# BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Nuclear Cost Recovery Clause

DOCKET NO. 100009
Submitted for filing:
March 1, 2010

## DIRECT TESTIMONY OF GARY R. DOUGHTY IN SUPPORT OF ACTUAL COSTS

## ON BEHALF OF PROGRESS ENERGY FLORIDA

COM 5
APA 2
ECR
GCL 1
RAD 1
SSC
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CLK 1.

IN RE: NUCLEAR COST RECOVERY CLAUSE

FPSC DOCKET NO. 100009

DIRECT TESTIMONY OF GARY R. DOUGHTY

## I. <u>INTRODUCTION AND EXPERIENCE</u>

**Q. Please state your name, occupation, and address.**

A. My name is Gary R. Doughty. I am President of Janus Management Associates, Inc. My business address is 412 White Columns Way, Wilmington, North Carolina 28411.

**Q. *What is the purpose of your testimony in this proceeding?***

A. Janus Management Associates, Inc. (Janus) was retained by Progress Energy – Florida (PEF) to review the reasonableness and prudence of project management and project control systems in place to manage the Levy Nuclear Project (LNP) during 2009. PEF is a subsidiary of Progress Energy, Inc. (PGN). PEF is in the process of seeking a combined operating license and siting approval for two AP1000 Advanced Passive nuclear power plants in Levy County, Florida and the necessary electrical baseload transmission facilities.

**Q. Do you have any exhibits to your testimony?**

A. Yes. I have prepared or assembled the following exhibits to my direct testimony:

- Exhibit No. ___ (GRD-1), Janus Management technical consulting firm services;
- Exhibit No. ___ (GRD-2), resume of Gary R. Doughty;
- Exhibit No. ___ (GRD-3), testimony experience in management prudence reviews;
- Exhibit No. ___ (GRD-4), outage and major capital project experience.

These exhibits are true and correct.

**Q. Have you testified before the Florida Public Service Commission (FPSC) in any prior Nuclear Cost Recovery Proceeding regarding the LNP?**

A. Yes. I submitted direct and rebuttal testimony to review the reasonableness and prudence of PEF project management and project control systems for the LNP on behalf of PEF in the Nuclear Cost Recovery Clause Docket No. 090009 in March 2009 (direct). I also submitted rebuttal testimony in Docket No. 090009 in August 2009.

The FPSC determined that PEF's project management, contracting, and oversight controls during 2008 were reasonable and prudent for the LNP. (Order No. PSC-09-0783-FOF-EI, issued November 19, 2009)

**Q. Please state your professional experience and education.**

A. Janus is a management and technical consulting firm providing services to the electric utility industry. See Exhibit No. ___(GRD-1). As president of Janus, I have provided technical support to nuclear utilities through analyses of specific nuclear plant capital construction projects and nuclear plant outage schedule issues. See Exhibit No. ____ (GRD-2). I have led teams that provided support to nuclear utilities in decision analyses for nuclear plant management, nuclear business strategy development, and economic analyses of nuclear plant continued operation versus License Renewal for an additional 20 years of operation or early retirement.

I have also served on independent review teams for utility boards of directors, including: (1) Ameren regarding Callaway Nuclear Power Plant performance issues; and (2) Northeast Utilities (NU) as a member of the Fundamental Cause Assessment Team to determine the reason for the decline of Millstone 1, 2, and 3 performance. I was also a member of the Mixed Oxide Fuel Fabrication Facility Independent Review Team for the Shaw / Areva Board of Governors to review project management, project controls and procurement activities of critical materials for the $4.8 billion facility at the Department of Energy's (DOE) Savannah River Site in South Carolina.

Since 1987, I have led several comprehensive prudence reviews of nuclear power plant project management, electric transmission project management, corporate decision-making, capital program management, and nuclear plant outage management. I have also performed several focused strategic studies for utility senior management and the Electric Power Research Institute.

During late 1986 through 1987, I served as Manager of Industry Relations for the Institute of Nuclear Power Operations (INPO), a private organization dedicated to promoting excellence within the nuclear industry. In this position, I was responsible for administration of INPO's communications, technical policy and informational programs to utility members, suppliers and international participants, related organizations and government agencies.

I have extensive experience in the field of nuclear power plant construction and project management. In 1975 to 1977, I was a startup engineer for the owner utility, Northeast Utilities (NU), of the Millstone 2 nuclear power plant in Waterford, CT. I was responsible for system testing and acceptance during the construction completion phase for several nuclear safety systems, fire protection systems, auxiliary equipment, and balance-of-plant components. During initial plant startup, I was a shift test engineer for the initial criticality, low-power testing and full-power operational certification.

From 1984 to 1986, I was project manager for NU of the Millstone 3 nuclear power plant prudence audit ordered by the Connecticut Department of Public Utility Control. The prudence audit reviewed all aspects of the management, engineering, procurement, construction, startup, project controls, regulatory performance and $4 billion costs of the 1150 megawatt (MW) unit.

While with NU, I was also Manager of Generation Projects for Millstone 2's program for major capital projects, major repairs and initiatives to respond to new regulatory requirements. During a major outage, I was responsible for management of more than $100 million of capital and maintenance projects, including removal of the nuclear thermal shield from the reactor and tube sleeving of the steam generators, both first-time projects for the utility. I managed the overall efforts to prolong the life of the Millstone 2 steam generators. I was responsible for developing annual budgets and schedules for capital and major expense projects to meet operational and regulatory commitments, and I served on the Millstone 2 Nuclear Review Board to review safety-related issues.

I served as a U.S. Navy Officer in the nuclear submarine force. As an officer in the U.S. Navy nuclear submarine force, I was trained in nuclear reactor engineering concepts and qualified to operate and maintain two naval reactor plants.

I have a Bachelor of Engineering degree in Electrical Engineering from Vanderbilt University, and received a MBA from the University of New Haven.

**Q. Do you have direct experience related to management prudence evaluations?**

**A.** Yes. I have performed 16 independent reviews regarding the prudence of utility management with respect to nuclear power plant and electric transmission project management and project controls. I have submitted testimony related to some of these independent reviews to nine state public utility commissions. These are identified in Exhibit No. ___ (GRD-3) to my testimony.

I have also performed prudence evaluations of a new nuclear power plant, major capital projects at nuclear power plants and fossil-fired plants, and construction of electric transmission facilities. The new nuclear power plants prudence evaluations in which I was involved are: as a member of the team engaged by the Texas Public Service Commission to review the Comanche Peak nuclear facility in Texas; and as project manager for the owner utility of Millstone 3 to respond to a prudence review by the Connecticut Department of Public Utility Control. The operating nuclear power plants for which I performed independent evaluations of major capital projects and long outages are presented in Exhibit No. ___ (GRD-4). These evaluations do not include the plants already listed in Exhibit No. ___ (GRD-3).

From 2005 to early 2009, Janus performed independent evaluations of Northeast Utilities $3 billion electric transmission infrastructure upgrade. Janus evaluated the siting, design, and construction of electric transmission facilities in Connecticut and Massachusetts.

## II. PURPOSE AND SUMMARY OF TESTIMONY.

**Q. Please describe the nature of your testimony in these proceedings.**

A. This testimony presents my expert opinion with respect to the reasonableness and prudence of PEF's management decision processes and project management and controls as they relate to the LNP in 2009.

**Q. How did you proceed?**

A. I started with the reasonableness or prudence standard which is accepted and utilized throughout the electric utility industry. Next, I reviewed PEF's decisions and processes as they relate to the LNP in terms of the processes used and the knowledge reasonably available to PEF managers. The areas that I reviewed were: 1.) Project oversight by the PEF parent board of directors (BOD) and senior management; 2.) Project concept and contract strategy; 3.) Project management; 4.) Project controls; 5.) Risk management; 6.) Policies and procedures; and 7.) Project assessment. I then measured the decisions and processes against the appropriate standard of reasonableness and prudence and arrived at an opinion concerning the reasonableness and prudence of PEF's decisions and processes for the management and control of the LNP.

**Q. What methods did you use to review PEF's decisions and processes?**

A. I reviewed the LNP documents such as its policies, procedures, schedules, cost estimates, contracts, progress reports, BOD minutes, risk analyses, management oversight reports, regulatory information, audit reports, benchmarking reports, independent assessments, and quality assurance reports. Further, I interviewed managers and key personnel involved in the LNP work, including the Baseload Transmission project, internal audit, project controls, and management.

**Q. What standard of reasonableness and prudence did you use in your assessment?**

A. In my experience in the electric utility industry, the general standard of reasonableness or prudence is as follows: Prudence is that standard of care which a reasonable utility manager would be expected to exercise under the same circumstances encountered by utility management at the time decisions had to be made.

The fundamental tenets of utility management prudence include the following:

1. Prudence requires reasonable, not perfect decisions. Nor does prudence require that the single "best" decision be made; a number of different decisions can be prudent.
2. There is a presumption of management prudence.

3. In determining whether a decision was prudently made, only those facts available at the time the decision was made can be considered. Hindsight review is impermissible.
4. A reviewer cannot substitute his judgment for that of the decision maker. The prudence standard recognizes that reasonable people can have honest differences of opinion without one or the other necessarily being imprudent.
5. Prudent decisions made under the set of circumstances at the time a utility investment is made should not be deemed imprudent if conditions change at some later time wherein the investment would not be made.

