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ORIGINAL
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Florida Power
CORPORATION

BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NO. 970261-EI

In Re: Review of Nuclear Outage at Florida Power Corporation's Crystal River Unit No. 3

DIRECT TESTIMONY OF RALPH G. BIRD

For Filing April 14, 1997

FLORIDA POWER CORPORATION

DOCKET NO. 970261-EI

DIRECT TESTIMONY OF
RALPH G. BIRD

1. <u>BACKGROUND</u>

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. Ralph G. Bird, P.O. Box 20328, Jackson, Wyoming 83001.

Q. PLEASE SUMMARIZE YOUR PROFESSIONAL EDUCATION, QUALIFICATIONS AND EXPERIENCE.

A. I retired in January 1992 from Boston Edison Company where I was Executive Vice President, responsible for nuclear and fossil electrical generation and for electrical transmission and distribution, including operation, maintenance, engineering and stores. The areas for which I was responsible included about 3500 Boston Edison employees. In 1991 I was also a member of the Board of Directors of Boston Edison Company.

During 1992 and subsequent years, I have been a member of the Board of Directors of a uranium processing company and I have served as a consultant to several electric utilities that have nuclear power plants.

Before being promoted to Executive Vice President, I was Senior Vice President-Nuclear at Boston Edison from early 1987 to December 1990. In that position I was the highest ranking nuclear executive in Boston Edison and was responsible for all aspects of the operation of the Pilgrim Nuclear Power Station and for the nuclear engineering and nuclear support functions. I was hired after the Pilgrim Station had entered a major outage.

The management team which I assembled and led completed the outage and restored Pilgrim Station to service during a period of intense oversight by the Nuclear Regulatory Commission (NRC).

Before joining Boston Edison, I served as an officer in the U.S. Navy. I graduated with distinction from the United States Naval Academy with a Bachelor of Science Degree in Engineering in 1956. In 1970 I received a Master's Degree in Computer Systems Management from the U.S. Naval Postgraduate School in Monterey, California. I retired from the Navy in 1984 as a Rear Admiral after spending most of my career in nuclear powered submarines. After leaving the Navy and before joining Boston Edison, I was a consultant at Pressurized Water Reactor (PWR) and Boiling Water Reactor (BWR) nuclear power plants.

My Navy experience included a number of assignments, all of which included responsibilities for leadership and management. I was commanding officer of a nuclear powered submarine and later served as Chief of Staff of the U.S. Pacific Submarine Force. I also served as senior member of the Pacific Fleet Nuclear Propulsion Examining Board where, with a small team of officers, I was responsible for an annual examination of each of about fifty naval nuclear propulsion plants in the Pacific Fleet to determine whether to certify them safe for continued operation.

My background also includes other training activities, safety evaluations, and personnel and material support. As a naval officer,I was continually involved in training my officers and crew. I was also involved in establishing the Chief of Naval Operations' Senior Officer Ship Material Readiness Course. The objective of the course was to teach admirals and senior captains who were enroute to major command assignments about oil-fired propulsion plant operation and maintenance. The course was intended to apply lessons learned in nuclear powered ships to improve the performance of the rest of the fleet. I helped to devise the curriculum and served as Senior Instructor for the first three classes.

A copy of my resume is attached as Exhibit No. ____ (RGB-1).

II. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS CASE?

A. The purpose of my testimony is to evaluate the reasonableness of management actions leading up to the initiation of the current outage at Crystal River 3.

III. STANDARD AND METHODOLOGY OF REVIEW

Q. HOW DID YOU DETERMINE WHAT INFORMATION TO USE IN PERFORMING YOUR EVALUATION?

A. The test of reasonableness is the standard of care which a reasonable person would be expected to exercise under the same conditions encountered by management at the time decisions had to be made. Therefore, I have identified actions which were taken by management and considered information which was known to, or reasonably should have been known to, management at the time they were making decisions.

