

REVIEW OF
**PROGRESS ENERGY
FLORIDA, INC.'S
PROJECT MANAGEMENT
INTERNAL CONTROLS
FOR
NUCLEAR PLANT UPRATE AND
CONSTRUCTION PROJECTS**

JULY 2011

BY AUTHORITY OF
THE FLORIDA PUBLIC SERVICE COMMISSION
OFFICE OF AUDITING AND PERFORMANCE ANALYSIS

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CONSTRUCTION PROJECTS**

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JUNE 2011

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THE STATE OF FLORIDA
PUBLIC SERVICE COMMISSION
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1.0 EXECUTIVE SUMMARY

AT A GLANCE

- ◆ The Levy Nuclear Plant cost estimate and schedule timeline has not changed since Docket 100009-EI. The company still anticipates executing the Full Notice to Proceed with the Consortium in 2013.
- ◆ Levy Project may be impacted in the future by Fukushima and the Duke / Progress merger.
- ◆ Crystal River EPU Project continues to be delayed as a result of additional delamination issues, further risking the current schedule of completion by spring 2013.
- ◆ Crystal River EPU Project costs have escalated from \$461 million in 2008 to a current estimate of \$617 million.
- ◆ The Crystal River License Amendment Request (LAR) revision was necessary in order to restructure a poorly initiated application, and audit staff believes that [REDACTED] spent was avoidable with better management oversight.

1.1 PURPOSE AND OBJECTIVES

At the request of the Florida Public Service Commission's (Commission or FPSC) Division of Economic Regulation, the Office of Auditing and Performance Analysis performed the fourth annual review of the internal controls and management oversight of the nuclear projects underway at Progress Energy Florida, Inc. (PEF or the company). This review examines the adequacy of project management and internal controls employed in the company's construction of Levy Nuclear Plant Unit 1 and Unit 2 and Extended Power Uprate of Unit 3 at the Crystal River Energy Complex.

The primary objective of this review was to provide an independent account of project activities and to evaluate the internal controls PEF employs for these projects. The information provided in this report may be used by Division of Economic Regulation staff to assist in an assessment of the reasonableness of the company's cost-recovery requests for the projects.

FPSC audit staff published previous reports in 2008, 2009, and 2010. Each was entitled *Review of Progress Energy Florida, Inc.'s Project Management Internal Controls for Nuclear Plant Uprate and Construction Projects*. The three previous reviews completed by FPSC audit staff are filed in testimony in Docket No. 080009-EI, 090009-EI, and 100009-EI, respectively.

1.2 SCOPE

This year's review also includes a follow-up of deferred issues that were carried forward from the 2010 hearings. These issues revolved around the Commission's Final Order PSC-11-

0095-FOF-EI, which withheld making a finding concerning the prudence of the contract management, contracting, and oversight controls employed by PEF during 2009 for the Crystal River Unit 3 Uprate project, especially as it relates to the License Amendment Request (LAR) development process.¹ An examination of the prudence of these controls and oversight activities is included as an issue in the 2011 Nuclear Cost Recovery proceeding.

The internal controls examined were those related to the following key areas of project activity:

- ◆ Planning
- ◆ Management and organization
- ◆ Cost and schedule controls
- ◆ Contractor selection and management
- ◆ Auditing and quality assurance

Internal controls are the vital mechanisms used by the company to stay within budget and on schedule. According to the Institute of Internal Auditors' *Standards for the Professional Practice of Internal Auditing*, appropriate internal controls allow the organization to accomplish the following:

- ◆ Produce accurate and reliable data
- ◆ Comply with applicable laws and regulations
- ◆ Safeguard assets
- ◆ Employ resources efficiently
- ◆ Accomplish goals and objectives

Well-constructed internal controls assist with the challenges of risk management and decision-making. Risks must be identified and appropriate protections established to prevent or control them. Prudent decision-making results from orderly, well-defined processes that address known risks, needs, and capabilities. Adherence to written procedures, effective communication, vigilant internal and contractor oversight, and ongoing auditing and quality assurance are essential to ensure that project costs are incurred prudently.

Specifically, according to Internal Control Integrated Framework designed by the Committee of Sponsoring Organizations of the Treadway Commission, internal controls should consist of five interrelated components:

- ◆ Control environment
- ◆ Risk assessment
- ◆ Control activities
- ◆ Information and communication
- ◆ Monitoring

When looking at the effectiveness and efficiency of operations, the reliability of financial reporting, and compliance with applicable laws and regulations, all five components must be present and function effectively to conclude the internal controls over operations are effective. This report will document the existence of each of these five components for PEF project management.

¹ Florida PSC Final Order PSC-11-0095-FOF-EI, page 47.

1.3 METHODOLOGY

Planning and research and initial data collection for this review were performed in January and February 2011. Additional data collection, site visits, interviews, analysis, and report writing were conducted between March and May 2011. The information compiled in this report was gathered via company responses to audit staff document requests, visits to the Crystal River Energy Complex, and interviews with key project personnel. Audit staff also reviewed testimony, discovery, and other filings in Docket No. 110009-EI.

A large volume of information was collected and analyzed by audit staff. Specific information collected from PEF included the following categories:

- ◆ Policies and procedures
- ◆ Organizational structures
- ◆ Contract requests for proposal
- ◆ Contractor bids
- ◆ Bid evaluation analyses
- ◆ Contracts
- ◆ Invoices
- ◆ Project scope analysis studies by PEF and consultants
- ◆ Internal audit reports and quality assessment reviews

1.4 CONCLUSIONS

1.4.1 LEVY NUCLEAR PROJECT

PEF's current, continuing focus is to obtain the Combined Operating License Application (COLA) approval from the Nuclear Regulatory Commission (NRC) and then re-evaluate the construction timeline. Currently, the company expects the Combined Operating License to be issued by mid-2013. During 2012, the company plans to begin negotiations of a *Full Notice to Proceed* amendment with Westinghouse and Shaw, Stone & Webster (the Consortium). PEF created a Readiness Requirements document that provides an outline of the major activities and key decisions that support the Full Notice to Proceed for the Levy Nuclear Project. The timeline gives additional clarity regarding the time frames of the key activities and decision points.

At the start of the Partial Suspension period in April 2009, PEF suspended all new work on the long-lead equipment (LLE) for the Levy Plant.² Since that time, PEF has been working with the Consortium to ensure the proper handling of the LLE purchase orders. The Levy project team made recommendations to the Senior Management Committee in June 2010 for the disposition of the LLE. Senior Management gave its authorization to move forward with the disposition and PEF provided notice to the Consortium. PEF worked with the Consortium during 2010 and into 2011 to appropriately negotiate and conclude final disposition of LLE.³

The target completion date of LLE negotiations was April 2011. As of March 2011, with the exception of [REDACTED], LLE disposition negotiations were complete and the overall financial impact was less than estimated by the company. PEF and the Consortium are continuing to negotiate [REDACTED] terms with the vendor of the [REDACTED]

² The Consortium had initiated Purchase Orders for LLE after the signing of the 2008 Letter of Intent.

³ PEF Response to Staff Data Request 1.23, BATES 000041 – 000042.

Change Orders on each of the resolved items have been executed or in process. As of May 2011, the Consortium received a revised [REDACTED] proposal for its [REDACTED] and the company anticipates reviewing and analyzing this proposal using a similar methodology as used for its other LLE dispositions.⁴ Once a determination is made, PEF will work with the Consortium on the proper disposition.⁵

The project has evolved since the original Determination of Need Docket No. 080148-EI. The company continues to evaluate and assess effects of both internal and external factors that impact the overall project cost and schedule. **EXHIBIT 1** provides a snapshot of recent events that impact the project. Each event listed in this exhibit is discussed further in Chapter 2.

LEVY NUCLEAR PROJECT KEY EVENT TIMELINE

KEY EVENTS	COLA Submittal	EPC Contract	LLE Purchase Orders	AP1000 DCD Completion	Economy and Load Growth
PREVIOUS STATUS	COLA filed with NRC in July 2008	Partial suspension clause enacted in April 2009	Suspended all new work on LLE in April 2009	Revisions force delay to DCD	Economy declines into recession
2010 EFFORTS	RAIs completed in March 2010	EPC amendment three signed in March 2010	Successful negotiation on LLE POs	WEC provided DCA Rev 18 to NRC	Economic conditions slightly improve
CURRENT STATUS	Final SER and Final EIS to be issued in April 2012	Planning negotiations with WEC of Full Notice to Proceed	Change Orders Executed with exception of [REDACTED]	NRC to complete rulemaking by September 2011	Despite improvements on Wall Street, unemployment remains high
FUTURE PLANS	Combined Operating License to be issued mid-2013	Start construction late 2013 or early 2014	Resume LLE purchase orders to completion	NRC will update the DCD schedule after Rev 19	Negotiate terms and conditions on EPC contract

EXHIBIT 1

LEVY SCHEDULE AND COST HAVE NOT CHANGED

The company states that no changes occurred in 2010 that impact the Levy Nuclear Project schedule or costs. The current project timeline continues to estimate in-service dates of 2021 for Unit 1 and 2022 for Unit 2. The company will continue to monitor risks related to the project during 2011 and 2012. **EXHIBIT 2** displays the Levy Project Timeline and tracks the company's estimated total project costs for the years 2008-2011.

FPSC audit staff has no recommendations at this time for the Levy Nuclear Plant project. FPSC audit staff will continue to closely monitor project progress, costs, and controls.

⁴ PEF Response to Staff Data Request 6.2, BATES 000002.

⁵ Ibid.

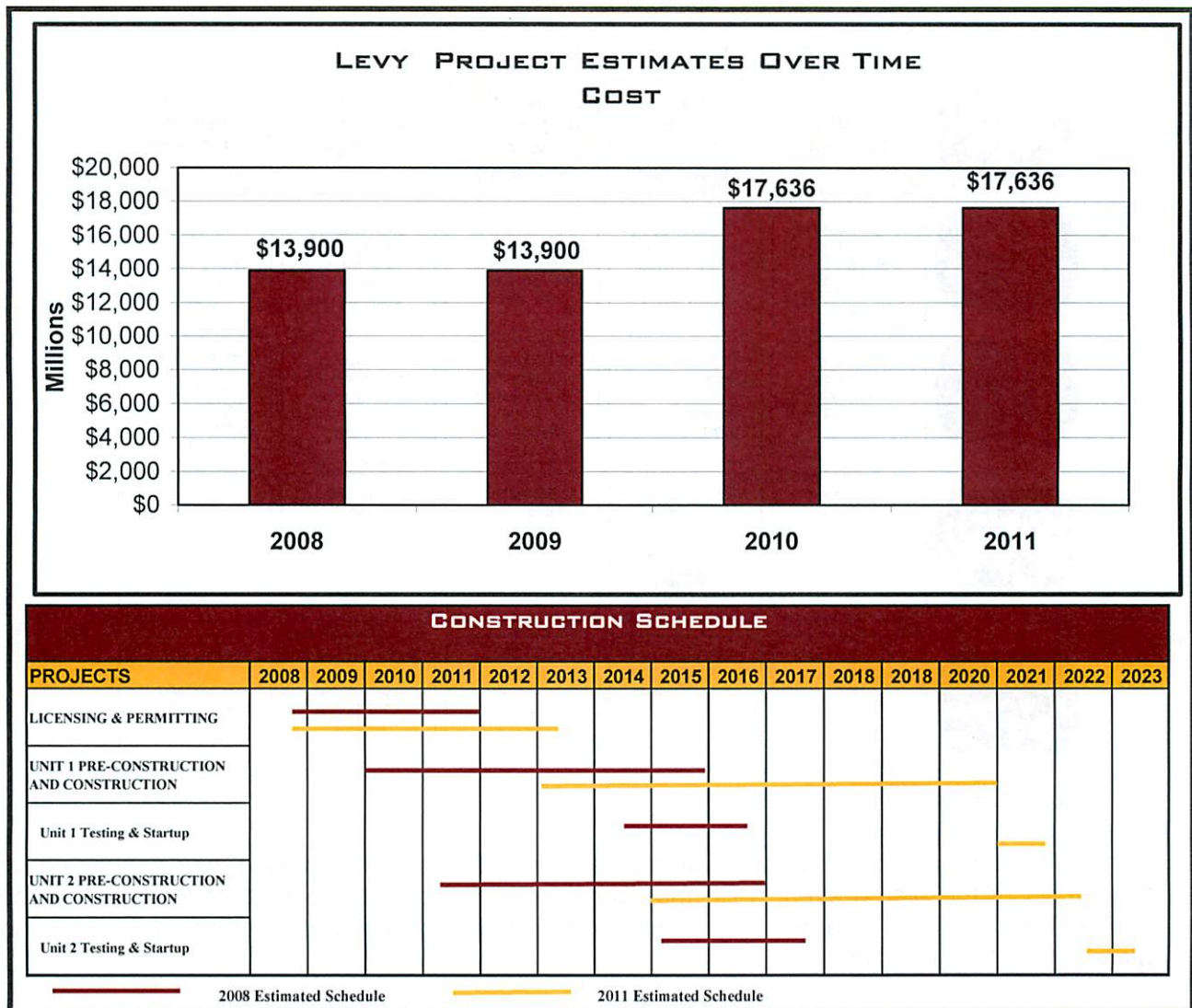


EXHIBIT 2

Source: 2008 – 2011 Integrated Project Plans

1.4.2 CRYSTAL RIVER 3 EXTENDED POWER UPRATE

The final construction phase of the EPU project continues to be delayed as a result of the extended Refueling 16 outage events. The original target construction date of fall 2011 was shifted to 2012 and then to spring 2013. Due to the discovery of an additional delamination of the unit’s containment structure in March 2011, an additional shift in schedule is possible. While the company is still evaluating the impact of the March event, the company will unlikely remain on its current Phase III schedule.