**Q. How did you apply this prudence standard to the management and project controls for the LNP in 2009?**

A. As I did in my prior testimony, I applied the prudence standard to a set of general evaluative criteria for a project of the size and complexity of the LNP. These general evaluative criteria for prudent decisions and project controls are: 1.) PEF senior management and the BOD should maintain appropriate involvement, have in place information channels and maintain sufficient oversight to make ongoing critical project decisions; 2.) The LNP project concept and contract strategy should provide the degree of control necessary to protect PEF's investment and be consistent with the magnitude of the project; 3.) The implementation of the decision to build the LNP should be reasonably planned, organized and controlled by PEF to be able to meet project goals for scope, schedule, budget, regulatory, safety, and quality requirements; 4.) The roles and responsibilities of the project team members and the interfaces among the Levy plant and the Levy transmission project team, other PEF functional organizations, the owner's engineers and other contractors, and the consortium should be documented and applied; 5.) The LNP risk management process should identify risks, track identified risks, and provide management with a logical and coherent framework to evaluate, prioritize, and develop courses of action to mitigate or avoid the major project risks; 6.) The LNP should have in place information systems to monitor and report costs, schedule progress, and contractor performance; and to detect threats to meeting project scope, budget or schedule; 7.) The LNP should have in place policies and procedures that define expectations and accountability for work products, identify responsibilities, and serve as training tools for new staff; and 8.) The LNP should have appropriate assessment processes to ensure that regulations, procedures, quality standards, and contractual obligations are met.

**Q. Please provide a summary of your testimony.**

A. In my opinion, PEF had in place reasonable and prudent LNP project management and project controls in 2009. In 2009, the LNP appropriately transitioned to the Nuclear Plant Development (NPD) organization to manage the Engineering, Procurement, and Construction Agreement (EPC) with Westinghouse Electric Corporation (WEC) and Shaw, Stone, & Webster (SSW) (together the "Consortium").

In 2009, PEF had reasonable and effective senior management oversight of LNP. Senior management oversight was extensive and the BOD was informed and engaged in project decisions. The Levy Program Governance Policy was issued. This policy provides a comprehensive guide for the project with coordinated independent oversight and management.

NPD further enhanced the project risk management process. The project controls in place to develop estimates, monitor budgets and schedules, and control contractors were reasonable. Reporting and performance monitoring and the performance indicators were reasonable.

In 2009, the LNP project management and execution policies and procedures were improved by the NPD and the Project Management Center of Excellence (PMCoE). Specific procedures were prepared to manage the EPC contract. In 2009, PEF performed appropriate project reviews, internal audits, benchmarking, self assessments, and quality assessments (QA) of the LNP.

## III. ASSESSMENT OF PEF'S PROJECT MANAGEMENT PROCESSES AND PROJECT CONTROLS FOR THE LNP.

**Q. Please describe the status of the LNP at the time of your assessment.**

A. The LNP is in the licensing and permitting phase with its Combined Operating License Application (COLA) docketed with the Nuclear Regulatory Commission (NRC). As part of the COLA process, the NRC is preparing the Final Environmental Impact Statement (FEIS) and the Final Safety Evaluation Review (FSER). The State of Florida Department of Environmental Protection and the Army Corps of Engineers are conducting their review of the LNP site wetlands mitigation program. PEF is performing engineering activities to support the licensing and permitting process.

The project work with respect to design, procurement, and construction activities was adjusted in 2009 because of the NRC Limited Work Authorization (LWA) determination. The NRC determined that most of the preconstruction work on the project originally to be completed under a Limited Work Authorization (LWA) would not be authorized until the NRC issues the COL. As a consequence of the NRC decision, the schedule for commercial operation of the Levy units was shifted forward by a minimum of 20 months from the original 2016 plan. This schedule shift also affected the schedule of the Levy Baseload Transmission Project engineering, real estate and construction activities. On May 1, 2009, PEF announced plans to shift the LNP construction schedule a minimum of 20 months. PEF is currently working to develop a new project timeline and project estimate, and is negotiating a contract amendment with the EPC Consortium to shift the LNP schedule.

## IV. ASSESSMENT OF SENIOR MANAGEMENT OVERSIGHT.

**Q. Was Senior Management involved in oversight and direction of the LNP in 2009?**

A. Yes. The Progress Energy BOD received regular updates of key LNP milestones and issues. The BOD established the Nuclear Project Oversight Committee to serve as the primary point of contact for BOD oversight of the construction of new nuclear projects. In 2009, the BOD was kept informed of key information regarding LNP and reviewed and approved LNP strategic direction and financial plans.

The Senior Management Committee (SMC) held Monthly Business Reviews to review project progress and address issues as necessary. Senior management made key decisions and maintained oversight of the LNP through the normal channels of organizational reporting and business planning and budgeting processes. Senior management reorganized the corporate structure to create the Corporate Development Group which includes responsibility for new nuclear construction and various corporate initiatives, such as efforts to expand energy efficiency and renewable energy resources. Senior management also approved the reorganization and staffing of the NPD. The SMC reviewed and approved the 2009 annual project plan, reviewed periodic status reports, and conducted the Monthly Business Review process. Senior management provided oversight of the EPC negotiations for the change order to incorporate the schedule shift.

Additional senior management oversight was provided by the Levy Integrated Nuclear Committee (LINC). In early 2009, prior to the formation of the Corporate Development Department, the senior management oversight functions of LINC were taken over by a similarly comprised group of PEF executive members, chaired by the NPD Vice President, who met at least quarterly to conduct a Levy Program Performance Review (PPR) of program status, risks, business conditions, projects and initiatives required to execute the LNP. PPR members engaged in and provided perspective to ongoing LNP activities based on each member's area of Company expertise. Minutes were maintained and the PEF Board, SMC and BOD were updated as appropriate. The Executive Vice President, Corporate Development was the Levy PPR executive sponsor.

**Q. Was the senior management and BOD involvement during 2009 in the LNP prudent?**

A. Yes. In my opinion senior management and the BOD maintained a prudent level of involvement regarding the LNP. Senior management kept the BOD informed of the project status, risk factors, costs, project management, and regulatory processes. The BOD was involved in approving key decisions. In 2009, the SMC provided comprehensive oversight of the LNP. Enhanced management coordination and oversight was gained with the creation of Corporate Development and the reorganization of NPD.

## V. ASSESSMENT OF PROJECT CONCEPT AND CONTRACT STRATEGY.

**Q. Did the LNP project concept and contract strategy continue to provide a prudent degree of control consistent with the magnitude of the LNP in 2009?**

A. Yes. In April 2009, the LNP project concept for the LNP was adjusted to address the schedule shift flowing from the determination by the NRC that most of the early site construction work could not be authorized under a LWA, but would have to wait until the NRC issues the COL. PEF adjusted the LNP project concept in 2009 to continue those activities that were necessary to achieve permitting and licensing for the LNP and address the minimum 20-month schedule shift while limiting the pre-construction planning and procurement activities.

NPD was reorganized to integrate the LNP plant with the LNP Baseload Transmission project and consolidate the project controls resources for the full LNP. The Vice President of NPD reports to the Executive Vice President Corporate Development.

NPD manages the EPC Consortium, the joint venture team (JVT) for the COLA, and several contractors for Baseload Transmission, environmental and geologic work. In 2009, the key contract activities focused on the EPC contract to obtain the necessary information to negotiate an amendment for the LNP schedule shift, and on reducing the site engineering work, deferring procurement activities, and closing the contracts for several of the Baseload Transmission project vendors as a result of the schedule shift. The LNP management team prioritized project work for the JVT related to the COLA, the completion of the Site Certification Application (SCA), the SCA commitments, the preparation of the FSER and FEIS, and the Levy site wetlands mitigation studies.

The LNP management team also addressed the Levy Baseload Transmission project work as a result of the schedule shift. Engineering and design work that was in progress was brought to an orderly completion status such that it could be efficiently restarted in the future consistent with the LNP schedule shift. Work was completed in December 2009 on the first phase of the Crystal River Energy Center (CREC) switchyard modifications for the LNP. PEF released most of the contractors including the owner engineer by early December as a result of the schedule shift. In view of the schedule shift, PEF performed a study to analyze cost savings of self-performing the land acquisition program for real estate and right of way activities. The study affirmed the potential cost savings.

PEF managed work on the Levy nuclear project through the EPC contract for work by the Consortium and through contracts with the JVT, owner's engineers, and other contractors using the task order process. The task order approach to authorize work is based on a specific scope that was estimated by the owner engineer and reviewed by the respective PEF project team for technical adequacy and cost. Once released for implementation, the work was monitored by PEF technical personnel and administered by the PEF designated contract representative.

**Q. What is your opinion with respect to the 2009 LNP project concept and contract strategy?**

A. In my opinion PEF established a reasonable and prudent project concept and contract strategy by establishing and later reorganizing the NPD, consolidating the entire LNP project generation and transmission work groups, and focusing on the work activities to defer major expenditures while addressing the minimum 20-month schedule shift. The 2009 LNP project concept was a prudent approach to managing the project. In my opinion, the 2009 LNP project concept provided reasonable control of project costs while achieving the necessary LNP work given the minimum 20-month schedule shift.

## VI. ASSESSMENT OF PROJECT MANAGEMENT.

**Q. Please describe the project management for the Levy Nuclear Plant in 2009.**

A. In 2009, the Levy project organizations for both the plant and Baseload Transmission began transitioning into the detailed engineering, site preparation, and construction phases.

In January 2009, the Nuclear Projects & Construction Department was restructured and divided. NPD was formed to concentrate leadership focus on the LNP in preparation for entering the site preparation, detailed design and construction planning phase. This move reflected senior management's recognition of the need to align the organization to focus support on new nuclear plant development. From January through April 2009, the NPD organization was headed by Mr. G. Miller, a senior manager, with overall accountability for LNP. Reporting to the General Manager were Licensing, Engineering and Project Controls.

In early 2009, the Levy Baseload Transmission Project group added a General Manager to the existing organization and was recruiting additional members of the Baseload Transmission project team. Reporting to the General Manager were managers in land acquisition, engineering, transmission lines and substations. The Baseload Transmission project had commenced the initial engineering and design work.

In May 2009, the Company reorganized NPD to bring the Levy nuclear plant project together with the Baseload Transmission project. John Elnitsky was named Vice President – NPD. The NPD vice president has overall accountability for both the plant and the associated Baseload Transmission. The revised NPD organization included nuclear plant licensing, engineering, and construction and the Levy Baseload Transmission project team. The change also integrated the project controls and business management functions of the nuclear and transmission project teams. In addition, the Program Coordination and Performance Improvement group was created in NPD to expand the PMCoE functions.