Q. PLEASE COMMENT ON THE USE OF HINDSIGHT IN AN EVALUATION OF THE REASONABLENESS OF NUCLEAR POWER OPERATIONS.

A. In order to evaluate whether actions taken and decisions made were reasonable, it is necessary to consider those actions and decisions in light of what was known at the time. In this regard, it should be noted that there may be multiple, reasonable courses of action available. External evaluations utilizing hindsight, that is, based on results achieved or upon information which could reasonably become known only after decisions were made, are not appropriate for an evaluation of reasonableness, and I have not considered them for this purpose. The same is true of self-critical evaluations conducted by management as part of developing improvement plans. Self-assessments throughout the commercial nuclear power industry typically use harsh, critical language to focus attention on areas where improvements can be made. These evaluations are conducted using hindsight to identify things which might have been done better, and the results of such evaluations are often used to help formulate plans for future improvements. Thus, the existence of such self-critical assessments is not an indication of prior mismanagement. To the contrary, such self-assessments are one of the characteristics of good nuclear power plant management.

Q. WHAT METHODOLOGY DID YOU USE IN PERFORMING YOUR EVALUATION?

A. The methodology included review of documentation from both internal and external sources relating to the performance of Crystal River 3 before the current outage. I have toured the plant and inspected some of the equipment important to this evaluation as well as observed the general condition of the plant and facilities. I held discussions with knowledgeable Florida Power Corporation (FPC) employees, including corporate officials, plant management, engineering and operations personnel. The information obtained in this review was then evaluated using the knowledge and experience which I have gained in about thirty years of experience in management of both naval and commercial nuclear power plants.

Q. PLEASE COMMENT ON THE REASON FOR VISITING THE PLANT AS PART OF YOUR EVALUATION.

A. A personal inspection of a plant can be useful in reaching conclusions about management of that plant. Based on many years of inspecting both naval and commercial plants, I have found that first-hand observation of the affected equipment and areas can help one understand some of the factors which may have influenced decisions which were made. Further, changes in a large enterprise such as a commercial nuclear power plant take time. The present state of a plant is a good indicator of conditions which existed in the recent past.

IV. PRINCIPLES OF MANAGEMENT

Q. PLEASE DESCRIBE, BASED ON YOUR EXPERIENCE, THE PRINCIPLES APPLICABLE TO MANAGEMENT OF NUCLEAR POWER OPERATIONS.

A. Management of nuclear power plant operations should be based on the following principles:

1) Nuclear reactor safety is the paramount consideration in management decisions regarding a nuclear power plant.

2) Managers achieve rising standards of performance by selecting and prioritizing a limited number of good ideas for analysis and implementation.

3) Managers use retrospective self-critical assessments and external assessments in order to pursue continuing improvement in operations.

4) Managers properly balance the multiple demands of safety, production and economics to meet their fiduciary responsibilities.

5) Management is an iterative process.

Q. PLEASE ELABORATE ON THE IMPORTANCE OF SAFETY IN MANAGING A NUCLEAR POWER PLANT.

A. A nuclear power plant differs from other power plants, and from most other industrial enterprises, in one important respect. A nuclear power plant contains radioactivity which, if things go wrong, could create a health hazard for the general public as well as for the workers inside the plant. This fact has resulted in the responsibility of the NRC to develop and enforce regulations designed to protect the health and safety of the public and to oversee the safe operation of U. S. commercial nuclear power plants. This fact has also resulted in the industry-wide desire of managers to operate well above the minimum standards of safety, in the philosophy of defense in depth in nuclear operations and in the accepted philosophy of conservatism and care in the management of nuclear power plants. Defense in depth is the philosophy of maintaining multiple independent barriers against radiation release to minimize the potential for and consequences of severe accidents. The philosophy of conservatism and care can cause a manager with responsibility for nuclear plant operation to sometimes decide to shut down a plant even when operation could continue under the governing regulations and standards in order to assure a continuing large margin of nuclear reactor safety and to seek reliable future operation, or to extend an outage for the same reasons. In my personal experience as a manager with responsibility for nuclear plants, I have initiated or extended outages for these reasons.

