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12 CONDUCT OF OPERATIONS

12.1 ORGANIZATION AND RESPONSIBILITY

12.1.1 FUNCTIONAL DESCRIPTION

The Production Department of Florida Power Corporation is responsible for all electric generating plant operations. Centralized control over these operations rests with the Production Superintendent whose offices are at the headquarters in St. Petersburg, Florida. The Production Superintendent reports to the Vice President--Power, and also has direct access to the Mechanical Engineering Department and its special consultants.

Each generating plant functions as an independent unit with support and assistance from the headquarters office staff or its consultants, as required. Reporting to the Production Superintendent through the Assistant Production Superintendent, each plant superintendent is responsible for the safe, reliable, and efficient operation of his plant. This organization is shown by Figures 12-1 and 12-2.

The Crystal River Plant Unit 3 organization, as shown by Figure 12-3, will consist of about 59 full-time employees functioning in four main groups: Supervision, Operation, Maintenance, and Technical Support. | 5

The normal operating shift will consist of one Shift Supervisor, one Watch Engineer, one Control Center Operator, one assistant Control Center Operator, and one Equipment Operator. The Shift Supervisors will report to the Operations Engineer. The operation group consists of about 26 employees.

The maintenance group will consist of about 15 men experienced in mechanical and electrical maintenance of large steam-electric generating plants and/or nuclear plants, under the supervision of the Maintenance Engineer. This number of men will be adequate for normal maintenance, but will be supplemented by additional competent maintenance personnel when maintenance schedule requires from our system maintenance crew, other plants' maintenance crews or outside contractors' personnel for major maintenance projects.

The Technical Support Group will consist of a staff of about 15 engineers and technicians who will function in the areas of reactor physics, health physics, conventional chemistry, radiochemistry, radiological protection, overall reactor coolant systems (normal and emergency), instrument and control maintenance, and plant performance. | 5

The initial startup, including initial core loading, initial criticality, approach to full power, commercial operation, and acceptance testing will be performed under the control and direction of FPC's Mechanical Engineering Department, using personnel from FPC's Production Department and technical assistance from GAI, and B&W. The personnel assigned to the plant and their responsibilities will be essentially the same for both start-up and regular operation, except that additional personnel may be assigned at any time to the plant for operational training purposes.

12.1.2 QUALIFICATIONS

All of the supervisory positions for Unit 3 will be filled with men who have had extensive operating and maintenance experience in fossil fueled steam-electric generating plants, and who will be given additional specific nuclear education and training. Section 12.2 gives the details of this training program and methods for qualifying plant personnel. The Plant Organization Chart (Figure 12-3) shows established qualifications by positions. | 5

12.1.3 ORGANIZATION DIAGRAM

A diagram showing the organization of the Production Department is included as Figures 12-1 and 12-2. A diagram showing the organization of the Crystal River Nuclear Plant is included as Figure 12-3. For a description of the organization, see 12.1. The lines of responsibility for control and review of operations are discussed in Section 12.5.

12.2 TRAINING

12.2.1 PLANT STAFF

A group of three FPC Engineers are in undergraduate training at the University of Florida in nuclear engineering prior to assumption of engineering supervisory responsibilities in the Crystal River Plant. | 1

A nuclear engineering indoctrination course (42 hours of instruction) was presented to 33 engineering, operating, and administrative personnel, and a similar course (35 hours of instruction) was presented to an additional 70 engineering, operating, and administrative personnel. A college level course in Nuclear Engineering will be presented to some 20 engineers directly involved with design and/or operating technology.

Special nuclear engineering courses will be conducted to provide engineering instruction to all engineers staffing the Plant. This training will be conducted by B&W's nuclear engineering staff and will include courses in basic reactor physics, basic reactor heat transfer and fluid flow, nuclear plant design features and systems, reactor vessels, fuel and control rods, steam generators, reactor operation, reactor auxiliary systems, safety analysis, fresh and spent fuel handling, nuclear fuel cycles, instrumentation and controls, normal and emergency power systems, and precritical startup and power operational testing.

The program for training the personnel on the Nuclear Plant staff is designed to meet the needs of each person chosen, depending upon his educational background, operating experience, previous training, and job responsibilities.