Project management of LNP under the new NPD Vice President, assumed some of the day-to-day LNP management activities of the LINC under a newly formed NPD Program Management Team (PMT). The PMT's responsibilities include: 1.) review program activity including safety and operational readiness; 2.) coordinate necessary inter-departmental program support activity with functional stakeholders; 3.) evaluate, assign and track near term program action items; 4.) review 30-day look ahead program events for involvement, preparation and expected outcome; 5.) review and discuss more detailed program activity with NPD leadership, assign actions and follow-up as needed; and 6.) periodically review PMT structure and charter as the program matures. The meeting frequency was initially set as weekly with program actions to be reviewed, evaluated and recorded during each meeting. During 2009, the NPD Program Action Item list grew to dozens of items categorized as "Deep Dive" topics, NPD action items, long range pending assignments, and "Line of Sight" significant meeting dates extending to year end.

Upon notification by the NRC that the LWA would not be issued earlier than the COL, PEF necessarily deferred work geared to early site construction, deferred procurement in an economical and efficient manner, but maintained the permitting and licensing activities. The NPD was responsible to maintain the licensing and permitting progress. NPD also reviewed the work priorities given the minimum 20-month schedule shift.

**Q. Please describe the LNP Baseload Transmission major activities managed in 2009.**

A. The Levy Baseload Transmission work in 2009 included completing the evaluation of the Levy Baseload Transmission project on the Florida bulk transmission system; completing route selection and design option studies; developing EHV equipment specifications and EHV system standard design criteria; supporting the SCA and COLA; and completing preliminary design packages on several subprojects.

During the year, the LNP Baseload Transmission team completed system analysis and implemented work on State and Federal licensing, program and project schedules and estimates, staffing and resource plans, project designs and transmission line route selection and land acquisition and permitting activities. The analysis for LNP and its impact on the Florida bulk transmission system was performed in accordance with NRC regulations, Federal Energy Regulatory Commission Large Generation Interconnection rules, existing Reliability Standards, and PEF Interconnection Requirements. The analysis confirmed the scope requirement for the Levy Transmission program.

Key decisions for the Levy Baseload Transmission project made in 2009 included route, conductor and structure selection. Engineering completed specifications for the major EHV equipment and standard design criteria for the proposed EHV system, and preliminary design packages were completed for several projects. Route selection studies identified the best evaluated and preferred rights-of-way using siting criteria incorporating environmental, land use, safety and cost considerations. Wetland surveys were completed on substation sites and preferred transmission rights-of-way. Acquisition of some property proceeded. NPD also completed the first phase engineering work on the EHV work associated with the LNP that was scheduled to be installed in the CREC switchyard in the fall of 2009.

**Q. In your opinion, was the project management for the LNP prudent in 2009?**

A. Yes. Project management of the LNP was prudent in 2009. The NPD organization established the integrated LNP plant and transmission project teams and other functional organizations, owners' engineers, and contractors under the direction of the NPD Vice President. NPD documented the roles and responsibilities for LNP team members. There accordingly was appropriate project management in place.

The LNP project management team appropriately managed the licensing and permitting efforts and implemented the work necessary to address and evaluate the schedule shift. Given the circumstances of being informed by the NRC that the LWA would not be issued earlier than the COL, PEF's decision to shift the schedule of the project by a minimum of 20 months was prudent. PEF reasonably investigated the likelihood that the NRC LWA position could be modified. PEF continued discussions with the NRC through April 2009 to investigate the potential LWA scope and schedule. When it was clear that the NRC's determination that the excavation and foundation preparation work – originally scheduled to be completed at the same time that PEF was seeking the COLA - would not be authorized until the NRC issued the COL, PEF decided to withdraw the LWA and formally informed the NRC of its decision on May 1, 2009. Without the ability to accomplish the LWA scope requested, PEF reasonably determined that the potential allowed LWA scope was insufficient to maintain the EPC contract project schedule.

*In my opinion, PEF implemented this LNP schedule shift prudently.* The Company reduced planned 2009 work on both the nuclear plant and the Baseload Transmission project to address the schedule shift. This action reduced 2009 project expenditures while supporting the LNP permitting and licensing effort to achieve approvals of the SCA and COLA. PEF wound down work in an orderly and efficient manner so that it could be resumed without undue loss of the work already performed and performed work that supported the permitting and licensing of the project. *This included deferral of procurement activities* for those long lead items that could reasonably and economically be deferred, limiting planned staffing additions for the NPD, and reducing the amount of work planned on the Baseload Transmission project.

PEF LNP management took this action on April 30, in accordance with the EPC contract provisions, by issuing a notice of change to the Consortium. PEF also directed the Consortium to prepare schedule and cash flow analyses for schedule shift scenarios to allow PEF to make an informed decision on a contract change order or amendment to be negotiated by PEF and the Consortium in subsequent months. As provided in the EPC contract, PEF negotiated change orders for the requested work for the schedule analyses and long lead procurement activity deferral evaluation work. The change orders were reviewed and approved by both the EPC Consortium and NPD management. NPD monitored the work performed under the change orders in the normal contract administration process and reported this in weekly and monthly reports.

Throughout the remainder of 2009, PEF monitored the EPC Consortium's actions to continue the necessary support work for the AP1000 design certification, the SCA and the COLA; defer procurement of those long lead items that could economically be deferred; and develop schedule and cash flow analyses for various schedule shift scenarios. Other engineering activities continued including geotechnical analyses such as the Levy Site Grout Test completed in May, and the Offset Boring Program completed in the fall of 2009. Work on the blowdown piping environmental assessment, wetlands delineation, and route selection also continued in 2009. Reviews of early site infrastructure and construction engineering documents in the vicinity of the Barge Slip were conducted in May and June. Also, in July, NPD held discussions with the EPC Consortium to start addressing transitioning Levy foundation conceptual design to final design.

Work on the Baseload Transmission project was also adjusted to address the schedule shift. Engineering work no longer immediately necessary to the project was stopped and the existing design work was archived, efforts to engage a land acquisition firm ended, and staffing was reduced. PEF decided to self-manage the land acquisition program after determining that self-management resulted in potential cost-savings. Some transmission work continued to a logical, economical conclusion. The CREC Switchyard phase 1 work installing three EHV switches, that required a unit outage, was completed as planned during the fall 2009

CR3 outage. The Line Route Study was also finalized and approved in October. NPD further identified potential land acquisition needs for wetlands mitigation, State Land easements, and certain transmission ROW and other facilities. This work is expected to be complete in 2010 and some ongoing beyond.

The LNP project management was effective in managing the necessary planning, scoping, siting, and initial engineering work associated with developing the LNP and Levy Baseload Transmission project given the schedule shift that occurred on the project. LNP project management is consistent with Project Management Institute standards and industry practices for nuclear and other major construction projects.

## VII. ASSESSMENT OF PROJECT CONTROLS.

**Q. Did PEF have in place prudent project controls for the LNP in 2009?**

A. Yes. In 2009, PEF initiated enhancements to LNP project controls to meet the challenges expected with the commencement of work by the Consortium under the EPC contract. The established LNP project control processes to report costs, work progress, and schedule performance consistent with the current status of the project and industry standards were reasonable and prudent. When the LNP schedule shift occurred, PEF took reasonable actions to ensure that the project controls systems efficiently and effectively supported the requirements of this period.

Throughout 2009, NPD management continued to make LNP project controls a key and visible element of its management and project implementation process. NPD established a structured approach to establish and enhance the necessary procedures and processes to implement the EPC contract. NPD management has made cost, schedule, and performance monitoring a key element in both its project implementation and oversight process via regular status and assessment meetings and reporting. NPD is incorporating "lessons learned," industry and professional "best practices," and other industry guidelines into its project control process. Further, PEF has in place appropriate contract management processes and procedures to administer the obligations of contractors providing services to the LNP.

**Q. How did management make cost and project controls a key and visible element during 2009?**

A. NPD management has emphasized quality, cost, schedule, and project management as the continuing theme of its management processes. This emphasis directly communicates and reinforces the importance of the project controls function. Management attention is observed throughout the management and project documents from the executive level down to the contract management and weekly project team meeting level. Management expectations are clearly stated and communicated.

**Q. Did PEF reorganize the LNP project controls organization during 2009?**

A. Yes. In May 2009, the integration of the Baseload Transmission project into NPD put the Levy Plant and the Baseload Transmission project under one executive. A series of "gear train" work sessions were held to refine the NPD organization including an evaluation of both the Transmission Baseload project controls unit and the NPD project controls unit. The result was a combined organization under the General Manager Corporate Development Business Services.

The project controls organization was staffed with personnel drawn from the prior two existing project control organizations ensuring overall continuity and management by experienced personnel. In addition, a manager of contract administration position was established with the principal responsibility for the EPC contract.

**Q. What were the primary LNP project control methods in place in 2009?**

A. Building upon the processes established prior to 2009, NPD continued to use several project control methods: 1.) Project plans; 2.) Financial controls (including contract earned value evaluations); 3.) Coordinated corporate budget planning with expenditures as authorized through the Integrated Project Plan process; 4.) Financial cash flow analysis; 5.) Schedules (engineering, contractor, and licensing); 6) Risk management plans; 7.) Performance indicators; and 8.) Vendor performance monitoring (cost, schedule, and performance); and other methods. These project controls are consistent with industry best practices and standards.

To report performance, the NPD prepares a monthly "Nuclear Plant Development Performance Report." This report typically covers such topics as 1.) Safety, cost, schedule issues and activities, including identifying any key issues and risks and providing a look-ahead overview; 2.) Performance data, including key performance indicators (KPIs), integrated cost performance, contract status, contractor cost and schedule performance, scope changes, high risk or critical issues, organization, and staffing; 3.) Significant project decisions; 4.) Self-evaluation results; 5.) Engineering updates; 6.) Licensing updates; 7.) COLA and AP1000 status; and 8.) Public and media interaction information. These topics are consistent with industry practices for project reports on projects of this size and scope.