Q. PLEASE EXPLAIN THE RISING STANDARDS IN NUCLEAR POWER OPERATION TO WHICH MANAGERS MUST RESPOND.

A. Rising standards are a fact of life in the U. S. commercial nuclear power industry. The NRC employs rising standards. This has occurred through changes in regulation, in regulatory guidance, and in interpretation and emphasis in NRC inspection and enforcement activities. Examples include improvements in fire protection, the development and use of probabilistic risk assessments, content and recoverability of design bases information, and depth and content of safety evaluations. These rising standards tend to be event-driven; that is, they evolve in response to an untoward event which occurs somewhere in the industry, and thus often cannot be anticipated.

The nuclear power industry has recognized that the health and safety of the public is best served by striving for excellence in all aspects of nuclear power operations, rather than simply complying with regulations. To this end, the industry sets goals reflecting the best practices and performance in the industry.

In their efforts to achieve rising standards of performance, nuclear managers solicit ideas for improvement from their staffs and then select and prioritize a limited number of many available good ideas for further assessment and implementation. Reasonable managers do not try to do everything at once.

Q. PLEASE GIVE AN EXAMPLE OF THE IMPORTANCE OF MANAGEMENT SELECTING ONLY A LIMITED NUMBER OF IDEAS.

A. One of the responsibilities of management is to appropriately prioritize actions to be taken. Resources will always be finite.

Trying to do too much can overload an organization and can cause failure to meet the most important safety and reliability objectives. Excessive plant modifications also can produce unintended and undesirable results. Safety and reliability may actually be degraded. For example, any plant modification carries with it costs and difficulties which go beyond simply funding, designing, and installing the modification. Manuals, drawings, and other documentation must be accurately revised to reflect the change. Plant operating and maintenance procedures may have to be changed. Operations, maintenance and engineering personnel may have to be trained on the modification. All of the foregoing activities must be integrated with innumerable other activities, usually including other modifications and repair work done in parallel to achieve safe and reliable plant startup and operation.

In addition, because a commercial nuclear power plant is complex, a modification to a component or system may have unintended effects in another part of the plant.

Q. PLEASE DISCUSS MANAGEMENT SELF ASSESSMENTS.

A. External evaluations and inspections can provide useful information to management. These evaluations however, are principally retrospective in nature. From the standpoint of nuclear regulatory compliance, that is appropriate. They identify where programs and processes may have fallen short, and are used to make changes where appropriate. But good managers do much more than respond to external inputs; they conduct self-critical assessments to identify where improvements could be made. These self-assessments are typically couched in harsh and critical terms. That is part of the nuclear culture. In order to properly evaluate such reports, it is necessary to keep in perspective the purpose for which they are written. The use of such self-assessments to evaluate the reasonableness of management would be inappropriate.

Q. ONE OF THE PRINCIPLES YOU MENTIONED DEALT WITH BALANCING MULTIPLE DEMANDS. PLEASE EXPLAIN.

A. A nuclear manager must be concerned with reaching and maintaining the proper balance between safety, production and economics.

Nuclear reactor safety is paramount. Management must first and foremost ensure that the plant is safe. Nuclear power plants are designed with significant margins of safety. Additional margin is established in the licensing basis. Beyond that, normal plant operating limits provide another margin beyond the design and licensed margins.

Reliable production of electricity is also an important objective for a commercial nuclear power plant. The public expects reliable sources of energy; to continue operation, a plant must not only be safe, it must be productive. But production at the expense of safety is avoided.

At the same time, management considers the economics of operation. Resources are finite, and management must decide how best to devote them to safety, productivity and efficiency of operation. There are always more good ideas available than there are resources to implement them. Management selects and prioritizes those which can and should be done.

Q. WHAT DO YOU MEAN BY "MANAGEMENT IS AN ITERATIVE PROCESS"?

A. In the management of nuclear power plants, it is necessary to develop and implement plans for improving the plant material condition, training of plant personnel, procedures, standards of operation and other such matters. This is necessary for the plant to keep up with the ever-rising standards of the industry and the expectations of the regulators.

In formulating such improvement plans, good managers will set aggressive goals which are expected to be difficult to attain. Plans are based on management's assessment of current conditions and anticipated needs and are prioritized as those assessed needs dictate. The highest priority should be given to matters which affect reactor safety, and lower priorities to issues of plant reliability or efficiency. Aspects of prioritization and available resources are factored into improvement plans.