As with the Levy Nuclear Project, the EPU project has evolved since the Commission approved the Determination of Need Docket No. 060642-EI. Throughout the project, the company continues to respond to internal and external factors that impact the overall project cost and schedule. **EXHIBIT 3** provides a snapshot of recent events that impact the project. Each event listed in this exhibit is discussed further in Chapter 3.

EPU PROJECT KEY EVENT TIMELINE

KEY EVENTS	LAR Submittal	Low Pressure Turbine Settlement	Phase III Engineering Scope Adjustment	CR3 Extended Outage	Phase III Construction Timeline
PREVIOUS STATUS	Original submittal was deferred in 2009 after PEF determined it would not meet NRC expectations	PEF deferred the installation of the LPT in Phase II due to vendor quality issues	PEF completed the Phase II in 2009, with Phase III scope planned for 2010	CR3 remained offline since 2009 due to the containment delamination	Phase III construction shifted from fall 2011 until spring 2013
2010 EFFORTS	Company continued to defer submitting its LAR in 2010	PEF entered negotiations with Siemens to resolve the LPT quality concerns	PEF started the majority of Phase III engineering scope development	PEF moved forward with the repairs to the containment structure	PEF developed a Phase III construction timeline with a spring 2013 startup
CURRENT STATUS	PEF submitted its LAR in June 2011	PEF finalized the LPT settlement, adding additional work scope at a cost of [REDACTED]	Additional Phase III Engineering scope identified at an additional cost of \$137 million	A second delamination event occurred with the CR3 containment structure in March 2011	Second delamination event may impact the overall Phase III construction schedule
FUTURE PLANS	PEF will respond to RALs issued by NRC	PEF will install the Siemens LPT during Phase III Construction	PEF will request approval from Senior Management for the additional scope	PEF is assessing the impact of this event on the EPU project timeline	Impact of the second delamination event in mid 2011

EXHIBIT 3

The company continues to evaluate its options for the EPU timeline, and depending on the impact of the March event, PEF may consider completing portions of its Phase III scope during this continued outage. The company anticipates providing a detailed update on the March event by mid-2011.

In addition to the flux in the schedule timeline, the project team has identified additional scope requirements and system modifications that are necessary to complete the project. These new requirements and modifications were identified during design finalization. This additional scope resulted in additional project cost of an estimated \$137 million.

The EPU project team anticipated receiving senior management approval for this increase in March 2011; however, this approval was deferred until the conclusion of the March delamination event analysis. With this 2011 increase, the project cost has escalated from \$461 million in 2008 to the current amount of \$617 million. **EXHIBIT 4** details the estimated project cost over time. While the project's cost has increased since inception, the company's current feasibility analysis still supports the economic viability of the project. The details of the Phase III scope increase are covered in chapter 3.

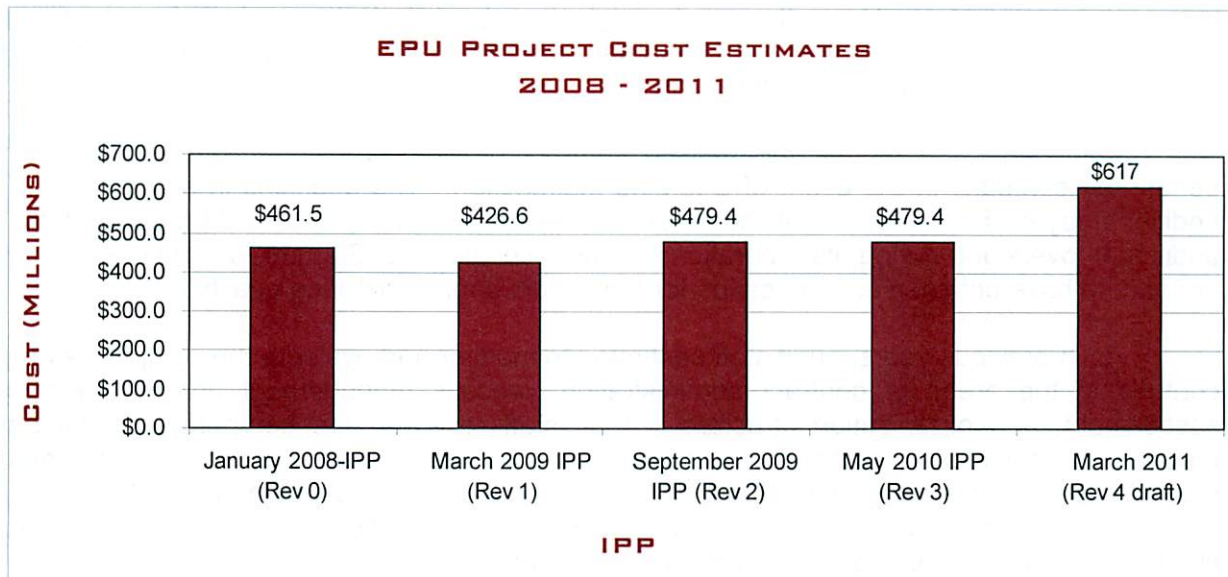


EXHIBIT 4

Source: 2006 BAP and 2008 through 2011 IPPs

In addition to monitoring the project controls that address the scope and schedule impacts from 2010, audit staff continued to evaluate the project management oversight of two issues addressed in the 2010 *Review of Progress Energy Florida, Inc.'s Project Management Internal Controls for Nuclear Plant Up-rate and Construction Projects*. This includes the development of the company's License Amendment Request (LAR) and the contract settlement concerning its low pressure turbines. Audit staff gathered additional information during this review to assess the effectiveness of the project management oversight in these areas.

Audit staff interviewed additional members of the review panel that assessed the viability of the original LAR document and reviewed the internal performance evaluations of key members of the LAR project team. After this review, in conjunction with the detail discussed in the 2010 review, audit staff believes that the additional [REDACTED]⁶ spent to re-write the LAR was less about draft editing than re-structuring a poorly-initiated application.

Audit staff believes that the lack of project management oversight during the initial application development contributed to both the underlying deficiencies and to the need for the additional AREVA work. This amount does not include any work related to necessary engineering or project-scope development. Therefore, audit staff believes that the [REDACTED] spent was avoidable. This issue is discussed in greater detail in chapter 3.

In 2010, the company finalized its settlement with the low pressure turbine manufacturer Siemens. In this settlement, the company states it received significant concessions from the vendor along with [REDACTED]. The company also negotiated an increase in scope that covers additional quality assurance services, which increases the overall cost to PEF by [REDACTED].

PEF management states that the settlement with Siemens represents "a favorable resolution of the outstanding issues . . . and in a number of respects, PEF has obtained more

⁶ The [REDACTED] is derived from two Change Orders to the AREVA contract 101659 Work Authorization 84. The initial Change Order 23 was initiated in October 2009 for [REDACTED] and Change Order 23—Rev 1 was initiated in January 2010 for an additional [REDACTED].

favorable terms and conditions than in its original contract.”⁷ In the end, PEF was willing to increase the overall contract terms to obtain additional assurances and quality monitoring of the turbines through installation and operations.

Audit staff agrees that the revised contract provides additional safeguards that will benefit the company in the event of a turbine malfunction. The additions in scope provide an additional layer of assurance that the turbines meet PEF’s quality standards and will allow for additional oversight during its operation. When considering Siemens’s concessions, PEF appears to have obtained compensation for the vendor’s manufacturing quality issues.

As in previous years, audit staff continued to monitor and evaluate the company’s project controls in the areas of contract administration, process management and oversight, risk assessment, and organization structure. Audit staff reviewed the company’s management reports and negotiated contracts to confirm the company’s compliance with its internal procedures. Audit staff confirmed the company continues to monitor and update its project management process and procedures throughout this project. No variances in the company’s compliance to its EPU procedures were identified during this review period.

⁷ PEF Response to Staff Data Request DR1CR3-19-000006.

2.0 LEVY NUCLEAR PROJECT

2.1 LEVY KEY PROJECT DEVELOPMENTS

During 2010, Progress Energy Florida shifted its efforts on the Levy Nuclear Project (LNP) from both component fabrication and licensing approval to focus largely on obtaining the Combined Operating License with planned construction occurring one year after receipt of the Combined Operating License. The company is continuing this focus for 2011 and 2012.

2.1.1 REGULATORY APPROVAL PROCESS MOVES TOWARDS COMPLETION

The Combined Operating License is expected to be issued by early to mid-2013. Between the anticipated April 2012 issuance of the Final Safety Evaluation Report and Final Environment Impact Statement and the anticipated mid-2013 Combined Operating License issuance, the mandatory and contested NRC hearing process will occur. The current NRC review schedule for the LNP COLA is shown in **EXHIBIT 5**. This schedule is contingent upon the NRC completing its AP1000 Design Certification review.

NUCLEAR REGULATORY COMMISSION LEVY PROJECT COLA REVIEW SCHEDULE	
Safety Review	Date
Phase A – Requests for Additional Information (RAIs) and Supplemental RAIs	March 2010 - <i>Completed</i>
Phase B – Advanced Final Safety Evaluation Report (SER) without Open Items	September 2011
Phase C – Advisory Committee on Reactor Safeguards (ACRS) Review of Advanced Final SER	January 2012
Phase D – Final SER	April 2012
Environmental Review	Date
Phase 1 – Environmental Impact Statement (EIS) scoping summary report issued	May 2009 - <i>Completed</i>
Phase 2 – Draft EIS issued to the Environmental Protection Agency (EPA)	August 2010 - <i>Completed</i>
Phase 3 – Responses to public comments on draft EIS completed	November 2011
Phase 4 – Final EIS issued to the EPA	April 2012

EXHIBIT 5

Source: PEF Response to Staff Data Request 1.2

2.1.2 NRC CONTINUES AP1000 DESIGN CERTIFICATION AMENDMENT REVIEW

NRC provided a schedule for completion of the AP1000 Design Certification Amendment review in a letter to Westinghouse dated June 21, 2010, and displayed in **EXHIBIT 6**. Westinghouse provided the Design Certification Amendment Revision 18 to the NRC on December 2, 2010, and is currently scheduled for NRC rulemaking in September 2011. However, this decision could be delayed by a May 20, 2011 announcement by NRC Chairman Jaczko. The NRC identified three additional issues with regards to the AP1000 design:

- ◆ In December 2010, the NRC and Westinghouse agreed that the containment vessel internal pressure calculations would need to be revised. The revised calculation will be reviewed with the NRC in June 2011.
- ◆ In April 2011, the NRC challenged the analytical guidelines used by Westinghouse in its comprehensive *Shield Building Design Report*. Westinghouse agreed to perform detailed load combination calculations to provide additional assurances to

the NRC. This information was presented to the NRC during a public meeting in May 2011.