During 2009, PEF incorporated elements of the Consortium's Levy EPC Monthly Status Report (MSR) into the NPD Performance Report. The EPC Agreement requires the EPC Consortium to provide the report by the 10th of each month. From the issuance of the first MSR in February 2009, PEF took an active role in ensuring this requirement was met and that the report contained timely, useful and accurate information. These efforts resulted in a more informative metric-based document.



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In June 2009, NPD began issuing a NPD Weekly Program Report capturing the component "projects" including Levy Licensing (COLA and SCA), Schedule Shift / EPC Negotiations, Transmission, Environmental Mitigation, and Levy State Lands. Other topics were added as appropriate. This report brought increased visibility to the entire Levy program in a consolidated location. These reports are the types of reports I would expect to see in a project such as LNP.

NPD also performs contract management. Contractors are required by each contract to meet specific performance, staffing and reporting requirements consistent with industry standards. Contractor project status reports address, when necessary, issues requiring management attention, quality issues, health and safety issues, teamwork and accountability issues, project budget and invoicing information, scope revisions, budget and schedule performance, monthly cash flow, requests for information, the project schedule, documentation submittals, and work accomplished during the month. These are the types of issues I expect to see in contractor status reports on projects of this size and scope and are consistent with industry practice and standards.

**Q. What controls were used for the Levy Baseload Transmission Project in 2009?**

A. The project control responsibilities for management of the Baseload Transmission Project included: 1.) real-time schedule and critical path



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analysis; 2.) cashflow development / assessment with contractor provided data; 3.) key performance indicator development; 4.) change order management; 5.) estimate development and estimate reviews; 6.) contract administration; 7.) contractor schedule and cost review; and 8.) management of project contractors. During early 2009, Baseload Transmission project staff was supported by a financial and business service group with primary responsibilities for cost management and reporting, interface with project controls, financial analysis, budget development and analysis, and project set-up and analysis. Cost estimating and other support functions were provided by Budget Management & Compliance as needed.

Monthly reports were issued summarizing the schedule and financial status of the Baseload Transmission project for senior PEF management. Typical reports addressed: actual, budget and projected expenditures; actual and projected total costs by year - line, substation, and AFUDC; milestone cost history; schedule dates and key events; required third party approvals; issues, impacts, and responses; and the project risk matrix with the likelihood and consequences of identified risk items. In addition, a specific project controls report was issued which detailed month-by month graphs and tables showing individual project actual, budget, variance, and projected costs.

Throughout 2009, the Levy Baseload Transmission project conducted monthly management reviews of program status, cost and schedule updates, near-term activities, program risks and challenges. Project meetings provided information, integration, and coordination between the Project Team and involved PEF Departments. Weekly status reports were also developed by the Levy Baseload Transmission project team showing overall trends, financial information, risks, 90-day look-ahead schedules, percent complete, staffing levels and actions/ issues.

With the integration of the Levy Transmission Baseload project into NPD in mid-2009, the Transmission Baseload Project status was included in the NPD Weekly Program Report. This status report summarized overall LNP project risk, financial performance, changes, milestones, key highlights, schedule and staffing.

**Q. What estimating activities occurred during 2009 on the LNP?**

A. In March 2009, Burns and Roe issued its report titled, "Review and Validation of the AP-1000 Cost and Schedule." Burns and Roe is a world-wide engineering and construction firm with expertise in nuclear power plants that had been engaged by PEF to provide an independent validation of the LNP nuclear plant estimate. PEF conducted a detailed review of the findings of the report, reviewed the findings with the EPC Consortium, and developed a data base to track related mitigation strategies.

The Levy Baseload Transmission Project conceptual screening estimate was issued in March 2009. The estimate covered the scope of the transmission project (substations, lines, and CREC switches). The estimate was based on high level conceptual designs because preliminary engineering had not been completed for a majority of the subprojects.

After the schedule shift, NPD's primary focus was on reviewing the scenario analyses prepared by the EPC Consortium evaluating the cost impact of the LNP schedule shift. The NPD team began assembling information to analyze options developed by the EPC Consortium.

**Q. Was the 2009 LNP cost estimation process prudent?**

A. Yes. The cost estimating process for the LNP is reasonable and prudent. The LNP cost estimate was developed in 2008 for the Integrated Project Plan and validated by Burns and Roe in 2009. This integrated estimate was the result of substantial effort by the Levy Plant Project and the Levy Baseload Transmission Project.

PEF identified the scope of the project, including activities to secure permits, authorizations, and approvals; the cost of land and rights of way; the owner-managed project costs; the initial fuel loads; the staffing for startup and commissioning; fees and insurance; escalation and contingencies; and the financing cost. The cost estimates were developed with the input of engineering firms that had similar project knowledge. The estimates were independently reviewed to validate the documentation supporting the costs and to provide an independent assessment of the cost estimate. This process included the elements of a sound estimating process that is consistent with industry and professional standards.

In 2009, the Baseload Transmission project issued the conceptual screening estimate which was a reasonable estimate. The Baseload Transmission project estimate was developed in accordance with professional cost engineering association standards. The estimate utilized available engineering information and provided for management, escalation, real estate, contingency, and other costs. The estimate also incorporated a risk and opportunity analysis.

With the project schedule shift in 2009, PEF has prudently directed the EPC Consortium to develop various scenarios and the resulting cash flows to be able to update the IPP estimate and projection in 2010 when a decision is made on the schedule scenario analyses and further information provided by the EPC Consortium and developed by the Company.

**Q. How was the LNP budget monitored in 2009?**

A. The budget for LNP work provides a detailed breakdown of responsibility and of accountability. Widely distributed monthly reports tie scope to identified responsible managers and track budgets, actuals and variances. The costs for contractor performed work is reviewed and controlled through the contract administration process.

At the NPD Vice President level there is a monthly budget variance report prepared with input and analysis from the project team. Overall budgets are reviewed by senior management through the Monthly Business Review process. In early 2009, the LINC monitored the overall LNP budget. With the shift of the Levy Baseload Transmission project from the Generation & Transmission Construction (G&TC) into NPD, a single senior executive has sole responsibility for the entire LNP budget.

LNP budget performance is also reviewed by senior management through the management review processes I described earlier in this testimony.

**Q. What was PEF's approach to scheduling the LNP in 2009?**

A. In early 2009, PEF began to implement and refine the approach developed in 2008 to develop the Integrated Master Plan (IMP). The IMP process was established to ensure that project activities included the schedule activities for the EPC Consortium to support the key project goals and milestones established by PEF management.

The IMP scheduling database included all activities required from COLA development and NRC review, engineering, procurement, fabrication, construction, staffing, training, and startup activities leading to commercial operation. The IMP was developed from the detailed project schedules required for individual LNP contractors including the EPC

Consortium. The IMP also contains schedule information from other sources including supporting PEF business units.

The IMP schedule linked to data from the EPC Consortium that contained approximately ten individual schedules with over 88,000 schedule items. In addition, schedule information from other contractors was also imported. Finally, templates for the AP1000, Toshiba schedule, four procurement schedules, and three construction schedules were established. The IMP scheduling database contained nearly 90,000 individual activities.

With respect to the Baseload Transmission project, the scheduling approach was to develop an overall project schedule to serve as a baseline to assess schedule performance against project milestones. This Level 3 schedule was developed by a dedicated scheduler with extensive experience on large projects worldwide. The schedule was developed to manage and monitor the work of the owner's engineer, the real estate acquisition contractor, and, ultimately the construction program. It was also to be used to monitor and coordinate the work of the various participating PE business units and other project participants. The initial schedule was issued February 16, 2009.

Both the IMP development and the Baseload Transmission schedule used Primavera scheduling software, generally recognized as the best available project scheduling software platform.

After the LWA determination notice and resulting schedule shift, both the LNP plant and the Transmission Baseload schedule approach was adjusted to reflect the change in the level of work anticipated for the remainder of 2009. The LNP plant scheduling effort focused on the permitting and licensing items, and the transmission schedule focused on the near term work at the CREC switchyard.

**Q. Was PEF's LNP schedule approach in 2009 reasonable and prudent?**

A. Yes. In my opinion, PEF's approach to scheduling is reasonable and prudent. The scheduling process for the Levy nuclear plant anticipated the needs of the project with the signing of EPC contract. The IMP is a reasonable approach to permit owner oversight and monitoring of the LNP project and the EPC Consortium schedule performance.

The Baseload Transmission schedule was reasonable. It was prepared by an experienced scheduler and peer reviewed. The schedule provided a logical sequence of activities and provided the necessary critical path sequence.

The scheduling approach used by the LNP in 2009 is consistent with my experience and industry standards for project schedules of very large projects of similar size and scope. The project is using industry accepted scheduling tools and processes for the incorporation of appropriate data into the schedules.

**Q. How did PEF manage LNP contractor performance in 2009?**

A. PEF provided oversight of contractors in 2009 as was done in 2008, through direct involvement of LNP technical, management, and project controls staff. LNP personnel provided oversight of contractors by communicating by face-to-face, e-mail, and telephone communications, and by formal and informal meetings. The quality program and audits provided independent reviews of contractor performance. The Company required contractors to provide monthly reports on their accomplishments and their performance under the contract relative to safety, quality, scope, budget, invoicing, schedule, and future work. PEF management reviews were conducted monthly.

Contractors were typically assigned work under a task order process where an assignment was made and an estimate developed by the contractor to complete the work scope. LNP project personnel reviewed the technical scope for responsiveness and the cost for reasonableness. Once approved, the contractor was allowed to proceed. The contractor reported progress against the scope, cost and schedule requirements. Changes in work required similar review and analysis. An impact evaluation was prepared to document the change. Changes were evaluated by technical personnel providing oversight of the work and approved NPD management.

This contract management process to monitor contractor performance was reasonable and prudent.

**Q. Did PEF improve oversight of contractors working on the LNP in 2009?**

A. Yes. During 2009, PEF improved the oversight of contractors on the LNP by developing and implementing the EPC Implementing Procedures. On the Levy Transmission Project, PEF implemented earned value measurements through the process described in the new PMCoE Project Earned Value Management procedure. These measurements are shown in the Transmission Owner Engineer's Progress (Patrick Energy) presentations. In addition, the Baseload Transmission project improved the Contract Change Notice Process for executing a change notice and authorizing the related work.