Supervisory and operating personnel assigned to the Crystal River Plant will participate in the training program designed to prepare these people for licensing in accordance with the AEC requirements. This training program is a cooperative effort with instruction by FPC, B&W, and the University of Florida, Department of Nuclear Engineering.

Many of the engineering and supervisory staff who received early education and training in the nuclear plant design and operation will serve as instructors for training plant operating personnel.

The various phases of the program are as follows:

Phase 1 - Theoretical Training

This phase of the program provides a "refresher" and basic foundation for the understanding of nuclear engineering and reactor theory. The course material and classroom hours of instruction are outlined below:

Subject Matter	Estimated Time, Hr.
Arithmetic	15
College Algebra	30
Trigonometry	15
Introduction to Calculus	60
Atomic Physics	60
Reactor Physics	90
Heat Transfer and Fluid Flow	75
Introduction to Nuclear Instrumentation	30
Shielding	30
Health Physics and Radiation Safety	30

Phase 2 - Nuclear Plant Operation Training

All operator trainees who have not had extensive recent experience at a nuclear power plant, and who will be licensed for initial fuel loading and startup of the new unit, will be sent to the University of Florida Training Reactor Facility for a two-week introductory course in reactor operation. A selected group from the operator trainees will then be sent to an operating nuclear plant for training in operation. The plant selected will have, if possible, a reactor similar to the B&W unit for which they will ultimately be licensed. This phase of training will provide about six months' residence at the operating plant. During this period the trainees will become completely familiar with the plant systems and participate in operations to the extent that they will become qualified to take an AEC operator's examination.

Phase 3 - Nuclear Plant Design Training

This phase of the program is conducted at the B&W facilities at Lynchburg, Virginia, for a period of about two months. It includes instruction in details of design and operation of the reactor system furnished by B&W.

B&W's training services include a concentrated eight-week curriculum designed specifically for the nuclear steam supply system being supplied. B&W's research and development facilities are also available for specialized fundamental training in areas of operation peculiar to the nuclear power plant, such as startup, physics, radiochemistry, and health physics.

Phase 4 - On-the-Job Training

After they have completed Phase 3, all trainees report to the plant site to begin on-the-job training. Here the B&W Training Coordinator begins an

intensive qualification program for each individual trainee. He will be assisted by B&W Company engineers and scientists who are at the site for the startup of the nuclear plant, and he may call in specialists from B&W facilities as required for the training. First, the trainees familiarize themselves with the physical layout and characteristics of the plant. B&W engineers and scientists will come to the Crys ... River Plant site, where they will work with the trainees on preparation of technical specifications, testing and operating procedures, performance of the test program and initial operation, and final preparation of the operators for the AEC licensing examinations.

When construction of the equipment and system is completed, the trainees will begin precritical testing under the guidance of the B&W engineers. After the reactor coolant system hydrotest, an integrated nuclear system hot functional test begins. At this time, about four months before fuel loading, the operating staff will be organized into shifts to begin around-the-clock operation of the plant. This period will afford the trainees a chance to familiarize themselves with most of the operating characteristics of the nuclear plant and with the normal operating routines and emergency operating procedures. Concurrent with the testing program outlined above, the Training Coordinator, through group and individual instruction, will have trained each man in all the facets of nuclear plant operation.

Finally, about two months before fuel loading, an intensive review session will be held with the men to be licensed. This will be their final training phase before being examined. Sample Reactor Operator and Senior Reactor Operator written examinations will be given, graded, and reviewed. The trainees take simulated operating tests, "walk-throughs" (oral examinations during tours of the operating areas of the plant), and "startups" (oral examinations given while operating in the control room). Since these tests simulate the process used by the AEC licensing examiners, the trainees should be well prepared for the license examinations, which is expected to be given about one month before fuel loading is scheduled to take place.

Approximately one month before initial fuel handling at the plant site, all Engineers requiring senior operator's licenses, all Shift Supervisors, and all Watch Engineers will be examined for receipt of "cold" licenses, in accordance with 10 CFR Section 55.25. This will provide a minimum of two licensed operators on each shift at all times during initial core loading through pre-critical operation testing, and into the initial commercial operation of the unit. The five licensed engineers will provide back-up for these initially licensed operators, as required.