A commercial nuclear power plant is a complex undertaking, involving numerous systems, tens of thousands of components, thousands of procedures and a staff of many hundreds of skilled individuals. As any particular improvement plan goes forward, management must continually reassess progress and readjust the plan. Priorities may change. Some aspects of the plan may work well and others not so well, requiring that changes be made. New issues may be identified and need to be dealt with, including those resulting from rising regulatory standards and shifting regulatory focus. As management makes the changes which are part of the improvement plan, time is needed for those changes to take effect and for the results to be assessed. Not all management actions will, or can be expected to, achieve the desired result on the first try. Failure to achieve all of the objectives of an improvement plan does not mean that the plan was a bad one or that management was unreasonable. Indeed, ready achievement of all of the goals may indicate the goals were set too low.

V. TURBINE LUBRICATING OIL PIPE RUPTURE

Q. PLEASE DISCUSS THE DECISION TO SHUT CRYSTAL RIVER 3 DOWN ON SEPTEMBER 2, 1996 FOR THE TURBINE LUBRICATING OIL PIPE RUPTURE.

A. On August 30, 1996, while the plant was operating at full power, Main Turbine bearing lubricating oil pressure decreased to the point where the backup oil pump automatically started. Close monitoring of the decreasing pressure led to the decision to shut the plant down on September 2, 1996 to investigate and correct the cause of the decreasing oil pressure. The shutdown was required to avoid major turbine damage.

After shutdown, an internal inspection of the main lube oil reservoir revealed flange separation and gasket material loss on a flange downstream of the lube oil eductor, a four and one-half foot longitudinal through-wall crack in the eductor pipe and damaged or missing pipe supports inside the reservoir. The lube oil eductor is a device which uses the discharge flow from the attached main lube oil pump to increase system oil flow to the bearings and minimize the need for additional pumping capacity. Its operation is essential to turbine operation. The separated flange and the pipe crack were the direct causes of the degraded lube oil pressure. Piping vibration inside the tank apparently caused the failure.

Prior to the decreasing lube oil pressure noted on August 30, 1996,operation of the turbine had been normal. Observed oil pressures had been within the normal range and were consistent with pressures recorded over the previous several years.

The affected piping and components are inside the oil reservoir and are not accessible for inspection during operation, so the impending failure could not have been observed earlier. No advisory letters from the turbine vendor concerning vibration-induced failures of lube oil piping or supports, and no indications of correspondence advising of such failures elsewhere in the industry were found to exist. Further, no indications of improper operation or maintenance which would have contributed to the failure were identified.

My conclusion is that this problem was neither reasonably foreseeable nor avoidable. FPC's actions to shutdown Crystal River 3 on September 2, 1996 and make repairs to the turbine lube oil system were reasonable.

VI. EMERGENCY DIESEL GENERATORS AND EMERGENCY FEEDWATER SYSTEM

Q. PLEASE DESCRIBE THE CIRCUMSTANCES WHICH LED UP TO THE CONDITIONS WHICH EXISTED IN SEPTEMBER 1996 AND PROMPTED FPC MANAGEMENT TO DECIDE TO EXTEND THE OUTAGE.

A. The following information was developed during investigations conducted by FPC personnel, and parallel investigations done by NRC inspectors. These investigations revealed a number of issues relating to modifications made to the plant over a period of several years in order to manage EDG loads.

By way of background, there are two EDGs installed to provide emergency electrical power at the Crystal River 3 plant. These generators are physically and electrically separated, and each provides power to a separate and redundant set or train of safety equipment ("A" and "B" trains) either of which can be used to mitigate an accident. The Emergency Feedwater (EFW) System consists of two pumps which provide water to the Steam Generators in certain accident situations where normal feedwater is not available so that heat can be removed by the Steam Generators, thus keeping the reactor cooled. One EFW pump is driven by an electric motor and the other by a steam turbine.