- ◆ The third issue relates to the design model used for the passive containment cooling system (PCS) tank. Westinghouse is working to verify preliminary conclusions that indicate that there is no reason to change the tank design.

On May 27, 2011, the NRC stated that the Vogtle and V.C. Summer Final Safety Evaluation Reports would be delayed to allow the NRC extra time to review additional design issues. However, the NRC does not plan to issue a schedule update until after the Design Certification Revision 19 is received from Westinghouse. Currently, PEF does not anticipate a delay in the LNP COLA review due to these design issues, although audit staff notes that the impact of the NRC's decision is not known as of this publication.⁸

NUCLEAR REGULATORY COMMISSION AP1000 DESIGN CERTIFICATION AMENDMENT REVIEW SCHEDULE DECEMBER 2010	
Actions	Completion Date
NRC finalizes AP1000 DCA review scope and closure strategy for remaining issues	June 30, 2010
NRC receives final Westinghouse DCA submittal	July 30, 2010
NRC technical staff completes Final Safety Evaluation Report (FSER) inputs	August 30, 2010
NRC issues final advanced FSER information issued to the Advisory Committee on Reactor Safeguards (ACRS)	October 18, 2010
ACRS holds final subcommittee meeting on AP1000 DCA	November 18, 2010
ACRS holds final full committee meeting on AP1000 DCA	December 2, 2010
NRC receives Westinghouse DCA Revision 18 submittal	Early-December 2010
NRC publishes Federal Register Notice for Proposed Rule	February 2011
Submit Westinghouse DCA Revision 19	June 2011
Public comment period ends	April 2011
Final Rule	September 2011

EXHIBIT 6

Source: PEF Response to Staff Data Request 1.4

2.1.3 AP1000 BENCHMARKING TRIPS CONDUCTED

Progress Energy was involved in two benchmarking trips to AP1000 projects in China in 2010. Audit staff was provided status reports and other documentation for both the Sanmen and Haiyang projects. Westinghouse also provides a limited China project video and photo updates on their AP1000 Web site⁹ that is monitored by PEF.

PEF believes that the aggressive goals to develop nuclear power in China present a significant challenge for the development of permanent plant staff, particularly in operations. This goal creates a significant challenge for the operator training program. Activities associated with completing the operations simulator become more critical, as this equipment is required for this training.¹⁰

⁸ PEF Response to Staff Data Request 6.3, BATES 000002.

⁹ http://ap1000.westinghousenuclear.com/ap1000_nui_ic.html

¹⁰ PEF Response to Staff Data Request 1.9, BATES 000018.

In addition to the China construction projects, PEF continues to monitor the domestic AP1000 projects. While still early in the construction process, there have been some construction issues at the Vogtle and V.C. Summer sites that Progress Energy can learn from for the Levy project. Audit staff was provided benchmarking reports and other documentation for both Vogtle and V.C. Summer projects. These benchmarks have provided positive impacts to the Levy project. As a result of the benchmark trips, valuable information has been gathered to assist with:

- ◆ Development of Progress Energy's Construction Experience program
- ◆ Design and industrial engineering efficiencies for the future design/location of the Levy Emergency Operation Facilities
- ◆ Preparation for the NRC Public Meeting on the LNP Draft Environmental Impact Statement
- ◆ Environmental Permitting process
- ◆ Identification of construction best practices and potential issues.¹¹

Audit staff believes that these benchmarking trips provide construction experience knowledge and lessons learned that are of value to PEF as the company moves forward to the construction stage at Levy.

2.1.4 EPC LONG LEAD EQUIPMENT CHANGE ORDERS FINALIZED

At the start of the Partial Suspension period in April 2009, PEF suspended all new work on the long-lead equipment (LLE) for the Levy Plant.¹² Since that time, PEF has been working with Westinghouse and Shaw, Stone & Webster (the Consortium) to ensure the proper handling of the LLE purchase orders. The Levy project team made recommendations to the Senior Management Committee in June 2010 for the disposition of the LLE. These recommendations are found in **EXHIBIT 7**. Senior Management gave its authorization to move forward with the disposition, and PEF provided notice to the Consortium. PEF worked with the Consortium during 2010 to appropriately negotiate and conclude final disposition of LLE.¹³

The target completion date of LLE negotiations was April 2011. As of March 2011, with the exception of [REDACTED], LLE disposition negotiations were complete and the overall financial impact was less than estimated by the company. PEF and the Consortium are continuing to negotiate [REDACTED] terms with the vendor of the [REDACTED]. Change Orders on each of the resolved items have been executed or in process.¹⁴

As of May 2011, the Consortium received a revised [REDACTED] proposal from its subcontractor, [REDACTED] for the [REDACTED]. PEF will review and analyze the proposal using a similar methodology as used on the other LLEs. Once a determination is made, PEF will work with the Consortium on the proper disposition.¹⁵ Cancellation cost risks for this item are included in **APPENDIX B**.

¹¹ PEF Response to Staff Data Request 1.10, BATES 000019 – 000021.

¹² The Consortium had initiated Purchase Orders for LLE after the signing of the 2008 Letter of Intent.

¹³ PEF Response to Staff Data Request 1.23, BATES 000041 – 000042.

¹⁴ PEF Response to Staff Data Request DR 6.2, BATES 000002.

¹⁵ PEF Response to Staff Data Request 6.2, BATES 000002.

**LEVY NUCLEAR PROJECT LONG-LEAD EQUIPMENT
DISPOSITION RECOMMENDATIONS TO PROGRESS
SENIOR MANAGEMENT
JUNE 2010**

Component	Supplier	Recommendation	Est Spend 2010-2012 (Millions)	Total 2007 Contract Price (Millions)	Paid-to-Date including any paid escalation per contract terms (Millions)
Totals (Millions)					

EXHIBIT 7

Source: PEF Response to Staff Data Request 1.17, BATES 001539

2.1.5 DUKE ENERGY-PROGRESS ENERGY MERGER IMPACT UNKNOWN

Duke Energy Corp. is working to acquire Progress Energy Inc. through an all-stock deal valued at \$13.7 billion. The merger is expected to close by the end of 2011.¹⁶ Subject to shareholder and regulatory approvals, the merger of Duke Energy and Progress Energy will create the nation’s largest utility, with more than seven million customers in six regulated service territories. The two companies’ mix of coal, nuclear, natural gas, oil and renewable resources will total approximately 57 gigawatts of U.S. generating capacity. The combined company will be called Duke Energy and headquartered in Charlotte, N.C.

Completion of the merger is conditioned upon, among other things, the approval of the shareholders of both companies, as well as expiration or termination of any *applicable waiting* period under the Hart-Scott-Rodino Antitrust Improvements Act of 1976. Other necessary regulatory filings include: Federal Energy Regulatory Commission (FERC), Nuclear Regulatory Commission (NRC), North Carolina Utilities Commission (NCUC), and South Carolina Public Service Commission (SCPSC). PEF will also provide information regarding the merger to the Florida Public Service Commission.¹⁷

Audit staff inquired into any merger impact to the Levy Nuclear Project, and the Vice President of the New Generation Programs and Projects stated that “any impact is unknown at this time.”

¹⁶ The Wall Street Journal’s MarketWatch article, May 5, 2011, *Progress Energy profit falls 3.2%*, by Drew FitzGerald.
¹⁷ <http://www.duke-energy.com/progress-energy-merger>

2.1.6 FUKUSHIMA NUCLEAR ACCIDENT IMPACT UNKNOWN

In April testimony before the US Senate, Nuclear Regulatory Commission (NRC) Chairman Gregory Jaczko stressed that, to date, the events in Japan had not reduced NRC licensing or oversight functions.¹⁸ As a precaution, however, Temporary Instruction 2515/183 was issued to all licensees, ordering an immediate review of every operating plant. Inspections were completed by the end of April 2011. While individually, none of the observations resulting from the inspections posed a significant safety issue, they indicate a potential industry trend of failure to maintain equipment and strategies required to mitigate some design and beyond design basis events. The results of the inspections are being assessed in greater detail through the NRC's Reactor Oversight Process and will also be examined by NRC's Task Force's examination of the agency's regulatory requirements, programs, processes, and implementation in light of information from the Fukushima event.¹⁹

The Nuclear Regulatory Commission supported the establishment of an agency task force, made up of current senior managers and former NRC experts with relevant experience. The task force will conduct both short- and long-term analysis of the lessons that can be learned from the situation in Japan, and the results of their work will be made public.²⁰

Currently, the potential impacts of the disaster on PEF current nuclear operations, extended power uprates, or new nuclear construction are unknown. Company officials stated that Fukushima is a historic event whose full ramifications are yet to be determined, but the incident will most likely lead to changes throughout the U.S. nuclear industry.

2.1.7 JOINT OWNERSHIP OF THE LEVY NUCLEAR PLANT STILL A CONSIDERATION

During the January 27, 2011, Integrated Project Plan presentation made by PEF management to the Senior Management Committee, PEF indicated that joint owner discussions during 2011 would continue with [REDACTED]

[REDACTED]. PEF also planned 2011 follow-up negotiation meetings regarding proposed Joint Ownership Agreements and Operations and Maintenance Agreements. PEF management plans to [REDACTED]

²¹ [REDACTED]

2.2 LEVY PROJECT CONTROLS AND OVERSIGHT

2.2.1 INTEGRATED PROJECT PLAN REVISED MARCH 2011

The company has made several revisions to its Integrated Project Plan since its initial request in September 2008; with the most recent revision (Rev.3) in March 2011. These changes reflect management's continued approval of the project and allowed for continued spending during the Levy partial suspension through mid-2012. The project team recommended a 3-year spend (2011-2013) of [REDACTED], including LLE purchase order disposition costs, with authorization for execution of funds through mid-2012 of [REDACTED].²²

¹⁸ Written statement, Gregory Jaczko, Chairman, US NRC, to the Environmental and Public Works Committee and the Clean Air and Nuclear Safety Subcommittee, US Senate, April 12, 2011.

¹⁹ <http://www.nrc.gov/NRR/OVERSIGHT/ASSESS/Summary-of-Observations-TI-2515-183.pdf>.

²⁰ <http://www.nrc.gov/reading-rm/doc-collections/news/2011/11-055.pdf>.

²¹ PEF Response to Staff Data Request 1.17 Supplemental, BATES 000548.

²² PEF Response to Data Request 1.11 Supplemental, BATES 000041.

Within this recent Integrated Project Plan revision, project management reported that there had been no significant changes in project scope, no anticipated impacts to the overall project schedule, and no change to the overall project cost estimate.²³ Reported 2010 actual costs were [REDACTED], compared to [REDACTED] approved by the Senior Management Committee in the April 2010 Integrated Project Plan. This difference was primarily attributed to lower than expected LLE purchase order disposition costs due to successful LLE negotiations.²⁴

Audit staff confirmed that the company followed its process with regards to Integrated Project Plan revision. The company adequately updated the Integrated Project Plan to request continued funding of the Levy Nuclear Project. Audit staff verified that senior management approved the revisions to the plan.

2.2.2 PROJECT MANAGEMENT POLICIES AND PROCEDURES ISSUED

PEF has procedures in place that direct the oversight and control of the Levy Nuclear Project. The company continues to review policies, procedures, and controls and revises documents as necessary based on changing business conditions, organizational changes, and project work schedules. During 2010, PEF revised 69 procedures for the Levy project in areas including interface agreements, quality assurance, development of procedures, self-assessment and benchmarking, operating experience and construction experience, engineering, condition evaluation and corrective actions, performance, contracts and purchasing, records management, the EPC contract, risk, and safety.²⁵ PEF created eight new procedures in 2010 for the Levy project. Five of these procedures deal with project management, two address construction, contracting, and supplier strategy, and one deals with administration.