The remaining operator trainees will have completed the written requirements of their licenses, and will receive their operational training during the first few months of commercial operation, after which they will take "operating test walk through" examinations for their operator licenses.

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Although the formal training program will end with the successful licensing of the operators, B&W engineers and specialists will continue to work with the operating staff throughout the fueling and startup phases until commercial operation is achieved. Training requirements for the various personnel classifications are shown below.

Training Requirements for Various Personnel Classifications

Classification	Training Phases
Plant Superintendent Assistant Plant Superintendent Technical Support Engineer Operations Engineer	Abbreviated 1; complete 2, 3, 4
Nuclear Engineer Assistant Nuclear Engineer	2, 3, 4
Shift Supervisor Watch Engineer	1, 2, 3, 4
Control Center Operator Assistant Control Center Operator	1, 2, 3, 4 (Power Reactor Operation Training After Plant goes into service)
Equipment Operator	1, 2, 3 (2 & 3 obtained on site during testing and after plant goes into service)
Chemistry and Radiation Protection Engineer	Abbreviated 1, 2; complete 3, specialized radiochemistry and health physics training
Health Physicists and Lab Men	Abbreviated 1; and specialized radiochemistry and health physics training
Instrumentation and Control Supervisor Maintenance Engineer	Abbreviated 1, 2; complete 3, 4

All personnel assigned to the Nuclear Plant in both operating and maintenance will be given training in radiation safety and procedures. Electrical, mechanical, and instrument and control maintenance personnel will receive specialized training relating to their job requirements. The scheduling of the various phases of operator training is shown in Figure 12-4.

12.2.2 REPLACEMENT PERSONNEL

During the normal operation of Crystal River Units 3 and 4, extra engineering, operating, and maintenance personnel may be assigned to the plant specifically

for training purposes, since it is expected that our Company will continue to add nuclear units to its system in the future. These men, as needed, will be drawn from other FPC facilities or employed directly into the organization at the plant. The training program for replacement personnel will cover the same material and basic program used for the training of the original personnel but will be conducted by the plant staff with outside assistance as required using our operating reactor for Phase 2.

12.2.3 ON-THE-JOB TRAINING

This section is covered by Phase 4 of the training program under 12.2.1.

12.2.4 EMERGENCY PLANS

As part of the overall program of developing plant procedures, an emergency plan will be developed prior to operation. The plan will cover emergencies such as fire, medical, injury and illness, radiation and contamination accidents, and other conditions that may result from operational malfunctions and natural disasters. Insofar as possible, the plant will be self-sufficient in handling emergency conditions but outside agencies such as the Florida Highway Patrol, U. S. Coast Guard, U. S. Corp of Engineers, local authorities, and the AEC, etc., will be called upon as needed. Alerting procedures will be included in the plan so as to quickly bring these forces into active assistance.

The Shift Supervisor on duty shall have the authority and responsibility to initiate any and all emergency plans which, in his judgment, are necessary. In the event the Shift Supervisor is incapacitated, then the next Senior Supervisor on duty shall carry out these responsibilities. The radio chemistry laboratory will be equipped with all necessary instrumentation and equipment needed to handle a radiation emergency. In addition, emergency monitoring kits will be placed throughout the station at predetermined locations. These kits will be inspected and used during periodic drills. Each individual assigned to Crystal River Plant will have written copy of his specific duty to be performed during the radiation emergency plan.

Training programs will be established and executed to insure that all selected personnel assigned to emergency monitoring squads have a working knowledge of health physics procedures and use of radiation instruments.

In the event the emergency involves a possible release of radioactivity to the environment, the first action which the operating personnel will take is to shutdown and secure the plant, if it has not by means of automatic protective and safety systems, been shutdown. In the event of the radiation accident, the shift supervisor will communicate with the Florida State Highway Patrol, which in turn has the responsibility as described in general order #36 to communicate with the necessary emergency teams, the general public, and local authorities to set the radiological emergency plan into motion. Coincidental with the securing of the plant, the plan for the evacuation of plant personnel and visitors will be initiated. Only designated key personnel and shift workers required for the emergency operation will be retained at the site. All evacuees will be surveyed by an emergency radiation monitor prior to leaving the plant boundary. All personnel remaining in the plant to perform emergency operating procedures will be surveyed for possible contamination.