**Q. Did you find examples of the effectiveness of the Levy Plant project controls?**

A. Yes. I found several instances that demonstrate the effectiveness of the LNP project controls. I have described below three significant examples of the prudence and reasonableness of LNP project controls in validating invoices, ensuring proper charging by the EPC Consortium, and internal *auditing:*

1. The EPC Invoice Validation & Processing procedure was initially used to review and validate 10 EPC Consortium invoices submitted in January, 2009. Two of these two invoices with a total value of more than $3M were rejected, and subsequently

withdrawn because the EPC Consortium did not sufficiently demonstrate through proper documentation that the Milestone Payments work had been completed. The EPC Consortium took prompt action to refund the portion of a long-lead equipment invoice (plus associated escalation with interest payments) in which evidence of required milestone completion could not be provided.

2. During review of some EPC Consortium invoices, NPD project controls identified that the actual escalation reported by the January 2009 index was approximately two-percent less than the July 2008 index. PEF worked with the EPC Consortium to adjust the applicable rates as provided for under provisions of the EPC contract. A reduced rate to "true-up" the EPC Consortium invoices for the next six months was agreed upon.
3. On August 3, 2009 the Audit Services Department (ASD) issued the report of the audit it conducted of the LNP EPC agreement. The objective of the audit, in part, was to review the key provisions of the EPC contract to assess the sufficiency of internal policies and procedures developed to support the administration of the EPC contract.

The ASD rated the overall EPC contract as being "Effective" (the most positive of four ratings). The audit found:

- All invoices sampled were appropriate and had evidence of a detailed review performed by Project Controls.
- Any billing issues identified were resolved in a timely manner.
- In multiple instances Project Controls identified billing issues and appropriately communicated with the Contractor to obtain resolution.

In sum, PEF's LNP project controls in 2009 were reasonable and prudent and they were reasonably and prudently implemented.

## VIII. RISK MANAGEMENT.

**Q. Did PEF have a reasonable and prudent LNP risk management process in 2009?**

A. Yes. Prior to 2009, PEF had in place a reasonable risk management process. In my prior review, I found the LNP risk management process to be a prudent approach to managing a project of this nature and one that is consistent with best practices in the industry and government agencies such as the Department of Energy and Department of Defense. Risks had been identified and assessed and responses were developed. During 2009, the LNP risk management process was prudently enhanced in several ways.

**Q. How did PEF improve risk management for the LNP in 2009?**

A. In 2009, PEF initiated several enhancements of the LNP risk management program. In January 2009, NPD began updating and re-ranking LNP risks with support provided by the LNP owner-engineer, Worley Parsons. The first enhancement was to transition the NPD risk tool from a regulatory driven focus to an overall EPC execution focus.

Over the period of January through April, an integrated team identified LNP risks and prepared a risk register to track them. Close to 60 risks were mapped "before treatment" and "after treatment" in Risk Maps. The top ten were reported and tracked in the monthly NPD Report. Treatment plans were developed to mitigate the high priority risks.

In March 2009, the PMCoE issued a new risk management standard, "Project Risk Management" PJM-SUBS-00008, which became the corporate standard and is applicable to all projects. This standard builds upon best practices in the industry.

Also, in March 2009, the EPC Consortium submitted the procedures for the Consortium AP1000 Risk and Opportunity Management Plan to NPD management. This document codified the risk assessment procedures for Consortium Risk Management. The Consortium risks consisted of some 250 items that required evaluation. These items dealt with project specific engineering, design, procurement, and construction potential risks. Throughout 2009, NPD reviewed the EPC Consortium risk management process. Meetings were held to ensure accuracy and alignment among the various levels of identified risks and their treatment.

Beginning in August 2009, NPD initiated an effort to implement a more robust risk management process to meet the PMCoE standards established by the new procedure. NPD held a series of meetings to review LNP risks and train both Levy nuclear plant and Baseload Transmission project personnel in the risk process. In September, workshops were held in Raleigh for the nuclear team and Florida for the Baseload Transmission team. A new risk management software tool was researched and purchased to serve as the platform for risk management.

With respect to the Levy Baseload Transmission project, complex work was planned in the CREC switchyard in 2009. A specific risk register was developed for this work. The matrix identified potential risks, probabilities, impact and response strategies.

**Q. Was PEF's 2009 risk management process prudent?**

A. Yes. PEF improved risk management in 2009. In my opinion, PEF maintained a reasonable risk management process. The LNP risk management process is a prudent approach to managing a project of this nature and one that is consistent with industry and government agency practices.

## IX. POLICIES AND PROCEDURES.

**Q. Did PEF have in place prudent LNP policies and procedures in 2009?**

A. Yes. PEF had in place reasonable and prudent policies and procedures for each function to be accomplished either directly or in support of the LNP. Throughout 2009, overall corporate and LNP specific policies and procedures were revised to improve normal corporate business functions, project management, procurement and contract administration. In addition, NPD made the following specific procedural improvements:

1. Created and revised as needed more than 20 EPC contract oversight procedures for schedule performance oversight, subcontracting, change control, price adjustment, and approval authority for change orders, among others.
2. Developed triggering conditions for development of additional EPC contract oversight procedures.
3. Created or revised PMCoE documents, including procedures for managing scope, cost, earned value, risk, procurement, quality, claims, and lessons learned.

PEF's policies and procedures define expectations and accountability for work product, identify responsibilities, serve as training tools for staff, and provide a program for review and updates. PEF's policies and procedures are consistent with industry standards.

**Q. Did NPD have in place the procedures necessary to support effective project management and control of the LNP in 2009?**

A. Yes. The underlying basis for managing the Levy Plant and Baseload Transmission projects is the extensive procedural hierarchy by which the Company traditionally managed plant and transmission line projects. PEF established the overall governance policy to guide the construction of the LNP. Also, as noted in my answer above, the PMCoE developed a set of corporate project management procedures to raise the standard of project management. Finally, many Levy EPC procedures were developed to address specific conditions encountered in implementing the EPC contract.

The LNP governance policy is a comprehensive guide for project execution. It established roles and responsibilities based on using internal departmental practices and procedures. The governance procedure provides coordinated management oversight and ensures independent oversight of line organization activities. The governance policy established Cost Performance Indicators (CPIs), Schedule Performance Indicators (SPIs), and COLA performance monitoring. NPD requires vendors to report performance with respect to CPIs, SPIs and other Key Performance Indicators (KPIs). Individualized KPIs were developed for LNP and are reported monthly in the NPD Performance Report.

For transmission activities, the G&TC guideline, Execution of Large Construction Projects and Programs, was used in early 2009. It provided an appropriate set of directives for the Baseload Transmission program team. This procedure identified project management, engineering, environmental support, right-of-way acquisition, project controls and business management support. After the Baseload Transmission project was integrated into NPD, the project management procedures were maintained.

**Q. Were PEF's policies and procedures in 2009 prudent?**

A. Yes. In my opinion PEF had reasonable and prudent policies and procedures in 2009.

## X. PROJECT ASSESSMENT.

**Q. Did PEF have in place prudent project assessment mechanisms and processes in 2009?**

A. Yes. In 2009, PEF performed reasonable and prudent audits, independent reviews, benchmarking initiatives, and self assessments. The key organizations that perform independent assessments are Internal Audit and Nuclear Quality Assurance (QA). In addition, the line organizations performed self assessments. NPD continued participation in several industry organizations to benchmark the LNP and obtain lessons learned.

**Q. Please describe the Internal Audit Project Assessment reviews performed in 2009.**

A. The Progress Energy corporate Internal Audit Services Department conducted internal audits on the LNP including: 1.) the Engineering, Procurement, and Construction contract; 2.) the Levy Baseload Transmission Program; and 3.) Florida Nuclear Plant Cost Recovery Rule (NPCRR) Compliance. The EPC contract audit report and the Levy Baseload Transmission Program audit report were provided to the NPD Vice President. The NPCRR Compliance audit was provided to the PEF Controller, the Vice President – Corporate Planning and the PEF Vice President - Finance. Each report identified the audited areas, with an overall opinion and specific observations and recommendations. In consultation with the audited department's management team, each observation and recommendation issue was assigned an action plan. Each action plan identified an owner and a completion date. The audits performed on LNP were responded to and recommendations were acted upon or are scheduled to be completed in 2010.

**Q. Please describe the Quality Assurance reviews and audits performed on the LNP in 2009.**

A. In 2009, Quality Assurance (QA) reviews and audits were performed for LNP activities in the field with respect to grout activities and boring; supplier audits, and operational readiness. Two grout test audits were to confirm actions had been properly taken as a result of earlier findings and to perform follow up field work. Although minor items were noted, the audits reported compliance with the project QA program.

Two surveillances were performed for the site boring tests, both of which were conducted in September. The audits reported that significant improvement was made by the contractors planning and performing the boring tests.

Comprehensive audits were performed on major suppliers, Shaw Stone and Webster and Westinghouse Electric Company, by joint utility teams. The completed audit reports identify recommendations, management responses, and actions taken as a result of these audits.

**Q. Did PEF engage in LNP Self Assessments in 2009?**

A. Yes. NPD performed self-assessments of its activities. 2009 LNP self assessments include: document control and records management; financial charging practices; design and license basis control; oversight of design finalization to ensure regulatory compliance; and contractor security requirements. Additionally, benchmarking was done to review activities at the lead AP1000 plant and to review licensing.

**Q. What benchmarking for the LNP was performed in 2009?**

A. In 2009, PEF continued to work with industry peers in several organizations: NuStart; the AP1000 Owners Group (APOG) / Builders

Group; the Institute of Nuclear Power Operations (INPO) New Plant Executive Group; and the Nuclear Energy Institute New Plant Working Group. Working with these organizations enabled NPD to ensure it had the latest information on issues associated with engineering and licensing associated with COLA development and finalization of the AP1000 design. Further, participation in these organizations led to reducing costs by sharing resources with other utilities planning to utilize the AP1000 reactor technology. The joint efforts also encouraged sharing technical and engineering information.