The company is currently working with other AP1000 Owners' Group (APOG) companies to identify and develop procedures for operator training programs at the AP1000 sites. The company is also participating in efforts to develop procedures for design and operational features as part of plant start-up and other training support procedures. These procedures may begin to be issued in 2012.²⁶

Audit staff reviewed the new and revised policies and procedures. These policies appear to be in compliance with the company's standards for development of policies and procedures. Audit staff recognizes that the company will continue to update and develop policies and procedures in the future, as specific events trigger the need for them.

2.2.3 OVERSIGHT AND MANAGEMENT POLICIES AND PROCEDURES FOR CONTRACTORS UNCHANGED

As the partial suspension period continues for the Levy project, there was limited contractor activity for both generation and transmission. The company is meeting on a quarterly basis with the EPC Consortium, and weekly phone calls with the Joint Venture Team (Sargent & Lundy, Worley Parsons, and CH2M Hill) to review and discuss the work supporting the COLA and Site Certification Application (SCA) projects.

The company's oversight and management plan for contractors did not change in 2010, but PEF has implemented several enhancements to continuously improve the oversight and management of contractors for the Levy Nuclear Project. Enhancements implemented in 2010 include:

²³ PEF Response to Data Request 1.11 Supplemental, BATES 000007.

²⁴ PEF Response to Data Request 1.11 Supplemental, BATES 000011.

²⁵ PEF Response to Staff Data Request 1.12A, BATES 000023.

²⁶ PEF Response to Staff Data Request 1.12B, BATES 000026.

- ◆ Issued new procedures *Corporate Development & Improvement Group Contract Change Order Management*.
- ◆ Ensured MCP-NGGC-0001 NGG contracting procedure compliance.
- ◆ Strengthened contract language for all open JVT COLA Contract Work Authorizations to better define the change order process in the contract.
- ◆ Updated the EPC Change Order review and approval process.
- ◆ Implemented changes for safety related contracts.
- ◆ Improved process for records management per procedural requirements.
- ◆ Completed an audit in January 2010 of EPC Monthly Invoice # 927917-R8-00361.
- ◆ Completed an audit of the JVT Invoice Process in December 2010.
- ◆ Developed a formal vendor invoice audit schedule process for 2011.²⁷

Audit staff reviewed these enhancements, including the completed final audit report of the EPC monthly invoices, the JVT invoice audit test plan, and the proposed vendor invoice audit schedule. Audit staff believes that these enhancements will strengthen internal controls.

2.2.4 RISK ASSESSMENT AND MITIGATION EXECUTED

PEF has stated that it is too early to assess the impact that the recent events in Japan may have, but believes that these events will result in a review of regulatory and design requirements which could impact AP1000 Design Certification or COLA schedules. In addition, these events have raised public concerns regarding nuclear plant safety which could reduce public support for new nuclear, introduce new challenges to COLA approval, increase the risk premium for financing, or reduce interest in joint ownership. These items will be updated once these risks become further defined.²⁸ The current Levy COLA Post Mitigation Risk Matrix, dated April 15, 2011, is shown in **APPENDIX A**. In addition, the current Levy Non-COLA Near-Term Post Mitigation Risk Matrix, dated April 1, 2011, is shown in **APPENDIX B**.

PROJECT ENTERPRISE RISKS

The company explained in its May 2010 filings that its risk mitigation on the Levy Nuclear Project (LNP) included continuous monitoring of the project enterprise risks for trends indicating fundamental changes that may further impact the Levy project schedule or costs. The company reports that these risks include, but are not limited to:

- ◆ Ongoing regulatory reviews by the NRC of the Levy COLA
- ◆ The progress of the Reference COLA (R-COLA) at Vogtle
- ◆ The progress of other proposed AP1000 plants
- ◆ The completion of the AP1000 Design Certification Document (DCD)
- ◆ Natural gas price declines
- ◆ The potential for carbon legislation or regulation at either the state or federal level
- ◆ Economic condition fluctuations
- ◆ Stock market reactions

The company states that all of these risks are being considered, evaluated and monitored for any potential impacts to the LNP schedule and/or costs. Additionally, PEF continues to monitor joint ownership opportunities as a further risk mitigation strategy.²⁹

²⁷ PEF Response to Staff Data Request 1.29, BATES 000049.

²⁸ PEF Response to Staff Data Request 3.3, BATES 000007.

²⁹ PEF Response to Staff Data Request 1.7, BATES 000013.

PROGRAMMATIC ENTERPRISE RISKS

On March 29, 2011, a presentation was made by Levy management to the Senior Management Committee regarding the latest revision to the Integrated Project Plan. During the presentation, Levy management reported "Programmatic Enterprise Risks." Management reported that these risks generally outside the control of the company and can affect the ability to proceed with the LNP project. LNP management considered these risks in its qualitative analysis of the feasibility of completing the LNP and reported that the company does not believe that shifts in trends of these risks represent a fundamental change that prevents the company from completing the LNP. Additionally, LNP management reported that the risk events demonstrate that the LNP should proceed at a slower pace with a narrower scope of near-term work. Currently, these risks and the company's qualitative ranking of trends for these risks shown in **EXHIBIT 8**. Audit staff recognizes that these risks are outside the control of the company and could affect the ability of the company to continue towards completion of the Levy Nuclear Project.

PEF LEVY NUCLEAR PROJECT PROGRAMMATIC ENTERPRISE RISKS MARCH 2011	
Risk	Qualitative Ranking
Economy	Neutral
Load Growth	Neutral
Customer Impact	Slight Favorable Trend
Carbon Legislation	Unfavorable Trend
Fuel Prices	Unfavorable Trend
Access to Capital (related to potential merger)	Favorable Trend
Political / Federal Support	Neutral

EXHIBIT 8 Source: PEF Response to Staff Data Request 1.11 S, BATES 000057

FEASIBILITY

One aspect of the feasibility assessment for the Levy Nuclear Project is a life-cycle net present worth assessment (also known as cumulative present value of revenue requirements, or CPVRR). PEF updated its CPVRR assessment based on the company's current forecasts for submission in this year's filing. PEF states that the results of the updated CPVRR assessment indicate that the plan is favorable in more cases than not. This indicator is one of many reviewed in consideration of the ongoing project feasibility; PEF had not updated the CPVRR at the time of the March 2011 update to the Integrated Project Plan, but stated in the plan that these updates would be made available in the 2011 filing. PEF believes that based on the CPVRR assessment and other qualitative factors set forth in their May 1, 2011, NCRC filing, the Levy Nuclear Project continues to be a viable generation option.³⁰

2.2.5 CHANGES TO MANAGEMENT OVERSIGHT AND STAFFING LIMITED

The department structure for the Levy Nuclear Project is essentially the same structure as audit staff previously reported in its June 2010 review. The LNP remains under the Corporate Development & Improvement Group (CDIG). Management of the LNP continues under the Vice President, New Generation Programs and Projects. Administrative oversight of

³⁰ May 1, 2011 Testimony of PEF Witness Elnitsky, Docket 110009-EI.

the LNP continues under the Senior Vice President, Corporate Development & Improvement Group (CDIG).

During 2011, with the continued partial suspension period, the company does not anticipate additional staffing. Some individuals providing support for the Levy Transmission work have been reassigned during the partial suspension period. Other positions within New Generation Programs and Projects have also been reassigned based on the priority of the work during the limited work schedule. Additionally, certain positions providing support within the CDIG Business Services have been reassigned or eliminated.³¹ In late 2012, the company states it will begin recruiting for nuclear operators in preparation for 2013 staffing.³²

2.2.6 INTERNAL AND EXTERNAL AUDITS AND QUALITY ASSESSMENTS COMPLETED IN 2010

Progress Energy's Audit Services Department (ASD) completed one audit in March 2010 titled *Florida Nuclear Plant Cost Recovery Rule Compliance Monitoring Review*. This audit reviewed compliance with the Nuclear Plant Cost Recovery Rule for true-up filings made in 2010 for the year 2009 related to the CR3 Uprate Project and the Levy Nuclear Project. The Audit Services Department concluded that overall compliance with the Florida Nuclear Plant Cost Recovery Rule for the 2010 true-up filings was effective. The audit report contained no observations or recommendations and required no corrective action.³³

The original 2010 audit plan also included a construction/project management audit of the Levy Nuclear Plant; however, due to other emergent corporate issues and relative risks, this audit was deferred until 2011.³⁴ When audit staff inquired about the emergent issues and relative risks, PEF replied that there was a greater need for these audit resources at another Progress Energy generation plant located outside of Florida. This audit was completed in May 2011 and the overall opinion of the ASD was that the Levy Nuclear Plant audit was effective. Two observations with recommendations were included in the report. In addition to this audit, the ASD also planned to conduct a *Florida Nuclear Plant Cost Recovery Compliance* (financial audit) audit in 2011. This audit was completed in March 2011, and the overall opinion of the ASD was effective.

SIX QUALITY ASSURANCE ASSESSMENTS AND AUDITS ISSUED IN 2010

Progress Energy's Nuclear Oversight Section performed a supplier audit of CH2MHILL to assess the proper implementation of the vendor's Quality Assurance Program and its respective implementing policies and procedures. The audit also reviewed the corrective actions taken in response to previous PGN audit findings from a March 2009 audit. The Progress' audit team concluded based on the results of the audit, with the exception of the identified audit nonconformance, that CH2MHILL is effectively implementing their Quality Assurance Program for the PGN COLA Development Projects.³⁵ PEF provided documentation that a corrective action plans were developed and implemented by the vendor. FPSC Audit staff reviewed this documentation and confirmed closure of the exceptions identified in the audit.

The Nuclear Oversight Section performed an *Assessment of the Nuclear Plant Development and Operational Readiness* (now New Generation Programs and Projects

³¹ PEF Response to Staff Data Request 1.14, BATES 000029.

³² PEF Response to Staff Data Request 1.16, BATES 000032.

³³ PEF Response to Staff Data Request 1.31, BATES 000002.

³⁴ Ibid.

³⁵ PEF Response to Staff Data Request 1.32, BATES 000127 – 000133.

organization) in September 2010. The purpose of this assessment was to determine if the department was effectively implementing its Quality Assurance Program. The Nuclear Oversight Section team reported that the department was effectively executing and fulfilling their requirements in this area. The audit team identified one finding and four recommendations during the assessment; however, the finding did not require a response. The next required debrief date for this audit is October 4, 2011.³⁶

In addition to internal assessments, the company participated in six quality assurance assessments and audits jointly conducted with the industry's Nuclear Procurement Issues Committee (NUPIC) organization and the AP1000 Owners Group (APOG). FPSC audit staff reviewed these audits and does not consider the majority of the findings to have a current impact on the Levy project—with the exception of the issue discussed below—although the findings provide PEF with insight into emergent issues related to the construction of the AP1000. The quality assurance assessments and audits completed in 2010 are as follows:

- ◆ Southern Company Lead Limited Scope Audit of Westinghouse AP1000 Projects (March 1 – 5, 2010)
- ◆ NUPIC Limited Scope Audit of Shaw Stone & Webster AP1000 Projects– Charlotte (June 6 – 10, 2010)
- ◆ NUPIC Limited Scope Audit of Westinghouse AP1000 Projects (September 27 – October 1, 2010)
- ◆ APOG Surveillance of Westinghouse Actions for [REDACTED] (October 4 – 7, 2010)

As noted, the majority of the issues identified in these audits and surveillances provide PEF with insight into the current performance of its AP1000 vendors. However, the company did take action with its long lead equipment provider Westinghouse based on the findings in APOG's *Surveillance of Westinghouse Actions for* [REDACTED].

QUALITY ASSURANCE AND NUCLEAR OVERSIGHT SECTION AUDITS PLANNED FOR 2011

The Nuclear Oversight Section has planned six quality assurance assessments and audits for 2011. These assessments and audits include both internal PEF assessments and cooperative audits with the Nuclear Procurement Issues Committee (NUPIC) organization. These quality assurance assessments and audits planned for 2011 are shown in **EXHIBIT 9**.

³⁶ PEF Response to Staff Data Request 1.32, BATES 000001 – 000016.