Normal communication networks from Crystal River Plant include Florida Power Corporation microwave network, and the Florida Telephone Company network. In addition, we anticipate that the FCC regulations for electric power industry communication emergency program will be implimented. This program will provide emergency communication networks between all utility companies and within all utility companies and will include communication to the Civil Defense, and the Defense Electric Power Administration. At present EPICEP is in a formulative stage and is being reviewed by a Task Force of the EEI. In the event that the EPICEP is not in effect at the time Crystal River Unit 3 goes into operation, Florida Power Corporation will install a base radio station at Crystal River Plant with emergency power supply, and with a capability of communicating to stations in Ocala, Fort White, and Crystal River, and radio equipped vehicles within range. 1

All plant personnel will be thoroughly familiar with the radiation emergency plan. Periodic drills will be held to insure that all station personnel have a working knowledge of action required of them by the radiation emergency plan. All outside agencies included in the plan will be informed of their expected roles in an emergency situation. Communications will be routinely tested.

12.2.5 PROCEDURES APPLICABLE TO ACCIDENTS INVOLVING RADIOACTIVE MATERIALS

The State of Florida's Department of Public Safety has a specific plan (General Order No. 36), which became effective on November 2, 1965, to provide for the handling of peacetime radiation emergencies. See Appendix 12-A for current details on this procedure relevant to Crystal River Plant Units 3 & 4. Florida Power Corporation's Safety Department is developing supplementary specific plans with the Florida Department of Public Safety for procedures during an emergency situation.

12.2.5.1 MARINE PROCEDURES

The United States Coast Guard Base at St. Petersburg, Florida, has advised FPC that the U. S. Coast Guard has jurisdiction over and is capable and ready to render assistance in the event of a radiation incident at the Crystal River Plant site. Their primary area of responsibility is the 33 square miles of water within the five-mile radius surrounding the plant, including a portion of the Gulf of Mexico and the Cross Florida Barge Canal.

Although a specific procedure is not presently established for Coast Guard action in the event of a radiation incident, Florida Power Corporation is assured that such procedures can and will be established as required to assure protection of boating activities, including aerial police assistance in the area. The St. Petersburg base with its seaplane and helicopter group is less than one hour flying time from the plant site. 1

12.3 WRITTEN PROCEDURES

Written procedures will be prepared and periodically reviewed and revised as necessary to cover both normal and emergency plant operating conditions. These procedures will include required actions for all credible abnormal situations. The emergency procedures will include those applicable to accidents which might conceivably result in a radioactive release beyond the site boundary.

12.4 RECORDS

Florida Power Corporation's regular system of record keeping, with amendments and additions as necessary, will be utilized at the Crystal River Plant Units 3 and 4. These records include personnel radiation history operating reports, maintenance files, operation log books and log sheets (both manual and recorder), and other necessary records to verify time and activities for all plant operations.

12.5 ADMINISTRATIVE CONTROL

Administrative controls will be established to assure that all operations, maintenance procedures, tests, and emergencies will be handled in accordance with the written procedures which have been reviewed and approved by established authorities. The Nuclear Plant Superintendent has the responsibility and authority to operate the plant within the limits of the administrative controls.

