorders that are used for backup was out of service for maintenance. Therefore, we experienced a loss of data for a few days. The variance computer still was not in operation at the close of the month, but steps were being taken to correct the situation.

Marine Ecological Program

As reported in the April status report, the Florida Board of Conservation initiated quarterly progress reports. Florida Power Corporation indicated that we would present interesting and valuable excerpts of these reports on a similar schedule; the first of these reports has been received. It is extremely brief and simply sets the format for the next report which will be sent in mid-July and will cover May and June. Due to its briefness, the entire first report is attached.

Marine Thermal Plume Program

The aerial IR radiometric measurements made by Cornell Aeronautical Laboratory, April 17-23, are still being processed and reviewed. Hopefully, we will have something to report next month.

Sample Collection and Analysis Program

No particular effort was expended on this program this month; initiation of data collection is not scheduled until the Spring of 1970.

19 May 1969

THERMAL ADDITION REPORT FOR PERIOD ENDING 30 APRIL 1969

This is the first in a series of quarterly reports concerning the progress and functions of the thermal addition studies being conducted by the Marine Research Laboratory of the Florida Board of Conservation. This interrelated series of projects involved are two biologists at the Field Laboratory in Crystal River and the full or part time assistance of at least seven biologists at the main laboratory in St. Petersburg. Consequently, these reports will discuss the work of these areas separately.

Crystal River Field Laboratory.

A total of 21 field stations have been established and are being completed monthly. These will provide data for ecological analyses of this estuarine area before and after the increases in thermal discharge. As predicted April catches increased somewhat over those of March indicating that summer populations are beginning to appear in the area.

Plankton samples, oysters, intake screen-wash samples and algal specimens are also being collected periodically to provide additional ecological data. The analyses of some of these will be performed at St. Petersburg.

The discharge canal structures are now in construction. Upon their completion a series of tests will be initiated to determine the effect of the heated effluent on the survival growth and general biology of pertinent marine species.

St. Petersburg Laboratory.

Three large temperature controlled rooms were constructed and work was recently completed on the furnishing and outfitting of these rooms (Tanks, plumbing, etc.) They will be used to rear important marine species under different temperatures to determine physiologically and biologically the effect of elevated temperatures.

Oysters will be the first animals tested since preliminary laboratory tests have indicated that high temperatures affect certain aspects of the animals physiology. Consequently, detailed tests will be conducted to more accurately define these affects and to ascertain the means by which surviving oysters are able to adapt to new conditions.

These tests will include among others, protein and trace metal analysis of the oysters and the water in which they are living, histological analysis of gonadal conditions of the oysters throughout the tests, and an analysis of weighted incidence of parasitic species present in test oysters.

Based on results of these tests, additional studies on oysters will be initiated. Later testing will also be done on other significant marine species occurring in the Crystal River area.

FLORIDA POWER CORPORATION

QUARTERLY ENVIRONMENTAL STATUS REPORT
SEPTEMBER 1969

General

You may have noted that you have not received one of these status reports recently (the last one published was May 1969). Florida Power Corporation has decided to switch from monthly reports to quarterly reports; thus, this September report will cover our environmental program activities for June, July, and August, 1969. Our next report will cover September, October, and November, 1969, and will be published in December. Hence, you can look for reports in March, June, September, and December.

The primary reason for changing from a monthly to a quarterly report is the fact that not enough substantial progress takes place during the course of a month's time to warrant the manpower effort required to prepare a monthly report. A secondary reason is that a quarterly report will coincide nicely with the quarterly reports that Florida Power receives from the Department of Natural Resources on the Marine Ecological Program.

Site Meteorology Program

The on-site data collection and processing by NUS Corporation continued during this past quarter; however, unfortunately, we have experienced considerable problems due to frequent failure of the automatic data-collecting equipment. An investigation of data obtained on back-up instrumentation is currently in progress to determine how much information, if any, has been lost. We now have collected data for one complete year, and are to receive an annual report from NUS Corporation with analyses by seasons.

Marine Ecological Program

This program is currently in full swing as is evidenced by the attached, complete copy of the "Quarterly Thermal Addition Report to Florida Power Corporation for the Period of May and June". This report is written by the Marine Research Laboratory, Bureau of Marine Research and Technology, Division of Marine Resources, Department of Natural Resources (formerly the Florida Board of Conservation).

Marine Thermal Plume Program

Cornell Aeronautical Laboratory (CAL) has submitted five sets of isothermal plots indicating the results of the aerial IR radiometric measurements performed on April 17-23, 1969, in the Gulf waters adjacent to the site.

Additional aerial IR flights were performed by CAL during late July when the ambient temperature of the water was at or near its maximum level. CAL is currently reducing the data obtained from these recent flights. The isothermal plot format will also be used for these new measurements.