**LEVY NUCLEAR PROJECT
QUALITY ASSURANCE ASSESSMENTS AND AUDITS
PLANNED FOR 2011**

Description	Scheduled Dates
PGN Surveillances of RCC Phase III Testing Activities	First and Second Quarter 2011
NUPIC Audit of Worley Parsons	Second Quarter 2011
NUPIC Audit of Sargent & Lundy LLC	Second Quarter 2011
NUPIC Audit of Westinghouse AP1000	Third Quarter 2011
Internal NOS Assessment of Nuclear Plant Development and Operational Readiness	September 26 – 29, 2011
NUPIC Audit of Shaw Nuclear Services	Fourth Quarter 2011

EXHIBIT 9

Source: PEF Response to Staff Data Request 1.32

NRC REVIEW OF THE PEF LEVY PROJECT

The NRC performed a Quality Assurance Inspection of New Generation Programs and Projects during the week of April 12, 2010. No violations or findings were identified during this inspection.³⁷ Audit staff reviewed the final NRC Report provided by PEF and confirmed that there were no violations or findings.

2.3 LEVY CONTRACT OVERSIGHT AND MANAGEMENT

2.3.1 CHANGES TO CONTRACTS AND CONTRACT MANAGEMENT

During 2010, PEF modified 24 procedures that deal with contractor selection and management. These procedures cover the areas of contractor compliance, procurement and payment approvals, materials controls, nuclear generation group support, records and document controls, and contractor safety.³⁸

PEF issued no RFPs for contracts in excess of \$100,000 since the last audit staff report in 2010. PEF provided work authorizations, change orders, and impact evaluations on all contracts previously examined in audit staff's 2008, 2009, and 2010 reviews. PEF also provided the contracts and contract addenda for materials and/or services valued greater than \$100,000 that have been executed or updated since the last review.³⁹ A list of these contracts (excluding 2010 EPC contract activity) is found in **EXHIBIT 10**. Contracts that exceed two million dollars of new activity are discussed in more detail below.

During late 2009 and early 2010, PEF entered into two Contracts for Sale and Purchase of Real Estate with American Government Services. The first contract was for three parcels of land in Levy County, identified as lots 6, 7 and 8 of the Ruby Subdivision. The total purchase price of this property was [REDACTED]. The second contract was for approximately 197 acres near U.S. Highway 19 in Levy County with a purchase price of [REDACTED], which sum was calculated at [REDACTED] per acre, with the final acreage calculation set forth in the purchaser's survey.

³⁷ PEF Response to Staff Data Request 1.31, BATES 000053.

³⁸ PEF Response to Staff Data Request 1.28, BATES 000048.

³⁹ PEF Response to Staff Data Request 1.24, BATES 000043.

PEF amended its Joint Venture Team contract for additional work identified for the COLA review. These amendments were prepared to (1) incorporate the Levy Roller Compacted Concrete (RCC) and Bedding Mix Design work, (2) change the ending date of the Work Authorization, and (3) support Levy Nuclear Plant's Combined Operating License Application (COLA) review and approval process. Each of these changes was documented on a change order (Joint Venture Impact Evaluation) form. This form was used to document the proposed change, the required reviews, and ultimate disposition of the requested change. These Impact Evaluations were incorporated as attachments to the contract amendments.

During 2010, PEF entered into an agreement with the State of Florida for the land easement at the barge slip near the Levy construction site. This easement allows PEF to construct, operate, and maintain a vehicular access bridge and a utility bridge between two parcels of land. One parcel will provide the barge slip and equipment staging area during construction.

LEVY NUCLEAR PROJECT CONTRACTS GREATER THAN \$100,000 EXECUTED DURING 2010				
Company	Contract #	Amend. Or WA #	Specific Scope	New Contract Activity for 2010 (\$000's)
American Government Services	Contract for Real Estate	---	Final payment for purchase of property for LNP.	██████
Duncan Co.	293651	3/	Amendment executed in 2010 to extend contract date only.	██████
Entrix	399960	1-2/19	LNP Wetland Mitigation Plan Production. (Amendments 1 & 2 executed in 2010)	██████
Golder Associates	453352	/03	Provide U.S. Army Corps of Engineers Section 404 Permit support for the Levy Project.	██████
Joint Venture Team (JVT)	255934	7/02	Amendment executed in 2010 to add new rates only.	██████
Joint Venture Team (JVT)	255934	5-6/03	Site Certification Application Development Support for Levy Nuclear Plant. (Amendments 5 & 6 executed in 2010)	██████
Joint Venture Team (JVT)	255934	3-6/05	LNP COLA Phase II – RAI Support. Incorporate Additional NRC RAI Responses, Seismic, Geotechnical and FSAR 2.4 RAIs. (Amendments 3, 4, 5 & 6 executed in 2010)	██████
Joint Venture Team (JVT)	255934	1-5/06	LNP Site Certification Application 2010 Follow On Activities. (Amendments 1, 2, 3, 4 & 5 executed in 2010)	██████
Joint Venture Team (JVT)	255934	1-3/07	LNP Offset Boring Program (Amendments 1, 2 & 3 executed in 2010)	██████
Joint Venture Team (JVT)	255934	1-3/09	LNP COLA Phase III – COLA Revision 2, Amendments incorporate RCC Specialty Test, Foundation Calc Rev. (Amendments 1, 2, & 3 executed in 2010)	██████
Florida DEP	Easement #31959	---	Barge Slip easement – Escrow for benefit of bike trail.	██████
Westinghouse Energy Development LLC (WEC)	3382	2-5/155	Support the COLA review process, as needed, for both the Harris (HAR) and the Levy Nuclear Plants (LNP). To provide support to respond to Requests for Additional Information (RAI) from the regulators. (Amendments 2, 3, 4, & 5 executed in 2010)	██████
Westinghouse Energy Development LLC (WEC)	3382	/208	LNP Site Soil Structure Interaction Analysis – response to NRC letter #085	██████

EXHIBIT 10

Source: PEF Response to Staff Data Request 1.24

2.3.2 EVALUATION OF CONTRACT INVOICES

In testing PEF compliance with published procedures, audit staff reviewed invoices and supporting documentation of LNP Westinghouse/Shaw, Stone & Webster, and the Joint Venture Team contracts to determine whether PEF followed its policies and procedures with respect to the processing of these invoices. Audit staff reviewed all approved 2010 Joint Venture Team contract work authorizations, amendments, and associated change orders. Audit staff was provided the *JVT Invoice Review Steps* document, *JVT Labor Hours Analysis*, and the *Contract Invoice Processing Guidelines* document.

Audit staff reviewed four Westinghouse invoices and four Shaw, Stone & Webster invoices and cross-referenced invoiced amounts to the minimum [REDACTED]

[REDACTED]. Audit staff observed that the processing analyst indicated that follow-up lists for job titles that did not appear on EPC contract and removed certain vendor travel reimbursements items that were not authorized. Audit staff verified that the amounts verified by the analyst were accurate and that the analyst used the appropriate EPC contract exhibit to verify the accuracy of the amounts. Additionally, audit staff confirmed management approvals of each invoice.

In addition, audit staff reviewed four invoices for the long-lead [REDACTED]. Audit staff verified two contract milestone dates and payments and confirmed that the invoice amounts agreed with the amounts outlined in the EPC contract payment schedule. Audit staff reviewed a June 2010 invoice for work done in August and September 2009, for the LLE item, [REDACTED], and verified the [REDACTED] on the appropriate EPC contract exhibits. Audit staff did not find any instances where PEF failed to follow existing procedures with respect to the sampled invoices.

3.0 CRYSTAL RIVER 3 EXTENDED POWER UPRATE PROJECT

3.1 DEFERRED DOCKET No.100009-EI NUCLEAR COST RECOVERY CLAUSE ISSUES

In its order for Docket No. 100009-EI, the Commission made the decision to defer several issues until the current year Nuclear Cost Recovery Clause cycle. Audit staff continued to monitor and evaluate these issues during this review and gathered additional information to assess the effectiveness of the project management oversight in these areas. The following section includes a more detailed analysis of these deferred issues beyond that provided in the *2010 Review of the PEF's Project Management Internal Controls for Nuclear Plant Uprate and Construction Projects*.

3.1.1 LICENSE AMENDMENT REQUEST APPLICATION DRAFT DID NOT MEET COMPANY EXPECTATIONS

To operate the unit at the higher output rate to be achieved by the EPU project, the company must submit and receive approval of a License Amendment Request (LAR) to the NRC asking for an amendment to its current operating license. As described in audit staff's *2010 Review of PEF's Project Management Internal Controls for Nuclear Plant Uprate and Construction Projects*, it was the company's original intent to submit the LAR application in September 2009. The company contracted with AREVA to complete the majority of its LAR with support and assistance from an internal team.

During Docket No. 100009-EI, discussion occurred concerning the company's LAR application preparation process and the review performed by the "expert panel" that identified deficiencies in the June 2009 LAR draft document. The panel concluded that the EPU draft would not pass the NRC acceptance review and that the company could not meet its fall 2009 submittal timeline.

After discussions with members of the LAR application preparation team and two members of the Expert Panel review board, audit staff believes that the company did not effectively manage the initial application development. Audit staff believes the management issue is reflected in the company's performance evaluations of certain LAR team members. Specifically, the company stated in one evaluation that the associate failed in "delivering a high quality EPU LAR on schedule due to issues associated with poor quality and lack of details." The evaluation goes on to state that "The Licensing review of the AREVA drafts was ineffective. At least some of the subsequently identified deficiencies could and should have been identified during that review."⁴⁰

The company acknowledged that a factor leading to the poor quality issue was the lack of a project management oversight structure. In addition to the LAR management team, audit staff interviewed members of the LAR application team. In describing the pre-review LAR approach, audit staff determined that there was not a structured, oversight process assigning accountability to team members and managers for the quality of the work product. Also, the project lacked a structured workflow schedule. Audit staff believes this lack of project management structure contributed to the quality issues identified by the expert panel.

⁴⁰ PEF Response to Staff Data Request CR3 1.6S Bates 000326.

Audit staff interviewed the two Progress Energy associates who participated on the Expert Panel to gain an understanding of the teams' charge and approach to reviewing the LAR application. These internal Progress Energy participants have extensive knowledge from their work experience in nuclear operations and plant licensing both with Progress and other organizations. In addition to the lack of quality content, both members stated that the panel's observation that sections of the single, non-proprietary version lacked sufficient data significantly impacted the need to restructure the report. One panel member stated that it was his opinion that the company and AREVA "got off on the wrong path" by choosing to limit specific technical details in the application. The other panel member stated that while NRC expectations were changing during this timeframe, it was his opinion that the initial LAR application prepared by PEF and AREVA contained less technical information than the Ginna LAR application—which PEF was using as its model. One panel member stated that while the CR3 LAR application management team did have previous NRC application experience, in his opinion this experience was "dated" for the current NRC standards.

The company acknowledged in its August 3, 2010, Rebuttal Testimony of Jon Franke in Docket No. 100009-EI that although management and quality issues were associated with the LAR draft and AREVA's contributions, the vendor resolved all errors at no cost to the company. While audit staff confirms that AREVA did correct portions of its work product at no cost, the company re-structured its application format to incorporate the recommendations of the panel and post-review LAR Recovery team. This effort required additional in-house and vendor work-hours to compete, and an additional AREVA work authorization with a final value of [REDACTED] was issued to cover these efforts.

Audit staff recognizes that during the review process the LAR application was in *draft* form. As such, it was an evolving document to which critiques and modifications would be expected. However, the critiques and modification identified by the Expert Review Panel, along with a follow-up adverse conditions review performed by Progress Energy's Manager of Nuclear Regulation, signal that the application restructuring and re-writing went beyond standard draft modifications.

As stated in the work authorization, PEF contracted with AREVA to complete "CR3 EPU LAR Re-write Activities"⁴¹ for previously drafted sections of the application, including revising the LAR template and incorporation of additional AREVA references into the application. In total, this activity resulted in an additional [REDACTED]⁴² in costs to the project⁴³. While the company identified this work as additional scope, audit staff believes that portions, if not all, of this work scope should have been seen as necessary in the original LAR development. Members of the expert panel stated that a major factor influencing the application's deficiencies was PEF's arrangement at the onset of the process, allowing AREVA to reduce the amount of technical detail in the draft application. Additionally, the panel members asserted that while the NRC's expectations may have evolved during this timeframe, overall, the LAR draft presented to the panel contained less detail than the standard suggested by the NRC—the Ginna LAR application.