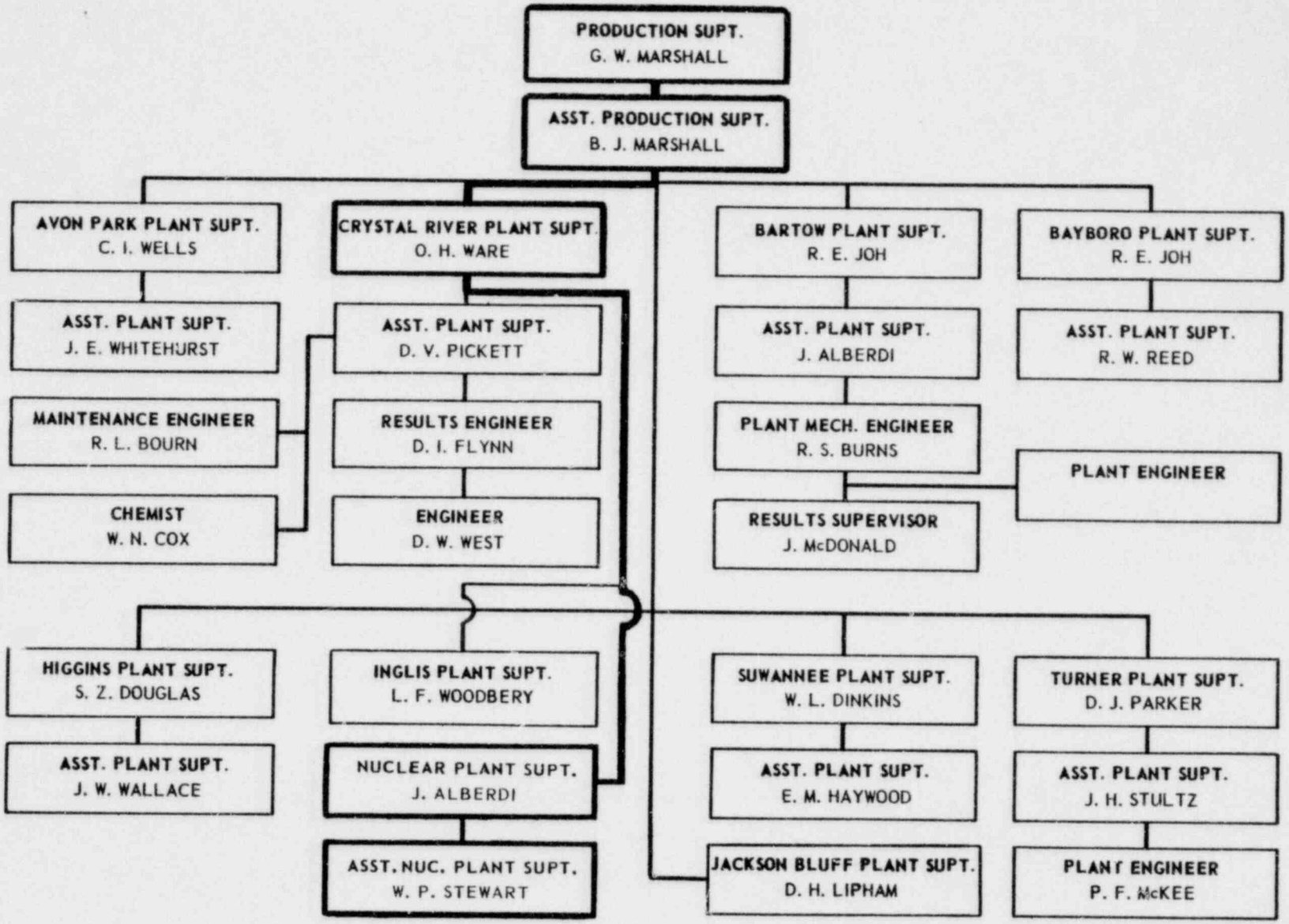
A Nuclear Operating Review Board, consisting of Power Department engineering personnel and outside consultants, as required, will be permanently created to meet periodically and review normal operations and written procedures to assure safe continuous operation and preclude any occurrence which might result in release of radioactive material to the environment. This Group also will review every abnormal occurrence or departure from the technical specifications to determine its cause and will make recommendations to the Production Superintendent, prior to any changes being made. When appropriate, other knowledgeable departments of FPC and/or the AEC will be consulted.

Administrative controls will also be established for review and approval of proposed changes prior to any changes to the physical plant being made. These controls will follow the same administrative channels as outlined in the preceding paragraphs for control of procedures.

A daily review of Crystal River Plant Units 3 and 4 operating logs, charts, and other data will be made by engineers and technicians in the Technical Support Group in order to insure that the plant is being operated in a safe and efficient manner.

In addition to these reviews, periodic plant staff meetings will be held to keep all operating personnel advised of current conditions in the plant.

The Nuclear Operating Review Board will be available to review any unusual operating data, if this is ever required. In addition, Production Department engineering personnel will make periodic visits to the plant to review operations and assist with any problems which might arise.