In addition, NPD participated with the International Atomic Energy Agency exchange visits to China to benchmark their AP1000 program and with an INPO trip to Southern Company's Vogtle AP1000 project.

## XII. CONCLUSION: LNP PROJECT MANAGEMENT AND PROJECT CONTROLS EMPLOYED IN 2009 WERE REASONABLE AND PRUDENT.

**Q. Are the LNP project management and project controls employed in 2009 reasonable and prudent?**

A. Yes. In my opinion PEF had in place throughout 2009 prudent and reasonable processes and an organizational structure to manage the LNP. PEF used reasonable and effective management practices to meet LNP goals for scope, schedule, budget, regulatory, safety, and quality requirements.

Senior management oversight was extensive. The project governance policy further provided a comprehensive guide for the LNP with coordinated independent oversight and management. The NPD is a reasonable management organization which reasonably established stronger business policies and controls. The EPC contract was prudently managed. NPD improved the risk management process consistent with industry best practices. There are reasonable project controls in place to develop schedules and estimates and monitor contractor performance and project expenditures. There was reasonable reporting and performance monitoring, and key performance indicators put in place were reasonable. NPD had in place effective and comprehensive project management and execution policies and procedures. In 2009, these procedures were enhanced and new procedures were developed for managing the EPC. The new project management procedures issued by the PMCoE further enhanced the standards set by Company management. There is extensive use of project reviews, internal audits, benchmarking, self assessments, and QA. As a result, the 2009 LNP project management and project controls were reasonable and prudent.

**Q. Does this complete your testimony?**

A. Yes.

## JANUS PERSONNEL

Janus team members have performed 16 prudence evaluations of the construction of new nuclear power plants, the costs associated with nuclear stations that underwent long outages, and the expenditures from trust funds for decommissioning shutdown units.

Janus personnel have submitted expert testimony regarding utility management prudence before the following public utilities commissions:

- Arkansas re: Arkansas Nuclear One Unit 2 Steam Generator Replacement
- California re: San Onofre 2 & 3 Steam Generator Replacement Project
- Connecticut re: Millstone 3 new construction 1986; Sale of Millstone Station and Millstone 1 decommissioning 2000
- Florida re: Crystal River 3 1996-1997 outage
- Georgia re: Vogtle 1 & 2 new construction
- Indiana re: D. C. Cook 1 & 2 1997 – 1999 outage
- Louisiana re: Waterford 3 Steam Generator Replacement Project
- Maryland re: Calvert Cliffs 1 & 2 1989-1991 outage; 2002 – 2003 Steam Generator Replacement Projects
- Massachusetts: Pilgrim 1986 – 1990 outage
- Michigan: D. C. Cook 1 & 2 1997 – 1999 outage
- New Hampshire re: Seabrook 1 new construction
- Ohio: Perry new construction
- Texas: South Texas Project and Comanche Peak new construction

In addition, members of the Janus team have submitted expert reports for U.S. District Court cases (re: the Peach Bottom 2 & 3 NRC-ordered shutdown and the Cooper power contract dispute) and testified before the Miami, Florida arbitration board re: Turkey Point 3 & 4 1990 – 1991 Dual Unit Outage. Janus has performed independent reviews of the D. C. Cook Nuclear Plant Unit 1 acquisition and implementation of the 2006 low pressure turbine replacement project and the D. C. Cook Unit 1 Severe Vibration Event Turbine Recovery Outage.



***<u>Gary R. Doughty, President,</u>*** has 35 years of experience in the nuclear industry with specific focus on the prudence of nuclear power plant capital project management and technical safety issues management. Mr. Doughty has led assessment teams performing management prudence assessments, economic analyses, and litigation support. He has also been a member of independent review teams for utility boards of directors: Ameren (Callaway Nuclear Power Plant performance issues); and Northeast Utilities (NU) as a member of the Fundamental Cause Assessment Team (Millstone 1, 2, and 3 performance issues and recovery).

Mr. Doughty has performed comprehensive management prudence assessments of new nuclear plant construction, nuclear plant recovery programs from long duration outages and Nuclear Regulatory Commission "watch list" situations.

- Project manager for NU of the Connecticut Department of Public Utility Control's prudence audit of the $4 billion Millstone 3 nuclear power plant
- Project manager of the independent prudence review team of the 32-month outage of Pilgrim to address NRC concerns, upgrade management, and make plant safety modifications
- Team director of an independent assessment team examining the costs and recovery schedule of Peach Bottom 2 & 3 from the NRC-ordered shutdown in 1987-1989 for the plant joint owners in U. S. District Court litigation.
- Project manager of independent management prudence review team of the Calvert Cliffs 1 & 2 outage to upgrade nuclear programs and repair the pressurizer in 1988-1990 while on the NRC "watch list."
- Project manager of the independent management prudence review team of the Crystal River 3 1996-1997 outage.

Mr. Doughty has also managed strategic economic studies of the continued operation of nuclear plants for MidAmerican Energy (Cooper Nuclear Plant), IES Utilities (Duane Arnold Energy Center), and Baltimore Gas & Electric Company (Calvert Cliffs 1 & 2). He directed assessments of the Steam Generator Replacement Projects for Entergy Operations, Inc. (ANO Unit 2) and for Florida Power & Light Company (St. Lucie 1). Mr. Doughty authored three strategic nuclear asset management reports for the Electric Power Research Institute on key economic issues facing nuclear utilities under competitive market conditions.

Mr. Doughty has provided testimony as an expert witness before the Arkansas, Connecticut, Florida, Indiana, Massachusetts, Maryland and Michigan state utility commissions and a Miami Arbitration Association panel concerning Arkansas Nuclear One Unit 2, Millstone 1, 2 & 3, Crystal River 3, D. C. Cook 1 & 2, Pilgrim, Calvert Cliffs 1 & 2, and Turkey Point 3 & 4 nuclear stations, respectively.

***Stephen J. Marmaroff, Vice President,*** has thirty seven years experience in the electric utility industry with management expertise in the areas of nuclear plant construction management, nuclear regulatory issues, capital program planning, and project management. Mr. Marmaroff has performed prudence assessments of utility management decision-making and has analyzed the economics of continued nuclear plant operation. He has testified as an expert witness on nuclear plant project management and outage management before the state regulatory commissions in Connecticut, Ohio, Massachusetts, Maryland, and Texas.

Mr. Marmaroff managed plant litigation support activities for Northeast Utilities concerning the Millstone 1, 2, and 3 recovery outages. He testified before the Massachusetts and Maryland public service commissions with regard to independent management prudence assessments of long nuclear plant outages for Boston Edison Company (Pilgrim Station) and Baltimore Gas & Electric Company (Calvert Cliffs 1 & 2). He has been involved in nuclear plant strategic asset management studies for MidAmerican Energy (Cooper Nuclear Plant) and IES Utilities (Duane Arnold Energy Center) and assisted Baltimore Gas & Electric Company (Calvert Cliffs 1& 2) and the Electric Power Research Institute develop strategic plans for license renewal.

Mr. Marmaroff was a senior consultant in prudence assessments of the construction of the Clinton, Comanche Peak 1 & 2, Millstone 3, Perry, Seabrook, South Texas Project, and Vogtle 1 & 2 nuclear plants. His utility experience includes nineteen years with American Electric Power, where he was Assistant Vice President and Projects Division head. In this position he was responsible for project management and control functions on the design and construction of fourteen generating units (including D. C. Cook Nuclear Plant) and various air pollution control retrofit projects and transmission system additions.

***Dennis Meilhede, P.E., Senior Associate,*** possesses a broad background in construction project cost and schedule management. He has extensive experience in the analysis of nuclear plant technical issues and nuclear regulatory issues for management prudence evaluations of nuclear plant outages and new construction projects. Mr. Meilhede was a lead consultant in five nuclear plant prudence audits and evaluated management decisions with respect to project controls for new construction plants, outage scope control, schedule delays/extensions, and cost control. He has prepared testimony for rate cases before state regulatory commissions in Connecticut, Florida, Massachusetts, Maryland, and Illinois. Mr. Meilhede developed analyses for litigation before the federal courts and the Miami, Florida Arbitration Association.

Mr. Meilhede participated in the Cooper Power Contract Extension Study and prudence reviews of long outages at Calvert Cliffs 1 & 2, and Pilgrim; and new construction of Millstone 3, Vogtle 1 & 2, and Clinton. He was lead consultant for outage delay schedule reviews in the Turkey Point 3 & 4 Dual Unit Outage arbitration and the Peach Bottom 2 & 3 NRC-ordered shutdown litigation.

Mr. Meilhede has been involved in litigation support for technical issues on nuclear outages at Millstone 1, 2, & 3 and Connecticut Yankee. He performed detailed analysis of the Crystal River 3 shutdown and assisted in testimony development. Mr. Meilhede assisted Baltimore Gas & Electric Company and the Electric Power Research Institute develop the Calvert Cliffs Nuclear Power Plant asset management strategy.

***Matthew D. Doughty, Associate***, has 7 years experience in project scheduling, project risk management and consulting assignments. He is a certified Project Management Professional. He has performed research and analyses for independent evaluations and legal disputes of utility plant projects. He performed project risk evaluations and project scheduling for an $800 million Department of Defense project.

Mr. Doughty is currently working with Public Service of New Hampshire (PSNH) in a review of the schedule performance of the most complex outage ever undergone at PSNH's Merrimack Unit 2 coal-fired power plant. He has assisted in the preparation of testimony related to cost and schedule performance for hearings before the California, Connecticut, and Louisiana public utility commissions. He also assisted in preparing the expert report for a case before the U.S. District Court in Nebraska involving a power plant joint-owner lawsuit concerning the costs associated with capital projects.