As a result of its assessment, audit staff believes that the [REDACTED] spent to re-write the LAR constituted the re-structuring of a poorly initiated application. Audit staff recognizes the

⁴¹ PEF Response to Staff Data Request CR3 1.22, Bates 000081.

⁴² The [REDACTED] is derived from two Change Orders to the AREVA contract 101659-Work Authorization 84. The initial Change Order 23 was initiated in October 2009 for [REDACTED] and Change Order 23—Rev. 1 was initiated in January 2010 for an additional [REDACTED].

⁴³ PEF Response to Staff Data Request CR3 4.2, Bates 000001.

efforts the company placed in its "LAR Recovery" initiative to bring the application in line with the NRC's expectation. However, audit staff believes that the lack of adequate project management oversight during the initial application development contributed to both the underlying deficiencies and to the need for the additional AREVA work. This amount does not include any work related to necessary engineering or project-scope development. Therefore, audit staff believes that the [REDACTED] spent was avoidable and questions its recovery through Docket No. 110009-EI.

3.1.2 LOW PRESSURE TURBINE REPLACEMENT SETTLEMENT REACHED

In 2009, the company made the decision to defer the installation of its low pressure turbines from Phase II to III of the project. This was a result of the issues related to the involving the D.C. Cook plant turbine failure in 2008 and quality issues identified during the manufacturing of the CR3 turbines. During 2010, the company entered legal negotiations with Siemens to work to resolve the outstanding issues involving the turbines. As noted in the 2010 PEF's Project Management Internal Controls for Nuclear Plant Uprate and Construction Project, audit staff recommended that the Commission continue to monitor these negotiations to ensure the company and customers were absolved of any additional costs resulting from this error.

On June 29, 2010, PEF and Siemens signed a Letter of Intent documenting that the companies would enter into good faith discussion to resolve the issues involving the manufacture and installation of the two LPTs. During the negotiation process, Siemens agreed to [REDACTED] with this settlement. The [REDACTED] that led to the spin test failure, with some offset due to PEF's decision to shift the installation of the turbines from Phase II until Phase III. PEF made the decision to delay the turbine installation because of the product quality uncertainties and concerns over its ability to obtain insurance coverage for the new turbines. Siemens held the position that the [REDACTED].

After final negotiation, the company agreed to a new cost for the LPT of [REDACTED].⁴⁴ This amount is an increase of [REDACTED] from the original contract amount of [REDACTED]. However, after [REDACTED], the final PEF price is [REDACTED], resulting in a net contract increase of [REDACTED] for PEF. The principal settlement terms include the following to be provided by Siemens:

- ◆ [REDACTED]
- ◆ [REDACTED]
- ◆ [REDACTED]

⁴⁴There are [REDACTED].

⁴⁵ NEIL will not insure these Siemens turbine due to the turbine failure at the D.C. Cook plant.

The settlement terms increased the original contract scope to include an additional [REDACTED] in engineering, testing, and monitoring work and [REDACTED] in technical support. Specifically, the additional work scope includes:

[REDACTED]

Audit staff verified the inclusion of this additional scope in the revised contract. The detail requirements are included in Attachment H of the Work Authorization 50 to the contract. This document outlines the specific testing requirements and quality assurance monitoring for the performance testing and installation of the turbines.

While PEF increased its costs for the LPTs, the company believes that it received favorable concessions and commitments from Siemens during the process. In addition to the [REDACTED], PEF believes that Siemens contributed additional commitments totaling [REDACTED] towards the contract. PEF breaks down this estimate as:

- ◆ Equipment Assurance (third-party issuance)
- ◆ Additional Warranties
- ◆ Additional Engineering and Services

[REDACTED]

Audit staff notes that the costs borne by Siemens for these commitments are not disclosed in the final contract amendment. Rather, these amounts are what PEF states it would expect to pay if these services were negotiated by the parties.

Audit staff obtained the basis for PEF cost estimates for these concessions. Specifically, PEF contract negotiators stated that for the Equipment Assurance concessions, the company participated in discussions with the eventual insurance provider; including the initial cost estimates for the service. PEF used these discussions as its basis for the [REDACTED] estimate. Likewise for the additional warranties, PEF developed the [REDACTED] amount used the known amount the vendor charges for an extended warranty on comparable turbines. For the Engineering and Services category, the company used its contract negotiation experience to estimate the costs. Because of the number and type of services being provided under this grouping, PEF was not as precise with this estimate. Audit staff believes that these estimates, if accurately valued, demonstrate an increase in the overall contract value.

PEF management states that the settlement with Siemens represents “a favorable resolution of the outstanding issues . . . and in a number of respects, PEF has obtained more favorable terms and conditions than in its original contract.”⁴⁶ In the end, PEF was willing to increase the overall contract terms to obtain additional assurances and quality monitoring of the turbines through installation and operations.

⁴⁶ PEF Response to Staff Data Request DR1CR3-19 Bates 000006.

Audit staff agrees that the revised contract provides additional safeguards that will benefit the company in the event of a turbine malfunction. The additions in scope provide an added layer of assurance that the turbines meet PEF's quality standards and will allow for additional oversight during its operation. When considering Siemens' concessions, PEF appears to have obtained compensation for Siemens' manufacturing quality issues.

3.2 EPU KEY PROJECT DEVELOPMENTS

3.2.1 REFUELING 16 OUTAGE TIMELINE EXTENDS TO 2011

The continued Refueling 16 outage extension shifted the final EPU project construction from the original 2011 timeline until spring 2013. The current 2013 schedule was established with the expectation that the unit would return to service from the current extended outage during spring 2011. The project team developed a detailed project timeline based on this anticipated date. As such, the company is continuing to finalize its engineering modification plans and long-lead contracts to support this construction date.

Under the current schedule, audit staff verified that the company is following its process and policies for developing and implementing the final stage of the project. The company has implemented a process to assign required tasks to project management personnel and to monitor the status of the project development through its management reporting process. **EXHIBIT 11** outlines the current Phase III pre-construction schedule and milestones.

EPU PROJECT PHASE III PREPARATION SCHEDULE MILESTONES	
Timeline	Event
January 2012	Mobilize Construction Contractor
March 2012	Finalize all Engineering Changes
April 2012	One-year out Readiness Review
October 2012	Six-month out Readiness Review
December 2012	Work order packages reviewed with Contractor for constructability
January 2013	All materials on-site
April 2013	50-day construction outage

EXHIBIT 11

Source: March 2011 Interview with CR3 Project Team

The project team is operating under a level two schedule for monitoring and tracking the progress of the Phase III engineering designs. Under this schedule, the project team monitors the weekly status of each Engineering Change through its Schedule Performance Indicators. Audit staff obtained and reviewed these schedules and verified that the project team is monitoring the status accordingly. Audit staff believes that the company has developed a schedule that incorporates the necessary milestones to meet the current construction timeline.

Audit staff observed that in the first quarter 2011, the project Schedule Performance Indicators were trending behind projections. The Project Manager stated that because of the evolution of the engineering design, it is more difficult to assign a schedule baseline for engineering development. To address this issue, the company is in the process of developing

corporate procedures to assist in developing engineering Schedule Performance Indicators. Overall, the Project Manager states that the project is still on task with the Level II schedule with no known issues that could prevent the team from obtaining the current schedule (outside of the Refueling 16 extended outage.). Audit staff believes that continual monitoring of these indicators is necessary through the remainder of 2011 to verify the company is maintaining its projected construction timeline.

IMPACT OF MARCH 2011 DELAMINATION EVENT UNKNOWN

In March 2011, the company identified an additional delamination issue with the CR3 containment structure. As of the publication of this review, the company has not completed evaluation of this event nor its impact on the unit returning to service. EPU project management states that until this impact is known, the company is operating under the expectation that the spring 2013 project completion date is still obtainable. Senior management has directed the EPU project team to continue with business-as-usual during the delamination assessment period, with the caveat that the project team should avoid overtime, limit all expenditures and service agreements, and limit new contracts until directed by senior management.

Audit staff can not speculate as to the impact of this event on the overall EPU schedule timeline. However, using the first delamination repair as a baseline, a strong possibility exists that this event will further delay the completion of the EPU project. If the company continues with the expectation of completing construction during the next refueling outage, the overall timeline may shift as the current outage extends past spring 2011. The company anticipates scheduling the next outage 18 to 24 months after the unit returns to service. While the company is evaluating all plant options, management is evaluating the option of moving some, or all, Phase III work into the current outage. The company will not make this decision until completing its assessment of the impact of the second delamination event on the current outage timeline. The company expects to complete the initial assessment by July 2011. If the company is able to finalize this assessment by this date, the Commission may have a greater understanding of the impact of the event during the Docket No. 110009-EI hearing.

3.2.2 LICENSE AMENDMENT REQUEST COMPLETED AND AWAITING SUBMITTAL

As of April 2011, the company has not submitted its LAR to the NRC for review. The company has completed the majority of the necessary rework identified in the Expert Panel. As discussed during the Docket No. 100009-EI, the company made the decision to delay submitting the application due to the schedule shift for Phase III. This delay also allowed the company to address an additional issue raised by the NRC. The company has stated throughout this process that the NRC timeline for application acceptance to approval should be 12 to 14 months. With the current Phase III construction scheduled for spring 2013, the company believes that its June 2011 submittal date will provide adequate time to receive the approval prior to finishing the project.

On April 21, 2011, the NRC held a public meeting with PEF to discuss the pending LAR submittal. During this meeting NRC staff confirmed that its LAR review schedule could be up to 24 months, although PEF has always asserted that the review process could take 12 to 14 months to complete. PEF questioned the timeline at this meeting and the NRC cited the fact that the CR3 unit being the first EPU request for this particular Babcock & Wilcox model plant as the reason. Audit staff notes that if NRC review requires the full 24 months, under the current submittal timeline and construction schedule, the company will not obtain its license until several months after completing the EPU construction. If this occurs, the company will not be able to

operate the unit at the new output during the gap between construction and the License issuance.

3.2.3 INCREASE IN EPU PROJECT SCOPE IDENTIFIED FOR PHASE III CONSTRUCTION

The project management engineering team spent the majority of 2010 developing the final engineering scope for Phase III of the EPU project. During this analysis and development, the project team determined that additional work was necessary to complete the uprate as envisioned. Project management explained that because the majority of Phase III engineering development was scheduled to follow the completion of Phase II construction, the company could not anticipate the specific modifications and additions necessary to finalize the construction project.

The company asserts that each scope modification or addition was necessary to complete the full project design or confirm the safety requirements of the NRC. The project team states that no modification or addition was a result of a correction to a previous design or construction issue. Rather, each scope modification or scope addition was a result of an open safety or performance issue identified during the engineering development process. For each open issue, the project team evaluated the impact using different scenarios for resolution. When applicable, the company evaluated each potential resolution and presented management with these options and the most appropriate resolution.

Audit staff reviewed the external assessment and internal management reports detailing the scope additions and the analysis used by the company to determine its course of action. These reports confirmed the need for the scope addition and the options reviewed by the engineering team. Audit staff confirmed that the project team followed PEF procedures in developing and approving the scope changes.

3.2.4 PROJECT COST INCREASE EXPECTED WITH THE ISSUANCE OF REVISED INTEGRATED PROJECT PLAN

With the uncertainty created by the second delamination event on the project schedule, the company has delayed issuance of its 2011 revised Integrated Project Plan. This revision will detail the cost impact of the Phase III scope additions on the overall project. The project team completed the revision and was scheduled to go before the Senior Management Committee on March 29, 2011, for approval. However, senior management deferred this meeting until the after the completion of the second delamination assessment. Although delayed, the company did provide audit staff with a summary of the Integrated Project Plan revision, including the project scope changes and the resulting impact on the schedule and project costs.

With the additional scope changes identified for Phase III work, the company anticipates an increase in project costs of \$137.6 million financial view (\$124.8 direct view⁴⁷). This amount bring the current financial view estimated total project cost to \$617 million, a 28.7 percent increase over the May 2010 total and a 34 percent increase over the original January 2008 estimate. **EXHIBIT 3** details the project costs impacts for each Integrated Project Plan since its inception in 2008.