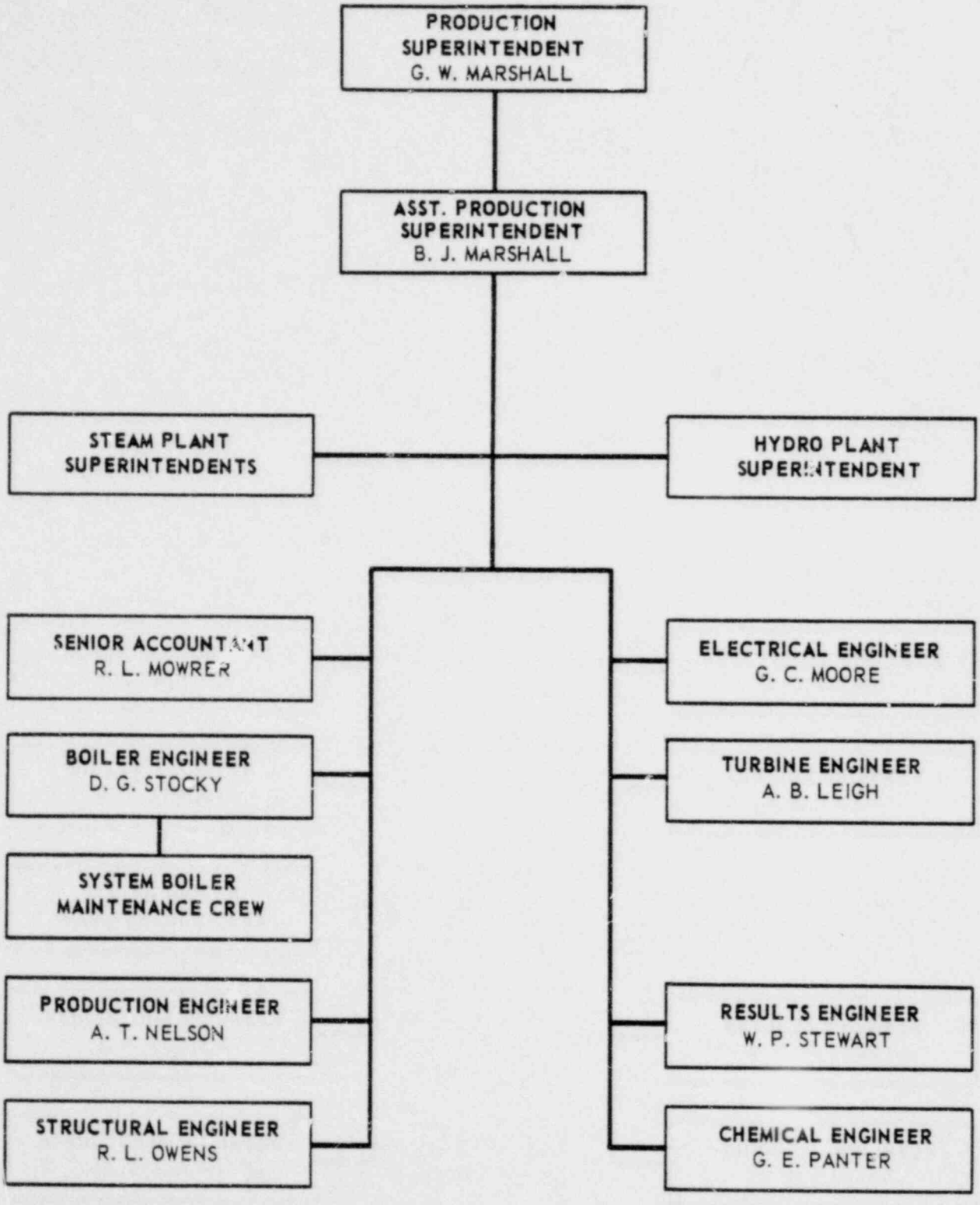


PRODUCTION DEPARTMENT
PLANT SUPERVISORY PERSONNEL
CRYSTAL RIVER UNIT 3

FPC FLORIDA POWER CORPORATION

FIGURE 12-1

AMEND. 5 (4-8-68)