Briefly, early in the operating life of Crystal River the EFW system was modified to make it a safety-related system. This modification included the addition of automatic starting of the electric motor driven EFW pump (EFP1) from the 'A' EDG. This modification increased the electrical load on the

"A" EDG in the initial loading time period. Since EFP2 is steam-turbine driven, there was not a corresponding increase on 'B' EDG loading.

In subsequent years, efforts were made to manage the planned post-accident load on 'A' EDG in order to maintain or improve electrical margins. One such action was a modification in 1987 which powered one of two redundant steam admission valves for EFP2 from the 'A' side emergency power. Operation of both EFW pumps, in turn, reduced the feedwater flow provided by EFP1 and accordingly the electrical load on "A" EDG.

In 1990, FPC determined that additional reductions in the 'A' EDG loading were desirable. In particular, under certain postulated very low probability accident conditions, the Low Pressure Injection Pumps would be called upon while EFP1 was still operating. The 1987 modification made EFP2 available under these conditions. The decision was made to automatically trip off EFP1 at low reactor coolant pressure to accommodate the Low Pressure Injection Pump load. This action reduced 'A' EDG loading and increased its operating margins. Based on information known at the time, Florida Power engineers believed that these modifications would permanently address mitigation of Small Break Loss of Coolant Accidents (SBLOCA) at Crystal River 3.

During Refueling Outage 10, early in 1996, Florida Power engineers were working to improve the guidance provided to operators for managing EDG loads. A potential condition in which operation of both EFPs with certain postulated concurrent failures might result in damage to one or both of the pumps because of pump cavitation was identified. Since EFP2 was relied on for 'A' EDG load management, the potential loss of that pump called into question the ability of the 'A' EDG to carry the electrical loads. In view of capacity improvements previously made to the EDGs, Florida Power engineers considered that it might be feasible to correct the situation by reversing the modification done in 1987. Detailed calculations were performed using more sophisticated tools and techniques than had been previously available to assess the transient load conditions. These calculations showed that EDG peak load rating would be exceeded for brief periods (1 to 3 seconds) during the loading sequence in the first minute of EDG operation. The focus of FPC efforts was on ensuring that the EDGs were capable of performing the intended safety function. Because the engineers were aware that the diesel engines installed at Crystal River 3 were rugged and reliable machines with substantial mechanical design margins, they contacted the EDG manufacturer. The manufacturer advised that the engine performance would not be adversely affected by the momentary overload conditions. Based on information then known, it was concluded that the 'A' EDG would be able to carry the load under the specified accident conditions. However, the fact that the expected loads exceeded the values specified in TS, thus placing the plant in a non-conforming condition, was not recognized. In follow-on review of this and related issues, Florida Power engineers identified the non-conformance with TS which was the immediate cause of the management decision to extend the outage.

Q. PLEASE PROVIDE YOUR CONCLUSIONS CONCERNING THE REASONABLENESS OF THE MANAGEMENT DECISION MADE ON

OCTOBER 4, 1996 TO KEEP CRYSTAL RIVER 3 SHUT DOWN FOR AN EXTENDED OUTAGE.

A. The decision made by FPC management on October 4, 1996 to go into an extended outage in order to address design-related issues with the Emergency Diesel Generators (EDG) and the Emergency Feedwater System was reasonable.

When the October 1996 decision was made to enter the outage, information had been recently developed by FPC which showed that calculated electrical loading on the 'A' EDG under some extremely improbable post-accident conditions could exceed the maximum loading specified in the Crystal River 3 Technical Specifications (TS). The potential excessive loading situation was identified through detailed analyses of electrical system performance using more sophisticated tools and techniques than had been previously available. To put the situation in perspective, the probability of the specific series of events (concurrent loss of coolant accident (LOCA) from a small piping break, loss of off-site electrical power supplies (LOOP) and a failure of the 'B' direct current electrical power) occurring at the same time has been calculated using probabilistic safety assessment techniques. This is the once in 11.6 billion year frequency of occurrence which has been mentioned elsewhere in this case. Despite the very low probability, this condition is within the licensing bases of the plant. Therefore, when this situation was recognized, TS required that the 'A' EDG be declared inoperable, even though the engine could actually have carried the potential required loads. In this case with the plant shut down, the EDG must be declared operable before plant startup.