The 2011 summary Integrated Project Plan breaks down the additional \$124.8 million (direct view) by activity. The largest portions of the scope addition are associated with

⁴⁷ A *Direct View* cost estimate is the project cost, excluding total burdens and allocations.

additional engineering cost and the required construction costs. **EXHIBIT 12** details this Phase III cost increase by activity.

The company provided a detail cost analysis for the components within the project scope. This analysis included the previous 2010 estimates and the current 2011 revised costs, itemized by its engineering, project management, and procurement portions. Audit staff was able to confirm these totals.

For the construction estimate, PEF contracted with an outside vendor to conduct a *Rough Order of Magnitude* evaluation and estimate for the Phase III construction scope. This vendor studied the proposed engineering scope to determine an appropriate installation approach for the final phase of construction. The company used this study for its new baseline cost estimate for its construction cost.

EPU PROJECT PHASE III COST INCREASE BY PROJECT AREA (DIRECT VIEW)	
Project Area	Amount
Engineering	██████████
Procurement	██████████
Construction	██████████
Project Management/Administration	██████████
Total Increase	\$124,800,000

EXHIBIT 12

Source: PEF Response to Staff Data Request 1.17

COST ESCALATION SINCE PROJECT INCEPTION

The project team presented its original project cost estimates to senior management in its 2006 initial Business Analysis Plan. This document summarized the original capital cost estimates, key assumptions and key risks, the company’s economic analysis, and the original project feasibility study. The project management team points out that, at the 2006 evaluation, the company had evaluated less than 10 percent of the Phase III engineering work. **EXHIBIT 5** highlights the cost estimates over time.

In the original 2006 evaluation, the company estimated the project cost to be \$427.2 million. This figure includes \$89 million in anticipated transmission costs, \$88 million in water cooling costs, and \$250 million in plant costs. In its evaluation, the company used a 10 percent contingency in assessing the “worst case scenario” for the cost of the project. The company established the 10 percent contingency with the understanding that the vast majority of the Phase III engineering analysis was incomplete. Additionally, the project team notes that in 2006, there was uncertainty in the need for the planned transmission and water cooling work, and that the costs associated with these items, if not needed, could provide additional contingency. The company used the unnecessary transmission costs to offset the increase in Phase II costs.

In July 2009, the company developed a procedure on Project Cost and Financial Management, which, among other points, establishes the parameters cost estimates and contingency percentages. This procedure was revised and implemented in 2010. This procedure references the *Association for the Advancement of Cost Engineers* standard for incorporating project estimates and contingency parameters based on the amount of

engineering work remaining to finalize the project. In accordance with the *Project Management Body of Knowledge*, the procedures define the parameters of contingency to include funds "added to the base cost of the project to cover estimate uncertainty and Risk."⁴⁸ This would not include any changes or additions to the project scope.

As of the 2011 draft Integrated Project Plan, project management states that approximately 50 percent of the Phase III engineering design is still outstanding. Under the new procedures, the company should anticipate that its accuracy rate of to be within 15 percent below to 20 percent over the estimate. Audit staff also recognizes that with approximately 50 percent of the engineering work still outstanding for Phase III, the overall cost estimates could continue to increase during the remaining planning phase.

3.2.5 DISCHARGE COOLING TOWER PROJECT SUSPENDED

The company has made the decision to suspend the new Crystal River Energy Complex cooling tower project. This project involved the construction of a new supplemental cooling tower to accommodate the increased discharge water temperature resulting from the uprate. The company states that the suspension was based on:

. . . the return to service dates for Crystal River Unit 3, under EPU conditions, being moved out and the subsequent need for the new cooling tower to be in service delayed. In addition, the U.S. Environmental Protection Agency (EPA) was preparing to issue new regulations that could impact the way the cooling systems and other operations of generating units at Crystal River Energy Complex could be managed. Since there was a delay in the need for the new tower the project was suspended to allow time to evaluate the proposed rules.⁴⁹

The project team reported in a March 2011 management report that analysis is being conducted on the impact of the proposed regulation on the CR3 fossil generating units, and the resulting impact to the overall discharge canal temperature.⁵⁰ The team anticipates that this review will be completed and presented to senior management in August 2011. The company has currently committed [REDACTED] in total EPU expenditures toward the construction on the discharge project.

3.3 EPU PROJECT CONTROLS AND OVERSIGHT

3.3.1 CHANGES TO PROJECT CONTROLS, RISK AND MANAGEMENT OVERSIGHT DURING 2010

The company continues to evaluate its processes, policies, and procedures for major project and EPU specific operations. During 2010, the company implemented both new project management procedures and revisions and updates to many of project management and EPU specific guidance procedures. The company modified certain corporate procedures, including the areas of:

- ◆ Project cost and financial management
- ◆ Project risk management
- ◆ Project management training development
- ◆ Corporate contractor processing

⁴⁸ PEF Response to Staff Data Request DR6CR3-2 Bates 000004.

⁴⁹ PEF Response to Staff Data Request 2.7

⁵⁰ PEF Response to Staff Data Request 1 CR3.14S2 Bates 000977

For specific Nuclear and EPU procedures and guidance documents, the company made revisions in the areas of:

- ◆ NGG contract initiation, development, and administration
- ◆ CR3 calculation recovery process
- ◆ Engineering change development

The *Engineering Change Development Guidance* strengthens the process for developing and managing the engineering modifications and changes for the project. The company developed these changes using experience gained during the Phase II process. Audit staff obtained copies of these procedures and reviewed the documents. Audit staff believes the documents are consistent with the standards of the company and provide additional guidance to the project and further strengthen the internal controls.

MANAGEMENT CHANGES IMPLEMENTED

The company made changes to the EPU project management team during 2010. Specifically, the company replaced the Manager-Major Projects of the EPU and the Project Controls Manager. In 2009 and 2010, the company employed a contractor to serve as the Manager-Major Projects of the EPU project. This contractor managed the implementation of the Phase II construction. At the end of 2010, this contract was not renewed, and the company promoted the Assistant Project Manager as the new EPU Manager-Major Projects. This represents the third general manager over the EPU project. The new EPU Manager-Major Projects previously served as a construction superintendent for the EPU Phase II construction and is familiar with the overall project design and scope.

The longtime Project Controls manager accepted a position within the company's Nuclear Oversight Section at one of Progress Energy Carolina's nuclear units. The Project Controls Scheduling Supervisor was promoted to Project Controls Manager in spring 2011 and has been a member of the project controls team throughout the project.

Additionally, during the extended Refueling 16 outage, the EPU project team at times shifted its resources from EPU efforts to support the operational efforts related to the containment structure repairs. With the shift in EPU construction from 2011 to 2013, the EPU project required fewer resources while additional operational resources were needed to assist in the delamination repair efforts.

INTEGRATED PROJECT PLAN REVISION DELAYED

As discussed in Section 3.2.3, the company delayed the planned updating of its Integrated Project Plan for the final phase of construction. According to company procedures, a revision to the Integrated Project Plan is necessary at each major milestone or when scope, cost, or schedule changes exceed the established threshold. After completing necessary Phase III engineering scope evaluations, the project management team initiated the process to update its Integrated Project Plan to reflect the new cost estimate, in accordance with its internal procedures. This process was suspended after the discovery of the additional delamination condition at CR3. Because this discovery could create additional delays to the EPU timeline or impact the overall viability of the EPU project, the company chose to defer finalizing the Integrated Project Plan until more is known about the return to service of CR3. Audit staff believes that this approach is reasonable, given the uncertainties impacting the CR3 plant. However, management should continue the approval process once a decision is made concerning the unit's future.

RISK EVALUATION PERFORMED

The company has maintained its ongoing risk evaluation process throughout 2010 and 2011. This process and assessment continues to evolve as the project moves toward Phase III implementation. Audit staff reviewed the risk matrices throughout the audit process and obtained snapshots of the risk matrices at several intervals throughout the audit timeline. As of late April 2011, the project team tracked 19 open risk items. Of these, PEF categorized 18 as low probability and low impact, with one highlighted as a moderate probability and moderate impact.

The sole moderate impact risk relates to the issuance of the EPU Safety Evaluation Report (SER), the ultimate project of the LAR process, by the NRC. This report is necessary for the plant to operate at the increased 180 MWe, once the project construction is complete. The identified risk is that the NRC may not issue this report prior to the completion of the work. The company recognizes that this delay would create a financial impact on the overall project. Audit staff verified that the company has a mitigation/action plan in place to track and monitor the risk. Additionally, the company noted in its late 2010 and early 2011 risk assessment the moderate possibility of additional cost increases related to the Phase III engineering costs. This risk was removed with the incorporation of these costs in the March 2011 Integrated Project Plan draft.

Audit staff verified that the company evaluates the project risk on a continuing basis. In accordance with company procedures, the EPU project team develops and monitors issues that can impact the overall viability of the project, specifically in the impact areas of cost and schedule. The project team provides updated risk assessments to management through periodic reports. Audit staff obtained copies of the company's management reports for 2010 and verified the inclusion of risk related issues. Additionally, the company incorporates its risk concerns within its senior management approved Integrated Project Plan.

Audit staff notes that as the final project phase moves toward construction, a continued focus on identifying and mitigating all project risks will be essential to ensuring a successful implementation with minimal project interruptions or cost overruns.

3.2.2 LIMITED INTERNAL AUDITS AND QUALITY ASSESSMENTS PERFORMED IN 2010

The company originally scheduled two EPU related internal audits for the 2010 cycle: the annual *Florida Plant Cost Recovery* audit and the *Construction/Project Management Crystal River 3 Extended Power Uprate* audit. The company completed the Cost Recovery audit in 2010, but chose to defer the Construction/Project Management audit based on the delay to the construction schedule created by the extended Refueling 16 outage and the audit risk priority. The company has rescheduled this audit for mid-2011. In addition, the company scheduled a Florida Nuclear Plant Cost Recovery financial audit for the 2011 cycle.

As with Internal Audits, the company did not perform any formal Nuclear Oversight Section reviews or assessment reviews since audit staff's 2010 Review of PEF's Project Management Internal Controls Review. The company cites the shift in schedule and lack of construction activities as the basis. The Nuclear Oversight Section anticipates performing a Nuclear Upgrades multi-site assessment during 2011 that will include the CR3 EPU project within its scope.

3.4 EPU CONTRACT OVERSIGHT AND MANAGEMENT

3.4.1 CHANGES AND ADDITIONS MADE TO CONTRACTS AND CONTRACT MANAGEMENT

During 2010, the company initiated many of the contracts for the long-lead components within the Phase III EPU work scope. Due to the delivery time, these items must be contracted for well before the actual construction timeline. **EXHIBIT 13** lists the contracts initiated in 2010 for the final EPU construction phase and the total contract amount. All are listed as [REDACTED] contracts.