PRODUCTION DEPARTMENT ORGANIZATION CHART

CRYSTAL RIVER UNITS 3 & 4

FLORIDA POWER CORPORATION

FIGURE 12-2

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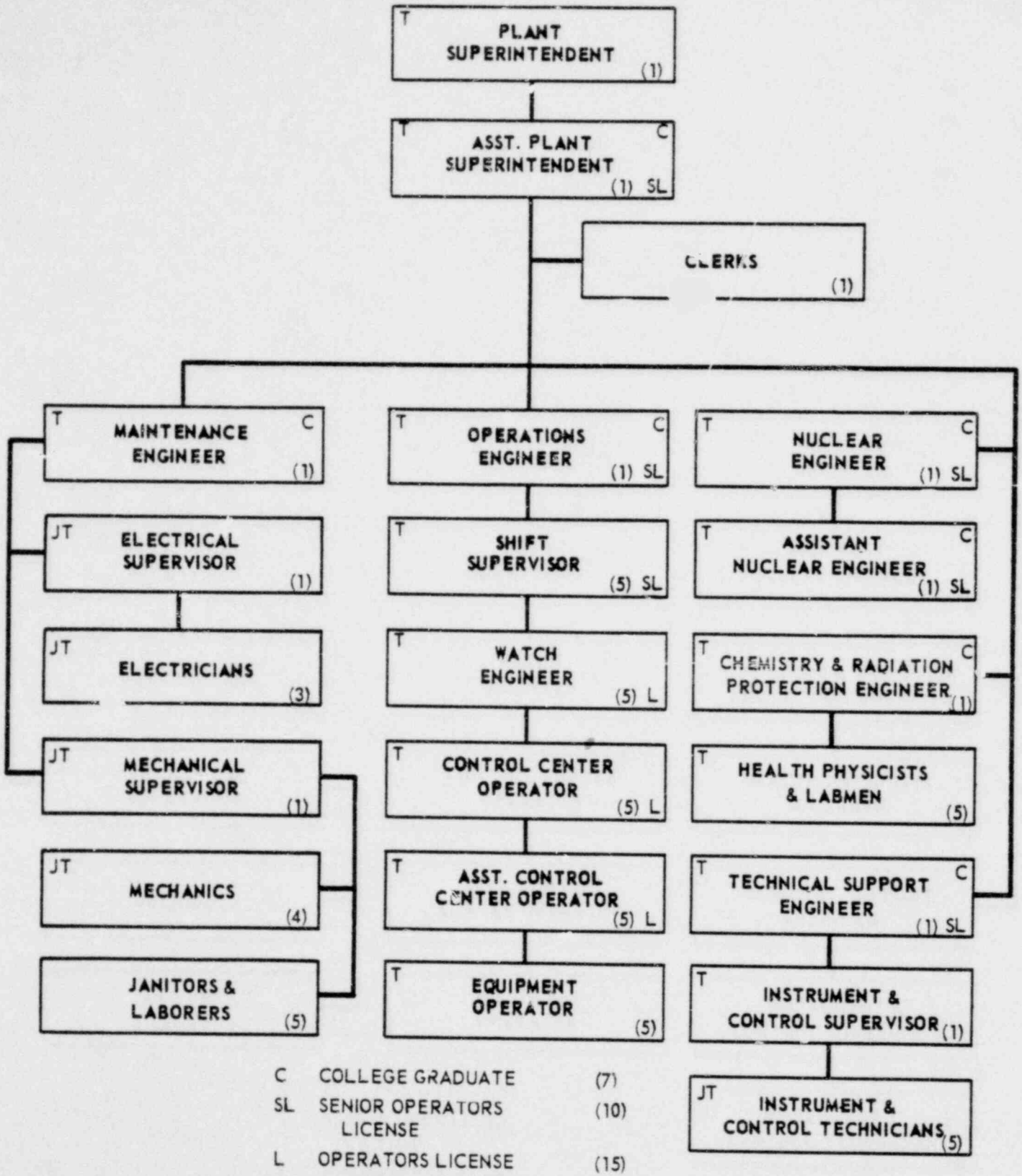

C	COLLEGE GRADUATE	(7)
SL	SENIOR OPERATORS LICENSE	(10)
L	OPERATORS LICENSE	(15)
T	PARTICIPANT IN TRAINING PROGRAM	(39)
JT	PARTICIPATE IN JOB RELATED TRAINING	(14)
	TOTAL STAFF	(59)