In view of the need to resolve EDG inoperability before plant startup, FPC management initiated a thorough investigation of the questions about EDG electrical loading. That was a reasonable management decision.

A multi-disciplinary engineering review was started. The review was focused on issues relating to EDG loading, and in particular, on the May 1996 reversal of a 1987 modification to the power source for one of two redundant steam admission valves for the steam-driven Emergency Feedwater Pump (EFP2). Under certain accident scenarios, this change would cause an increase in EDG load.

The review confirmed that FPC's internal processes had identified that calculated load exceeded EDG rating when the EFW modification described above was being installed in April 1996. Further information had been received from the EDG manufacturer showing that the generator set was capable of responding to the increased load. Based on the information provided by the review, FPC managers concluded that this issue could be technically resolved by requesting an amendment to the TS, but additional questions arose about whether the CR-3 EFW system could meet Technical Specifications. Accordingly, FPC management decided to conduct further investigation into these issues before considering startup. The decision to conduct a thorough investigation was a sound one, and was consistent with the philosophy of conservatism and care which I described earlier.

VII. CONCLUSION

Q. GIVEN THE CIRCUMSTANCES YOU HAVE DESCRIBED LEADING UP TO THE INITIATION AND SUBSEQUENT EXTENSION OF THE OUTAGE, HOW DOES THAT REFLECT ON FPC MANAGEMENT, IN YOUR OPINION?

A. FPC managed Crystal River 3 safely and reasonably.

FPC took a cautious and step-by-step approach over a period of several years with full awareness and consideration of the importance of EFW and the emergency electrical power system. Modifications were made which were intended to manage safety system electrical load requirements to stay within the capability of the installed EDGs. FPC avoided extensive modifications which would have necessitated lengthy outages and incurred higher costs for their customers. The designer of the Crystal River 3 reactor was consulted for some of these modifications; each of them was a matter of record, known to the NRC. Subtle system interactions introduced by these modifications were not recognized at the time. When the interactions were identified, FPC management took prompt and appropriate action to extend the outage and fully investigate the situation. Based of their investigation, thorough corrective actions have been developed and are being implemented. I conclude from my review that FPC management has been reasonable in their operation of Crystal River 3.

Q. HAVE YOU COMPLETED YOUR WORK FOR FPC IN THIS MATTER?

A. My initial evaluation, based on review of available information, is complete. However, I will be reviewing questions and issues which may be raised in filings from intervenors or from the Commission Staff in this matter and may find further investigation to be appropriate. Should that occur, and if additional information is developed which bears on my conclusions, I may supplement this testimony.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes it does.

EXHIBITS TO THE TESTIMONY OF
RALPH G. BIRD

EXHIBIT NO. ___ (RGB-1)
RESUME

RALPH G. BIRD, Rear Admiral, U.S. Navy (Retired)
P.O. Box 20328
Jackson, Wyoming 83001
207 739 9653

EDUCATION

Bachelor of Science, U.S. Naval Academy (with distinction) - 1956
U.S. Naval Submarine School - 1958
U.S. Naval Nuclear Propulsion Training - 1959
Master of Science, Computer Systems Management, U.S. Naval Postgraduate School - 1970

EXPERIENCE

1996-present — Consultant to Commonwealth Edison Company in 1994 rate case.

Consultant to two other nuclear utilities concerning pending litigation.

1992-present — Member of the Board of Directors of Sequoyah Fuels Corporation, a uranium processing company.

1994-1996 — Consultant to Houston Lighting and Power in litigation involving the cities of Austin and San Antonio concerning the South Texas Project.

1992-1993 — Consultant to Southern California Edison Company. Served as management expert witness for preparation of testimony submitted to the Public Utilities Commission concerning the prudence of nuclear power plant outage expenses.

1990-1991 — Boston Edison Company, Executive Vice President.

Overall responsibility for nuclear and fossil electrical generation, transmission, and distribution including operation, maintenance, training, engineering, and stores. In charge of about 3,500 employees and a $420 million annual budget.

During 1991 also served as a Director of Boston Edison Company.

1987-1990 — Boston Edison Company, Senior Vice President, Nuclear.