EPU PROJECT CONTRACTS OVER \$100,000 INITIATED IN 2010			
Work Scope	Initiation Date	Contract Amount	Dollars Spent as of 12/13/2010
Condensate Pump and Motor	4/2/2010	[REDACTED]	[REDACTED]
Additional Condensate Pump Discharge head and proximity Transducer system	9/03/2010	[REDACTED]	[REDACTED]
Atmospheric Dump Valves	2/18/2010	[REDACTED]	[REDACTED]
Small and large bore LPI valves	4/02/2010	[REDACTED]	[REDACTED]
2 eight inch LPI Valves (amendment)	7/08/2010	[REDACTED]	[REDACTED]
Feedwater Pumps 2A and 2B	6/10/2010	[REDACTED]	[REDACTED]
Feedwater Pumps 1A and 1B	3/08/2010	[REDACTED]	[REDACTED]
Two Feedwater Heat Exchangers	5/03/2010	[REDACTED]	[REDACTED]

EXHIBIT 13

Source: PEF Response to Staff Data Request 1.21

EPU PROJECT WORK AUTHORIZATION AND AMENDMENTS INITIATED DURING 2010		
Amendment	Amount	Reason
Beetle Plastics LLC, amendment 1	[REDACTED]	Incorporate final cooling tower material based on engineering and design work
Mesa Associates, WA 24, amendment 5	[REDACTED]	Incorporating approved project deviation notices for cooling tower
Mesa Associates, WA 24, amendment 7	[REDACTED]	Incorporating approved project deviation notices for cooling tower
ITT, amendment 1	[REDACTED]	Increase fixed price to include revised modifications to pump design
AREVA, WA 93	[REDACTED]	Incorporate the changes outlined in CO 10,30,31,33,34,35, & 37
AREVA, WA 84	[REDACTED]	Incorporate change orders 23 rev 1, 25, 30 and 34
Babcock & Wilcox Canada, WA 03	[REDACTED]	Incorporate additional EPU qualifications for the replacement Once Through Steam Generators
Siemens Energy, WA 50	[REDACTED]	Amendment 7, LPT rotor, blade validation, testing, installation, and operation
Siemens Energy, WA 50	[REDACTED]	Amendment 6, extract work authorization from Refueling 17 and proration of Refueling 16 and Refueling 17 installation charges
AREVA WA 84, CO 44	[REDACTED]	Initial funding for fast cooldown system activities
AREVA WA 84, CO 48	[REDACTED]	Initial funding for ADV EC, HPI termination, and pressurizer level—pending further negotiations and final change order
AREVA WA 93	[REDACTED]	Facilitate replacement of feedwater heaters 2A and 2B

EXHIBIT 14

Source: PEF Response to Staff Data Request 1.24

Audit staff reviewed each contract to confirm that it was executed within the company's policies and procedures. In each case, it appears the company followed its process for implementing the procurement. Audit staff verified that each item was included in the required Phase III scope of work.

In addition to the new contracts executed in 2010, the company initiated amendments to several of its existing contracts. **EXHIBIT 14** lists the 2010 amendment and work authorizations over \$100,000 that the company initiated on existing contracts.

For each amendment, audit staff reviewed each impact evaluation and Integrated Change Form to confirm the company was in compliance with its project management and procurement procedures. The company requires that management authorize any scope or schedule change identified within the Integrated Change Forms. In each case, audit staff determined that the authorized approval was obtained for each change and that the company initiated these contracts in accordance with its current process and procedures.

3.4.2 TESTING OF CONTRACT MANAGEMENT TO PROCEDURES

In addition to verifying the integrated change forms for each contract amendment and new contract, audit staff performed a sample review of the contract payment process to confirm compliance with company procedures. Audit staff requested quarterly invoices from a sample of current contracts to assess the company's compliance to its contract management policies and procedures. For each invoice, audit staff verified the Integrated Change Form in relation to the contract terms, the vendor invoice, and corresponding company payment. For each, audit staff verified the amounts billed to the contract amounts and confirmed that the company reviewed each invoice for accuracy.

For this review, audit staff requested a sample of 2010 quarterly statements from four major Phase III components or system designs. These statements included invoices for the following engineering scope:

- ◆ Feedwater system
- ◆ Inadequate core cooling monitoring system
- ◆ Low Pressure Injection system
- ◆ Atmospheric dump Valves

While audit staff selected areas, in many cases there were multiple invoices for each system. After review, staff determined that the invoices were billed and processed in accordance with PEF procedures. Additionally, staff was able to verify that PEF employees familiar with the contract requirements and engineering specifications are involved in the review process.

4.0 CONCLUSIONS

4.1 LEVY NUCLEAR PROJECT

4.1.1 PROJECT EVENTS AND DEVELOPMENTS

PEF remains committed to bringing two new AP1000 nuclear reactor generating plants into service, projecting that Levy Units 1 and 2 will come on line in 2021 and 2022, respectively. In 2010, PEF estimated that an increase in project cost will result from the shift in schedule. In 2008, the company estimated the total project cost, including fuel and excluding AFUDC, at \$13.9 billion. The 2010 estimate (unchanged in 2011), using the 2021/2022 in-service date as its base, projects the cost at \$17.636 billion. This cost represents an approximate increase of \$3.7 billion, or 27 percent.

During 2010, Progress Energy Florida shifted its efforts on the Levy Nuclear Project from both component fabrication and licensing approval to focus largely on obtaining the Combined Operating License (COL) with planned construction occurring after the receipt of the COL. The company is continuing this focus for 2011 and 2012. Currently, the company expects the COL to be issued by mid-2013. During 2012, the company will begin negotiations of the *Full Notice to Proceed* amendment with the Consortium.

At the start of the Partial Suspension period in April 2009, PEF suspended all new work on the long-lead equipment (LLE) for the Levy plant. PEF believes that LLE disposition negotiations (with the exception of the [REDACTED]) were successful and the final cost was less than projected. Change Orders on each of these items (with the exception of the [REDACTED]) have either been executed or are in process. PEF and the Consortium are continuing to negotiate [REDACTED] terms with the vendor of the [REDACTED]. PEF stated that the initial response from the vendor was [REDACTED].

Company officials stated that Japan's Fukushima incident is a historic event whose full ramifications are yet to be determined, but the incident will most likely lead to changes throughout the U.S. nuclear industry. Currently, the potential regulatory and cost impacts of the event on PEF current nuclear operations, extended power uprates, or new nuclear construction are unknown.

The utility company Duke Energy Corp. is working to acquire Progress Energy Inc. through an all-stock deal valued at \$13.7 billion. The merger, which would create the nation's largest utility, is expected to close by the end of 2011.⁵¹ Audit staff agrees that the merger's impact on the Levy planning is not yet known.

4.1.2 CONCLUSIONS AND RECOMMENDATIONS

Overall schedule and costs are unchanged from 2010, with in-service dates for Levy Units 1 and 2 in 2021 and 2022, respectively. Audit staff recognizes that enterprise risks which lie outside the control of the company could affect the ability of the company to continue toward completion of the Levy Nuclear Project.

FPSC audit staff has no recommendations at this time for the Levy Nuclear Plant project. FPSC audit staff will continue to closely monitor project progress, costs, and controls.

⁵¹ The Wall Street Journal's MarketWatch article, May 5, 2011, *Progress Energy profit falls 3.2%*, by Drew FitzGerald.

4.2 CRYSTAL RIVER 3 EXTENDED POWER UPRATE PROJECT

The final construction phase of the EPU project continues to be delayed as a result of the extended Refueling 16 outage events. The original target construction date of fall 2011 was shifted to 2012 and then to spring 2013. Due to the discovery of an additional delamination of unit's containment structure in March 2011, an additional shift in schedule is possible. While the company is still evaluating the impact of the March event, it is increasingly unlikely that the company will remain on its current Phase III schedule.

The company continues to evaluate its options for the EPU timeline, and depending on the impact of the March event, PEF may consider completing portions of its Phase III scope during this continued outage. The company anticipates providing a detailed update on the March event by mid-2011.

In addition to the flux in the schedule timeline, the project team has identified additional scope requirements and system modifications that are necessary to complete the project. These new requirements and modifications were identified during the design finalization. At the time of the Phase II construction, the engineering team had completed approximately 20 percent of the engineering design for the remaining Phase III scope. The company did not have a full understanding of the new engineering requirements and existing modification necessary to implement the project. As the engineers identified these new requirements, additional scope was incorporated into the project plan.

This addition to scope resulted in an estimated increase in project cost of \$137 million. The EPU project team anticipated receiving senior management approval for the increase in March 2011; however, this approval is deferred until the conclusion of the March delamination event analysis. With the 2011 increase, the project cost has escalated from \$461 million in 2008 to the current amount of \$617 million. While the project's cost has increased since inception, the company's current feasibility analysis still supports the economic viability of the project.

In addition to monitoring the project controls that address the scope and schedule impacts from 2010, audit staff continued to evaluate the project management oversight of two issues addressed in the *2010 Review of Progress Energy Florida, Inc.'s Project Management Internal Controls for Nuclear Plant Uprate and Construction Projects*. Specifically, the development of the company's License Amendment Request and the contract settlement concerning its low pressure turbines. Audit staff gathered additional information during this review to assess the effectiveness of the project management oversight in these areas.

Audit staff interviewed additional members of the review panel that assessed the viability of the original LAR document and reviewed the internal performance evaluations of key members of the LAR project team. After this review, in conjunction with the detail discussed in 2010 review, audit staff believes that the additional [REDACTED] spent to re-write the LAR was less about draft editing than re-structuring a poorly-initiated application.

Audit staff believes that the lack of project management oversight during the initial application development contributed to both the underlying deficiencies and to the need for the additional AREVA work. This amount does not include any work related to necessary

engineering or project-scope development. Therefore, audit staff believes that the [REDACTED] spent was avoidable.

In 2010, the company finalized its settlement with the low pressure turbine manufacturer Siemens. In this settlement, the company states it received significant concessions from the vendor along with specified [REDACTED]. The company also negotiated an increase in scope that covers additional quality assurance services, which increases the overall cost to PEF by [REDACTED].

PEF management states that the settlement with Siemens represents "a favorable resolution of the outstanding issues . . . and in a number of respects, PEF has obtained more favorable terms and conditions than in its original contract."⁵² In the end, PEF was willing to increase the overall contract terms to obtain additional assurances and quality monitoring of the turbines through installation and operations.

Audit staff agrees that the revised contract provides additional safeguards that will benefit the company in the event of a turbine malfunction. The additions in scope provide an additional layer of assurance that the turbines meet PEF's quality standards and will allow for additional oversight during its operation. When considering Siemens' concessions, PEF appears to have obtained compensation for Siemens' manufacturing quality issues.

As in previous years, audit staff continued to monitor and evaluate the company project controls in the areas of contract administration, process management and oversight, risk assessment, and organization structure. Audit staff reviewed the company's management reports and negotiated contracts to confirm the company's compliance with its internal procedures. Audit staff confirmed the company continues to monitor and update its project management process and procedures throughout this project. No variances in the company's compliance to its EPU procedures were identified during this review period.

⁵² PEF Response to Staff Data Request DR1CR3-19-000006.

5.0 APPENDICES

5.1 APPENDIX A

**Levy Nuclear Project COLA Risk Matrix
April 2011**

Probability							Impact
Very High (90-100%)							
High (66-89%)							
Moderate (34-65%)		2	6				
Low (11-33%)		1, 4, 7	3				
Very Low (0-10%)		5, 8				9	
		Minimal	Moderate	Significant	Severe	Critical	
		<\$2M	<\$5M	<\$10M	<\$15M	>\$15M	

Marker	Short Name	Project Risk Exposure
1	Changes to Security rules may delay NRC review and require design changes in physical plant arrangement	
2	Complex RAI – Probable Maximum Tsunami	
3	Complex RAI – Seismic / Structural	
4	Contested hearings could impact schedule	
5	Failure to control Design Changes impacting license	
6	Lack of Public Acceptance Influences Decision-Makers	
7	Lack of understanding of the permitting process and ineffective scheduling	
8	QA Program Implementation	
9	Resolution of LEDPA analysis for USACE could delay licensing proceedings	
Total Risk Exposure – All Risks [\$M]		

APPENDIX A

Source: PEF Response to Staff Data Request 3.3

5.2 APPENDIX B

**Levy Nuclear Project Non COLA Risk Matrix
April 2011**

Probability							Impact
Very High (90-100%)							
High (66-89%)							
Moderate (34-65%)	2, 5	8			6		
Low (11-33%)	13	10	11		4		
Very Low (0-10%)	12, 14, 15		7				
	Minimal	Moderate	Significant	Severe	Critical		
	<\$20M	<\$50M	<\$100M	<\$150M	>\$150M		

Note: Impact ranges are based on ERM-SUBS-00021 [Enterprise Risk Management Standard]

Marker	Short Name	Project Risk Exposure
2	LLE Negotiations –	
4		
5	Modified Transmission Scope Uncertainty	
6		
7		
8		
10	Change in Timing and Scope of Crystal River Switchyard work	
11		
12	Recruiting Nuclear Operators	
13	Land Acquisition required to support transmission, pipeline routing and wetland mitigation	
14	Recruiting Project Staffing and Project Controls Refinement	
15	Dispute on portion of	
Total Risk Exposure – All Risks [\$M]		

APPENDIX B

Source: PEF Response to Staff Data Request 3.3