As a senior consultant for Booz Allen Hamilton, Mr. Doughty implemented and managed the risk management process for the U.S. Army's implementation of the Defense Integrated Military Human Resource System (DIMHRS) in the Program Operations Branch of the Army DIMHRS Program Office. Mr. Doughty supported the Program Operations efforts on the Army Integrated Master Schedule, including coordinating updates and analyzing the information captured within the schedule.

# RESUME OF GARY R. DOUGHTY

## I. POSITIONS AND EMPLOYMENT HELD IN THE FIELD OF NUCLEAR POWER FACILITIES

**1992 – Current President of Janus Management Associates, Inc.**

Janus Management Associates, Inc. is a nuclear power plant consulting firm that provides evaluation of safety, management and technical issues associated with nuclear power plants. As president, Gary Doughty has performed individually or with teams several independent management and operational assessments of operating and decommissioned nuclear power plants. Key areas of experience include:

**Independent Reviews of Nuclear Safety, Management and Technical Issues**

- Process, Organization, and Management Prudence Reviews
- Nuclear Engineering, Licensing and Project Management Evaluations
- Analysis of Technical Issues and Resolution of Employee Safety Concerns

**Nuclear Power Plant Strategic Decision Analysis**

- Nuclear Plant Strategic Asset Management and Capital Reinvestment Analyses (e.g., Steam Generator Replacements, Power Uprates)
- Nuclear Plant Asset Valuations, Economic Assessments, and Due Diligence Reviews to Provide Basis for Continued Operation, License Renewal, or Acquisition

**1987 – 1992 Senior Vice President of the Nielsen-Wurster Group, Inc**

The Nielsen-Wurster Group, Inc. was a construction management and project management consulting firm that provides services associated with nuclear power plants to public service commissions, utilities, and engineering / construction firms. As Senior Vice President at the Nielsen-Wurster Group, Inc., Gary Doughty performed independent management reviews of many nuclear power plants including a newly constructed plant and several operating plants that had experienced long duration outages.

**1986 – 1987 Manager of Industry Relations for the Institute of Nuclear Power Operations**

The Institute of Nuclear Power Operations is the nuclear power industry's safety organization. This position was responsible for publishing and distributing safety event analyses and industry good practices to industry members.

**1975 – 1986 Nuclear Management and Plant Staff Positions with Northeast Utilities Service Company and Northeast Nuclear Energy Company**

- Manager of Millstone 2 Capital and Large Expense Projects - responsible to evaluate, plan, estimate, schedule and install capital and maintenance projects.
- Member of the Millstone 2 Nuclear Safety Review Board
- Project Manager of the Millstone 3 Nuclear Plant Construction Prudence Audit by the Connecticut Department of Public Utility Control
- Manager of Nuclear Information and liaison to the Governor of Connecticut for Nuclear Issues
- Start-up Engineer for Millstone 2 nuclear safety systems and Shift Test Engineer for Initial Start-up and Power Ascension Testing

**1970 – 1975 Officer, United States Navy Nuclear Submarine Program**

- Served in U.S.S. Sturgeon (SSN637), a nuclear fast attack submarine, as division officer for the Auxiliary Division and Sonar Division. Also served as Damage Control assistant, Ship Diving Officer, Nuclear Weapons Security Officer, and Communications Security Officer. Qualified for ship watch positions as Engineering Officer of the Watch, Officer of the Deck, Diving Officer and In-port Duty Officer.

## II. INDEPENDENT EVALUATION ASSIGNMENTS PERFORMED AS PRESIDENT OF JANUS MANAGEMENT ASSOCIATES, INC.

- 2009 - 2010 – Janus is currently performing an independent prudence review of the 2008-2009 D. C. Cook Unit 1 Severe Vibration Event Turbine Recovery Outage. Janus is also independently reviewing the D. C. Cook Unit 1 2006 Low Pressure Turbine Replacement Project.

- 2007 – 2008 - Member of the Independent Review Team (IRT) for the U.S. Department of Energy Mixed Oxide Fuel Fabrication Facility for the MOX Facility Board of Governors. The IRT was selected to review project methods and activities for key actions in the design and construction of the $4.8 billion facility at the DOE's Savannah River Site in South Carolina.

- 2005 – 2009 – Janus provided assistance to Northeast Utilities management and its legal department to implement more than $3 billion worth of capital projects including major underground 345,000 Volt transmission lines, replacement of underwater cables across Long Island Sound, construction of a 1.2 billion cubic foot liquefied natural gas storage tank, and the conversion of a coal-fired plant to wood-fired. The assistance included documentation of major project decisions; preparation of project history workbooks; and training in prudent management principles.

- 2004 - 2006 – Member of the Callaway Nuclear Plant Independent Review Team established by the Ameren Board of Directors. The team performed an independent review of the causes of Callaway's performance decline and developed recommendations for improvement regarding management organization, leadership, planning, training, standards, engineering effectiveness, and safety culture.

- 2004 – 2005 - Provided expert testimony to support Southern California Edison Company (SCE) before the California Public Utility Commission (CPUC) rebutting assertions made by The Utility Reform Network that the Pacific Gas & Electric Company should pursue legal remedies against the steam generator manufacturer, Westinghouse Electric Corporation, to pay for replacement steam generators. The CPUC ruled in favor of SCE.

- 2004 – Performed an independent review of several million dollars worth of contractor claims for Xcel Energy / Northern States Power Company associated with the steam generator replacement project installation contract for the Prairie Island Nuclear Station in Minnesota.

- 2004 – For PSEG Nuclear performed an independent review of the Salem 1 and 2 / Hope Creek Nuclear Station of the work management system for the plant maintenance program. Also performed independent reviews of employee concerns reported to the U.S. Nuclear Regulatory Commission related to mechanical maintenance, the safety tagging program, spare parts, and problem identification process.

- 2003 - 2004 – Connecticut Yankee Decommissioning Project review of major management decisions, planning, scheduling, cost, and decommissioning activities for the safe decontamination and dismantlement of the plant.

- 2003 - Salem 1 and 2 and Hope Creek review of project management organization and processes to perform $800 million of capital improvements to replace Salem 1 steam generators, increase rated power of Hope Creek, build an ISFSI, and replace Salem 1 and 2 main turbines. Member of a team that reviewed licensing and technical issues, quality of engineering documents to meet design basis and configuration management requirements, the performance by field construction forces and work practices with safety-related equipment.

- 2003 – Yankee Rowe Decommissioning Project review of major management decisions for the safe handling and transfer of spent fuel from the spent fuel pool to the independent spent fuel storage installation.

- 2002 – 2003 - Cooper Nuclear Power Plant analysis of major capital and maintenance projects to assess their justification for continued plant operation, contribution to nuclear safety and requirement to meet nuclear regulatory regulations.

- 2001 – Independent cost management review of the decommissioning activities of Unit 1 at the San Onofre Nuclear Generating Station for Southern California Edison Company.

- 2000 - Independent steam generator operating experience review of the Calvert Cliffs 1 & 2 steam generators, plant operating and maintenance practices for steam generators and water chemistry control improvements to enhance the integrity of the steam generators for Baltimore Gas and Electric Company. Submitted testimony to the Maryland Public Service Commission regarding the industry's experience with steam generator tube corrosion, the various industry actions taken to arrest or limit corrosion and the justification and reasonableness of replacing the Calvert Cliffs 1 & 2 steam generators.

- 1996 – 2002 – Member of the Millstone Fundamental Cause Assessment Team to investigate the causes of the decline in performance of the Northeast Utilities nuclear program. Monitored the Millstone Recovery including the design basis reverification effort, the improvements made to the safety analysis and 10CFR50.59 processes, the response to Nuclear Regulatory Commission violations and restart commitments, and the efforts to establish a Safety Conscious Work Environment.

- 1997 – 2002 - Millstone 1 Decommissioning review of major management decisions for the safe shutdown activities and initial decommissioning projects to establish a spent fuel island and to separate the plant from the operating units, Millstone 2 and 3. The electrical separation project involved complex electrical issues and unreviewed safety questions concerning safe shutdown requirements per Appendix R and installation of electrical cables near safety-related equipment while plant was at full power.

- 1996 - 1999 – Analysis of several operational safety issues at Connecticut Yankee that occurred during 1996. Performed an independent review of the management decision to prematurely shut down Connecticut Yankee, participated in a review to validate the decommissioning cost estimate, and performed an analysis of nuclear fuel failure events in the plant's operating history.

- 1998 – 1999 - Led a team to conduct an independent analysis of the technical and safety issues associated with the 1997 – 1999 D. C. Cook 1 & 2 outages. The outages were related to design basis information and nuclear accident performance of the safety-related ice condensers and containment sump design.

- 1998 – 1999 – Independent steam generator operating experience review of the Arkansas Nuclear One – Unit 2 (ANO-2) steam generators, plant operating and maintenance practices for steam generators and water chemistry control improvements to enhance the integrity of the steam generators for Entergy Nuclear – Operations. Submitted testimony to the Arkansas Public Service Commission regarding the industry's experience with steam generator tube corrosion, the various industry actions taken to arrest or limit corrosion, and the justification and reasonableness of replacing the ANO-2 steam generators.

- 1996 – 1997 - Led a team to conduct an independent analysis of the technical and safety issues associated with the 1996 – 1997 Crystal River 3 outage. Several "unreviewed safety questions" were investigated associated with Technical Specification limits for safety equipment electrical loading of the Emergency Diesel Generators and potential net positive suction head problems of the Emergency Feedwater Pumps during postulated nuclear accident conditions.

- 1995 – Independent review of the performance of the Millstone 2 engineering staff with respect to a modification of the Engineered Safeguards Actuation System (ESAS). The ESAS review included examination of project planning, equipment procurement, system installation and testing, regulatory and design requirements, and configuration management.

- 1994 – 1996 – Assisted the Calvert Cliffs 1 & 2 Nuclear Power Plant License Renewal and Steam Generator Replacement Decision Analysis efforts. Participated in Baltimore Gas and Electric Company's evaluation of the risks and benefits, and the requirements necessary to become the first plant approved by the Nuclear Regulatory Commission for license renewal. Assisted the Calvert Cliffs Steam Generator Integrity Team analyze repair and replacement options and requirements of the steam generators. Prepared two reports documenting these efforts for the Electric Power Research Institute.