Responsible for all nuclear matters including facilities, personnel, operation, and interface with local, state, and federal officials. Restored Pilgrim Nuclear Power Station to operation and restored the Boston Edison Nuclear Organization's credibility with regulatory agencies and with the public and the media.

1985-1986 **Consultant to Westinghouse Electric Corporation and to Nuclear Utilities**

Assisted in preparation of the successful Westinghouse proposal for management of the Department of Energy, Hanford, Washington, site.

Assisted in assessment and recommendations for improvement of training at Tennessee Valley Authority nuclear power plants.

Assisted the plant manager at Rancho Seco Nuclear Station in responding to an evaluation by the Institute of Nuclear Power Operations and in developing programs for corrective action.

1984-1985 **Westinghouse Idaho Nuclear Company**

As Executive Assistant to the Vice President of Production at the Idaho Chemical Processing Plant, which reprocesses nuclear fuel, identified problems in training and created programs for corrective action: a long range training plan which included a program to define knowledge and qualification standards; and a program for creating an integrated set of company nd department manuals to provide policy, procedures, and technical information needed for plant operation, maintenance, and training.
As Manager, Fluorinel Startup, created an effective project organization of about 110 people to bring this $200 million uranium fuel dissolution plant into operation.

1984 **Management Consultant**

Assisted senior management at Grand Gulf Nuclear Station in improving plant management, operation, and maintenance and in achieving a favorable evaluation by the Institute of Nuclear Power Operations.

1981-1984 **Deputy Chief of Naval Material for Logistics**

Responsible for oversight and policy for a large part of the 200,000 personnel (mostly civil service) and $30 billion budget of the Material Command. Responsible for policy and performance assessment of maintenance and support for all ships and aircraft and for logistics evaluation of new ships, aircraft, and equipment proposed for procurement.

Was awarded fourth Legion of Merit.

1979-1981 **<u>Deputy Chief of Staff for Logistics and Security Assistance, U.S. Pacific Command (All U.S. Army, Navy and Air Forces from western U.S. to eastern Africa)</u>**

Logistics responsibilities included: war plans, policy and management of fuel, munitions, sealift, airlift, and base construction and repair.

Security assistance responsibilities included: command of military assistance groups attached to U.S. embassies in 11 Pacific countries from Japan to Pakistan; formulation of recommendations to the Joint Chiefs of Staff on money, military equipment, and training to be provided to Pacific countries as grants or loans; coordination with State and Defense Departments, U.S. Ambassadors and their staffs, and foreign military and civilian officials.

Accomplishments included: initiated, gained State and Defense Department approval, and concluded a bilateral agreement for Korea to turn over most of its large merchant fleet to U.S. control during an emergency, thus resolving major shortages in U.S. sealift capacity; initiated similar agreements with two nations for airlift capacity to compensate for U.S. shortages; effectively presented Navy views on sealift problems to Congressional committee and was commended in writing by the chairman; initiated legislation which was passed to improve foreign military training.

Was awarded the Defense Superior Service Medal.

1977-1979 **<u>Chief of Staff, Submarine Force, U.S. Pacific Fleet</u>**

Responsible for policy formulation and operation of 40 nuclear powered attack and Polaris missile submarines throughout the entire Pacific and Indian Ocean regions, including bases, maintenance, personnel, training, supply and budgeting. Directed employment of about 10,000 personnel and billions of dollars in assets.

Initiated and implemented major changes to improve submarine personnel efficiency, which improved morale and retention of skilled personnel. Examples included: reduced engineering watch requirements from 33 to 7 men for many in-port conditions with no decrease in reactor safety; improved personnel training to the point that at least 25% fewer men were required to remain on board during in-port periods; and reduced ship deployments from 6 months to 4 months away from home.

Dealt effectively and courteously with numerous sensitive and, in some cases, potentially embarrassing, press queries.

In recognition of performance, was award third Legion of Merit and was selected for early promotion to Rear Admiral.