( ) NUMBER IN CLASSIFICATION

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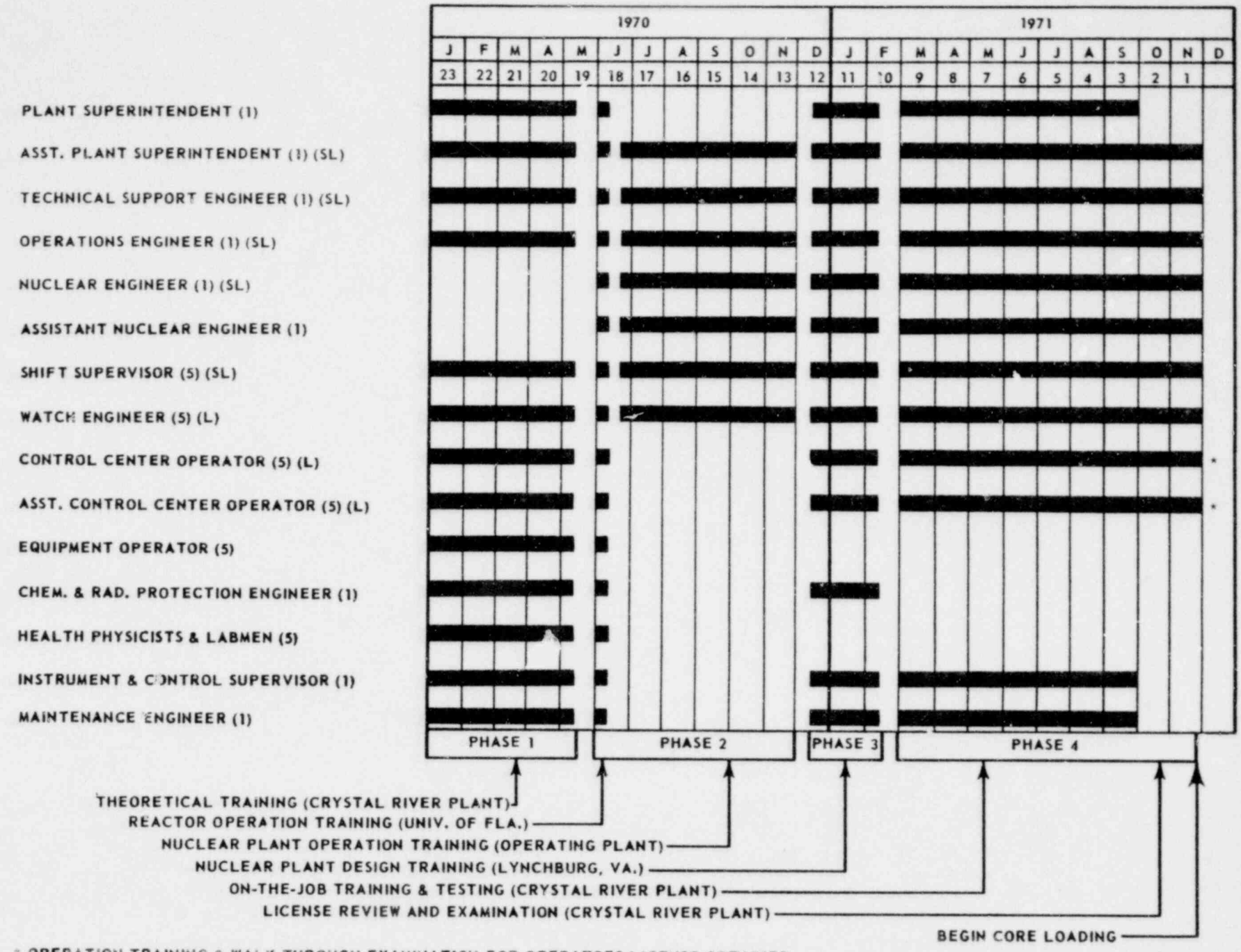
PLANT ORGANIZATION CHART

CRYSTAL RIVER UNITS 3 & 4

FLORIDA POWER CORPORATION

FIGURE 12-3

AMEND. 3 (3-1-68)



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TRAINING SCHEDULE

CRYSTAL RIVER UNITS 3 & 4

FPC FLORIDA POWER CORPORATION

FIGURE 12-4