- 1993 - 1994 – Assisted the owner utility, IES Utilities, prepare the Duane Arnold Life Expectancy Study which analyzed the economics of continued operation of the plant and estimated the future regulatory requirements and safety enhancements necessary to achieve full license life and license renewal.

- 1992, 1995 and 1997 – Performed periodic independent assessments of the St. Lucie 1 Steam Generator Replacement Project over the life of the project. The assessments included a review of the engineering – construction contract bid submittals; a comprehensive review of the planning, licensing, and engineering for the project; and a readiness assessment just prior to the steam generator replacement outage.

- 1992 – 1994 – Led a team to perform an independent review of the 1989-1991 Calvert Cliffs 1 & 2 outage. The review focused on the prudence of management decisions and the plant activities required to repair a breach of the nuclear steam supply pressure boundary from leakage discovered in the pressurizer heater inserts.

## III. INDEPENDENT EVALUATION ASSIGNMENTS PERFORMED AT THE NIELSEN-WURSTER GROUP, INC.

- 1992 – Independent assessment of several refueling outages for the Turkey Point Power Plant Units 3 & 4 regarding the technical issues and nuclear safety-related equipment modifications to meet regulatory requirements and to upgrade plant systems. Provided expert testimony before a Miami, Florida Arbitration Panel on behalf of Florida Power & Light Company (FPL) regarding the Dual Unit Outage and FPL's engineering, construction, testing, and outage management performance.

- 1991 – Led a team to perform an independent assessment of the 1990 – 1991 Turkey Point 3 & 4 Dual Unit Outage. Both units underwent a year-long outage to install major nuclear safety-related electrical system upgrades and make security system modifications. The assessment evaluated the plant's safety culture; the plant organization's efforts to preplan the safety modifications, and the engineering organization's design activities, regulatory communications and equipment testing program.

- 1991 – 1992 – Led an independent team to evaluate the Peach Bottom 2 & 3 recovery from the Nuclear Regulatory Commission's (NRC's) Shutdown Order. The team performed a detailed investigation of the NRC's evaluations, reviews and inspections, the Peach Bottom "Commitment to Excellence Program," the plant Restart Plan and the Restart Testing Programs. The evaluation was conducted on behalf of the plant's joint owners.

- 1990 – 1991 – Led a team of three consulting firms to evaluate the risks and benefits of extending the Cooper Nuclear Station power contract from 2004 to 2014. The Cooper Contract Extension Study team prepared projections of future cooper O&M costs, capital additions, and fuel costs; assessments of the plant's material condition; evaluations of the regulatory compliance record and standing; and the implications of decommissioning expenses and nuclear waste disposal issues and costs. Other study areas addressed alternative generation supply options, the anticipated impact of the Clean Air Act Amendments of 1990 and financial issues.

- 1989 – 1992 - Led a team to perform an independent review of the 1989-1991 Calvert Cliffs 1 & 2 outage. The review focused on the prudence of management decisions and the plant activities required to repair a breach of the nuclear steam supply pressure boundary from leakage discovered in the pressurizer heater inserts. The review also included detailed analyses of engineering and design controls and maintenance of several safety-related components and systems (motor-operated valves, service water, instrument air, and emergency diesel generators).

- 1987 – 1992 – Participated in multidiscipline teams that examined the construction completion costs and utility management prudence associated with nuclear power plants under construction for public utility commissions, joint owners and engineer / constructors. These facilities included Comanche Peak, South Texas Project 1 & 2, and Nine Mile 2.

- 1987 – 1991 – Led an independent team to perform several evaluations related to the 1986 – 1990 Pilgrim outage. The team evaluated company decisions and actions to recover from the outage. The team also performed a detailed analysis of the processes, procedures, and management control systems in place to engineer and implement major maintenance and capital projects. Specific projects reviewed included the Hydrogen-Water Chemistry system, the Plant Simulator, replacement of Safety Injection System motor-operated valves and installation the Station "blackout" diesel generator.

## IV. EXPERIENCE AT THE INSTITUTE OF NUCLEAR POWER OPERATIONS (INPO)

- 1986 - 1987 – Participated in plant evaluations of Oconee 1, 2, & 3 and D. C. Cook 1 and 2. Responsible as Manager of Industry Relations to communicate INPO information and positions to industry members and governmental and technical organizations. Responsible for the publication and distribution of industry "good practices" and nuclear plant significant operating events, and safety performance indicators.

## V. NUCLEAR POWER PLANT EXPERIENCE AT THE NORTHEAST UTILITIES SERVICE COMPANY AND NORTHEAST NUCLEAR ENERGY COMPANY

- 1982 –1986 – Manager of Generation Projects for Millstone 2 Nuclear Generating Unit. Responsible for the overall project evaluation, planning, estimating, scheduling and installing capital and maintenance projects with an overall budget of more than $100 million. Plant projects included responding to NRC regulatory requirements such as Appendix "R" Fire Protection, Generic Letters associated with the Three Mile Island Accident, and upgrades to safety-related systems. Major projects included removal of the reactor thermal shield and a steam generator integrity program that comprised several tube sleeving campaigns, channel head chemical decontamination and corrosion product removal efforts.

- 1984 – 1985 – Temporary assignment as manager of schedule integration for Millstone 3 construction completion and plant start-up activities and as Northeast Utilities' Project Manager of the Millstone 3 Nuclear Plant Construction Prudence Audit by the Connecticut Department of Public Utility Control.

- 1977 – 1982 - Manager of Nuclear Information - responsible for informing the Governor of Connecticut's office, the media and the public about nuclear plant operations for Millstone 1, 2, and 3 and Connecticut Yankee Atomic Power Plant. Developed the emergency and nuclear incident communications program in response to the Three Mile Island Accident in 1979.

- 1975 – 1976 - Start-up Engineer for Millstone 2 nuclear safety systems and Shift Test Engineer for Initial Start-up and Power Ascension Testing. Wrote, conducted and certified the acceptability of plant systems from the engineering-construction firm.

## VI. NUCLEAR POWER EXPERIENCE AND TRAINING IN THE UNITED STATES NAVY

- Training in Navy Nuclear Power School located in California, and Nuclear Prototype in Idaho. Division Officer (Ensign to Lieutenant) aboard nuclear attack submarine, U. S. S. Sturgeon (SSN 637). Also served as SUBSAFE Officer and Nuclear Weapons Security Officer aboard Sturgeon. Qualified to operate and maintain navy nuclear reactors as Engineering Officer of the Watch for the S1W Prototype and the S5W U. S. S. Sturgeon nuclear reactors.

## VII. EDUCATION

- Bachelor of Engineering in Electrical Engineering, Vanderbilt University
- Master of Business Administration, University of New Haven
- Senior Professional Certificate – Finance, University of New Haven

| State Commission | Management Prudence Subject |
|---|---|
| Arkansas | Reasonableness of replacing Arkansas Nuclear One Unit 2 steam generators |
| California | San Onofre 2 & 3 Steam Generator Replacement Project reasonableness of pursuing legal remedies against the steam generator manufacturer |
| Connecticut | Millstone 2 and 3 reasonableness of capital expenditures prior to the sale to Dominion Power and Millstone 1 decommissioning work |
| Florida | Crystal River 3 1996-1997 outage cause and duration reasonableness<br>Levy Nuclear Project independent review of reasonableness and prudence of project management and project controls. |
| Indiana and Michigan | D. C. Cook 1 & 2 1997 – 1999 reasonableness of outage cause and management of maintenance activities |
| Louisiana | Reasonableness of project management and controls for the replacement of Waterford 3 steam generators, reactor vessel closure head and control element drive mechanisms |
| Maryland | 1.) Calvert Cliffs 1 & 2 1989-1991 outage prudence review<br>2.) Replacement of Calvert Cliffs 1 & 2 Steam Generators |
| Massachusetts | Pilgrim 1986 – 1990 reasonableness of outage management and project management |

| Nuclear Power Plant | Assignment |
|---|---|
| Connecticut Yankee - Connecticut | Evaluate reasonableness of management of decommissioning activities and costs |
| Cooper – Nebraska | Evaluate reasonableness of outage management, capital projects and costs |
| D. C. Cook - Michigan | 1.) Evaluate reasonableness of Unit 1 project management of the Low Pressure Turbine Replacement Project.<br>2.) Evaluate reasonableness of outage management and costs for the Unit 1 Turbine Recovery Outage following the September 2008 severe vibration event. |
| Millstone 1, 2, & 3 - Connecticut | Evaluate reasonableness of management decisions related to shutdown of all units due to steam leak. |
| Millstone 2 - Connecticut | Evaluate reasonableness of outage management of 1995 outage extension to deal with emergency safeguards actuation system and service water piping replacement. |
| Peachbottom 2 & 3 – Pennsylvania | Evaluate reasonableness of outage management, capital projects and costs |
| St. Lucie 1 – Florida | Periodic independent assessments of the steam generator replacement project.<br>1.) 1992 - independent review of the selection process for the engineering – construction contractor.<br>2.) 1995 - comprehensive review of the planning, licensing, engineering, and construction planning.<br>3.) 1997 – project readiness assessment of the engineer-constructor installation team and the St. Lucie 1 outage management team. |
| Salem 1 & 2 and Hope Creek – New Jersey | Evaluate Salem and Hope Creek project management organization and processes to perform $800 million of capital improvements to replace Salem 2 steam generators, increase rated power of Hope Creek, build an independent spent fuel storage installation, and replace Salem 1 & 2 main turbines. |
| San Onofre Unit 1 - California | Independent cost management and documentation review of the decommissioning activities |

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| Rowe - Massachusetts | Evaluate reasonableness of management of decommissioning activities and costs |
| Turkey Point 3 & 4 - Florida | Independent assessment of the 1990 – 1991 Turkey Point 3 & 4 Dual Unit Outage to install major nuclear safety-related electrical system upgrades and make security system modifications. |