We have not yet attempted to interpret or draw any conclusions from the measurements that have been taken. It is our intention to wait for the latest set of results from CAL, and then to analyze the information in order to develop a clear understanding of what is occurring due to the presence of the power plant. At the same time, we will critique the aerial IR measurement technique to see if it is the proper method to acquire the information we require.

Sample Collection and Analysis Program

No effort was expended on this program during this quarter because initiation of this program is not scheduled until the Spring of 1970. Activity, however, will increase markedly during this next quarter in order to meet our anticipated schedule.

QUARTERLY THERMAL ADDITION REPORT

TO

FLORIDA POWER CORPORATION

FOR THE PERIOD OF MAY AND JUNE

JULY 1969

Ref: 18-5-2

CRYSTAL RIVER [illegible] BORATORY

The 21 permanent systematic biological sampling stations were sampled on schedule in May and June. Conditions continue to change slightly as air and water temperature increases. The most notable changes thus far have been an increase in the abundance of algae and a general increase in the numbers of species and abundance of all animals.

Preliminary comparison of plankton samples taken each month at the intake and discharge points indicated that smaller plankton and larval forms may survive the trip through the condenser. The larger planktonic forms however were killed.

The 24 hour screen wash sample was completed each month. The apparent correlation between the presence of a barge in the intake canal and a large screen wash catch was verified in the May sampling. Very few specimens were taken during the first six hours of monitoring prior to the barge's arrival. The catch increased considerably while the water was muddied and then decreased again as the muddy water was pumped through the plant and removed. There was no barge

activity during the June sample and the screen wash catch was small.

Monthly oyster samples were taken and prepared for trace metal analysis. The results on one of these tests indicated high copper content in oysters taken from the discharge canal, and efforts are being made to determine the source of contamination.

The structures in the discharge canal were completed by F.P.C. construction site personnel and oyster strings, buckets of oyster cultch and wire and wooden crab traps were hung on them. The control structure in the intake canal has not yet been completed. Oyster set on these cultch materials has been negligible but marine fouling organisms, primarily barnacles, have attached in large numbers throughout the canal.

A rotenone station was also established and sampled in June. A small ditch leading into the discharge canal was blocked off and treated with rotenone to provide a more complete catch of the species present.

Temperature monitoring of intake and effluent canal continued as time permitted. All in all sampling progressed quite well during these two months and analysis is continuing at the field laboratory and in the St. Petersburg

facilities. Some problems were encountered during a workmen's strike at the power plant but these were relatively minor. A more difficult situation has been unavoidably created by the planned moving of the building which houses the field laboratory. The building is still in parts and several days were spent without power causing delays in some analyses. This move will soon be completed however, and activities will return to normal.

ST. PETERSBURG LABORATORY

Controlled temperature studies.

The first preliminary experiment utilizing the temperature controlled rooms at St. Petersburg was completed. Certain problems were encountered as expected but important results were obtained and are being considered in the planned repetition of this first test.

Oysters were collected and initial tests including water chemistry, glycogen, organic nitrogen, lipid and ash analyses, determination of the presence and abundance of fungal parasites, histological examinations of gonadal tissue and pesticide analyses were performed. The remaining oysters were then divided into three groups and each placed in a temperature controlled room. The first room was preset at 35°C and the oysters were placed directly into this heated

water.

The second and third groups of oysters were placed in their respective rooms which were preset at 25°C. The second room was slowly raised to 35°C while the third was held at 25°C to serve as a control.

All analyses were continued at intervals throughout the test.

Some minor problems occurred in the pumping and heating systems and certain electrical modifications were shown to be necessary during this test. These problems are being corrected and will be completed prior to the next test. Thus one of the main objectives of this first study (to test the equipment under full operation) has been completed.

Although some biological analyses are still in progress, interesting results have been obtained. 1) Mortality rates in both 35°C rooms were quite high while those in the control tank exhibited good survival. 2) Initial tests for fungal parasites showed low incidence in all oysters. However, in both 35°C tanks, at the end of the experiment, incidence and abundance were greatly increased and tests indicated that some of the mortality had probably been caused by these parasites. 3) The oysters showed a relatively high chlordane content after the tests. We are now checking on possible sources of this contamination. 4) The loss of both wet and

dry weights in the 35° rooms indicate that protein may have been utilized more rapidly than glycogen (which also showed decreases in these rooms). This possibly is in agreement with earlier experiments in 1968. 5) Lipid and ash content also declined in the 35°C rooms indicating a rapid lipid utilization.

Algal identification.

Identification and recording of the algal species and abundance is continuing on a monthly basis. The algae are collected as a part of the systematic sampling program and Mr. Jack van Breedveld of our staff, and Dr. C. Dawes of the University of South Florida make the identifications. They also take regular trips to Crystal River to observe the conditions of algal growth first hand. This is usually accomplished through observations using SCUBA equipment.

SUBMITTED BY,

Edwin A. Joyce, Jr.

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FLORIDA POWER CORPORATION

I Rev. 3/12/69
II Rev. 4/1/69
III Rev. 9/2/69

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