1976-1977 **Senior Instructor, Chief of Naval Operations' Senior Officers' Ship Material Readiness Course, Idaho Falls, Idaho**

Established the course. In 2 months assembled instructors, devised a curriculum, and began teaching an intensive 4-month course in oil-fired steam plant operation and maintenance for Rear Admirals and senior Captains en route to major commands. The course continues with little change today as an important factor in improving the material condition of Navy ships.

1974-1976 **Senior Member, U.S. Pacific Fleet Nuclear Propulsion Examining Board**

Responsible for conducting an annual examination of each of 50 naval nuclear propulsion plants in the Pacific (aircraft carriers, cruisers and submarines), to certify them safe for continued operation. Performance led to next assignment because, in the words of the Chief of Naval Operations, "Captain Bird is the most professionally qualified and best tested engineer in the Navy."

1970-1974 **Commanding Officer, New Construction Nuclear Power Attack Submarine**

Accountable for all aspects of operation and maintenance of the ship and training the officers and crew. Directed testing and acceptance of the ship, including the reactor and propulsion plant, for the Navy.

Was twice awarded the Legion of Merit for operations of great importance to the United States. Ship also won battle efficiency "E", engineering "E", and the Navy Unit Commendation. These results were achieved while maintaining a reenlistment rate nearly double the Navy average.

Selected for promotion to Captain at 17 years of service, 3 years ahead of U.S. Naval Academy classmates.

1969-1970 **Student, Naval Postgraduate School, Monterey California**
Received Master of Science degree in computer systems management.

1967 - 1969 **Executive Officer, Polaris Missile Submarine**

Responsible for all internal functions of the ship, including operation, maintenance, administration, and training. Ship excelled in all missions, conducted a flawless test firing of Polaris missiles, and as a result was awarded the Navy Unit Commendation.

1965-1967 **Material Officer, Submarine Squadron 14, Holy Loch, Scotland**

Responsible for planning and performance of Polaris submarine maintenance to ensure that each sailed on time and functioned reliably during 2-month submerged patrols.

1963-1965 **Engineer Officer of Nuclear Attack Submarine**

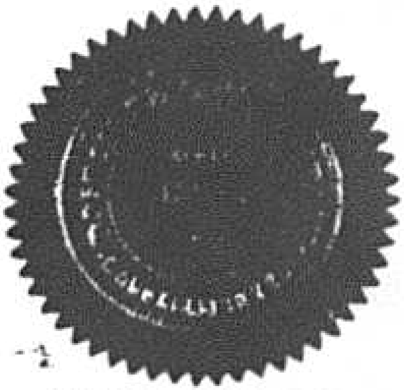
Responsible for nuclear plant operation and maintenance, including officer and crew training. Proposed alterations which were adopted by the Navy to improve nuclear propulsion plant safety and reliability. Performance resulted in assignment as squadron engineer for the Polaris submarine squadron.

1956-1963 Sea duty in a destroyer and a diesel submarine in a variety of assignments. Qualified OOD and qualified in submarines. Completed Naval Nuclear propulsion training. Served as a division officer in a new construction nuclear submarine.

At a regular meeting of the Board of Directors of Boston Edison Company, duly called and held on December 19, 1991, a quorum being present and acting, on motion duly made and seconded, it was

> RESOLVED: That we, constituting the Board of Directors of Boston Edison Company, hereby express our deep appreciation for the valued contributions of our colleague and fellow director
>
> RALPH G. BIRD
>
> upon the occasion of his retirement from this Board.
>
> An officer of this Company since January 1, 1987, Ralph was charged with the significant corporate responsibility of returning Pilgrim Station to service and putting plant operations on a path to excellence. He met the challenge with leadership, integrity, resourcefulness and dedication. Under Ralph's direction, Pilgrim Station restarted in 1988, and its performance since that time has been a source of corporate pride. The importance of Ralph's contributions to the Company was such that he was promoted to the position of Executive Vice President and elected to the Company's Board of Directors.
>
> The Board of Directors hereby expresses its gratitude to Ralph G. Bird for his many and valued contributions to the Board and to the welfare of the Company, its pride in his significant accomplishments and its warm wishes for his continued good health and happiness.

A true copy from the records.



Attest:

Clerk

BOSTON EDISON