Watts Bar Nuclear Plant
Unit 2 Completion Project

Sixth
Quarterly Update to the
Estimate to Complete
August - October 2013

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Nuclear
Construction

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Section 1 - Executive Summary

The sixth quarterly update of TVA's Estimate to Complete (ETC) the Watts Bar Nuclear Plant Unit 2 (WBN2) focuses on the activities between August and October 2013. The update reviews the progress of work made during the eighteen months since April 2012 when the TVA Board of Directors approved a revision of an earlier ETC.

Performance during the quarter continued to be consistent with the new ETC, and targets continued to be met for safety, quality, cost, and schedule.

As bulk installation work progressed during the quarter, construction activities shifted toward completing commodities within specific systems. This focus on system completion has resulted in growing emphasis on startup testing and moves the project toward major completion milestones such as Open Vessel Testing (OVT), cold hydro, hot functional testing, integrated leak rate testing, safeguards testing, and loading fuel.

Specific systems are tied to each milestone, and there is a 'waterfall' schedule for completing and testing those systems in a logical sequence that supports each milestone. More than 35 systems are scheduled to be released for pre-operational startup testing during a three to four month period in the spring and summer of 2014.

Quarterly Summary Points

Exceeded more than 22.8 million work hours without a lost-time incident

Recordable Injury Rate was also reduced 26 percent from fiscal year 2012

Performed activities in a manner that resulted in a Quality Control acceptance rate of 97 percent

Met cost and schedule expectations

Continued to track to a most likely December 2015 target for commercial operation

Released two plant systems ahead of schedule for pre-operational testing

Identified no new risks that affect project completion

The WBN2 team recognizes there will be challenges as the project moves forward. The challenges include:

- Completing the release of the bulk of systems for pre-operational testing during a compressed time period while maintaining safety and quality standards;
- Testing systems that share components between Unit 1, which is in operation, and Unit 2, which is under construction, without jeopardizing the safe and reliable operations of Unit 1; and
- Addressing regulatory and licensing issues.

Watts Bar Unit 2 has experienced managers, skilled craft, and a plan that can identify, assess, and address challenges as they arise. The organization will adjust as necessary to facilitate the resolution of challenges. And, the organization will achieve the understanding and alignment needed to support the reliable operation of Unit 1, the operating unit, while supporting the safe and high quality completion of Unit 2 within budget and on time. The successful transition of Watts Bar to dual-unit operations is the goal.

Section 2 - Background

In August 2007, the TVA Board of Directors approved resuming construction to complete WBN2. However, the project did not fully meet expectations for schedule or budget.

In August 2011, a new management team performed a root cause analysis of the issues responsible for the problems and developed a revised ETC for the project.

The new ETC is based on a range of values for both schedule and budget. As part of its effort to develop the ranges, the team considered risks that could have an effect on work to meet project expectations.

On April 26, 2012, the TVA Board of Directors approved the budget and schedule shown below to complete WBN2.

Watts Bar 2	Aggressive	Most Likely	Upper Range
Completion Cost	$4.0 Billion	$4.2 Billion	$4.5 Billion
Commercial Operation	September 2015	December 2015	June 2016

Note: More information and additional details about the cause analysis, as well as the process that was used to develop the new ETC, can be found in the Executive Final Report on the Estimate to Complete posted on this link: http://www.tva.com/power/nuclear/pdf/wattsbar2_executive_etc.pdf

Section 3 - Quarterly Performance Summary

The project continued to meet its targets for safety, quality, cost, and schedule in the three months from August through October 2013.

During the course of the quarter, the Startup and Completion group assumed an increasingly active role as testing became critical to project completion. Startup and Completion continues to conduct flushing, component tests, pre-operational tests, boundary integrity tests, and acceptance tests on the systems the Construction group has released for testing. These tests are critical to project completion, and the Construction group has shifted its focus exclusively to completing specific systems and to releasing these for testing by the Startup and Completion group.

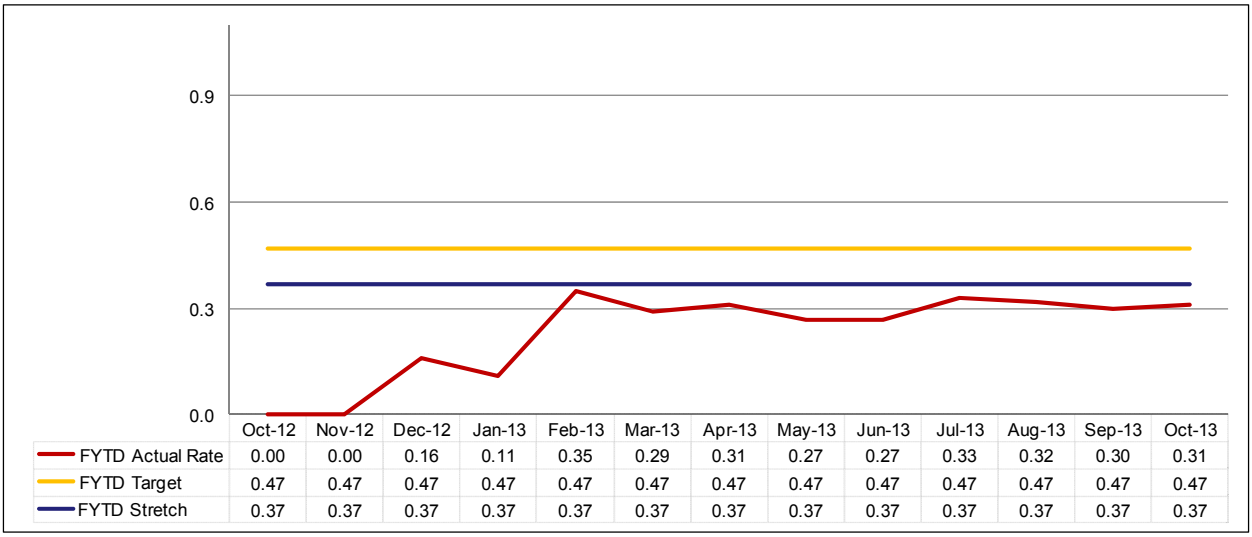
The majority of this system-specific work supports the project's first major milestone of OVT, which is scheduled to take place in the spring of 2014. OVT will involve pumping water through seven specific systems needed for shutting down the reactor and supporting nuclear operations.

Detailed information illustrating project performance is provided in the remaining sections of this report.

Safety

Safety performance for the quarter remained strong. WBN2 workers exceeded 22.8 million work hours without a lost-time incident. The Recordable Injury Rate[1] performance continued to be better than goal, as shown in the graph below. The Recordable Injury Rate improved 26 percent in fiscal year 2013 compared to fiscal year 2012.

Watts Bar Unit 2 Recordable Injury Rate
(Fiscal Year 2013)



	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13
FYTD Actual Rate	0.00	0.00	0.16	0.11	0.35	0.29	0.31	0.27	0.27	0.33	0.32	0.30	0.31
FYTD Target	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47
FYTD Stretch	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37

This sustained, beneficial performance is the result of attentive efforts that have been consistently carried out during the course of the year. This includes senior management involvement with craft safety teams, communicating directly with craft, and continued support for the Tri-Lateral Safety Alliance intervention program in which more than 600 interventions were conducted during the quarter. Furthermore, the number of low-level safety incidents is closely monitored. The frequency of low-level safety incidents is seen as a precursor to potentially more serious safety incidents.

Improvement plans implemented by Bechtel Construction to address a number of lower level safety incidents resulted in:

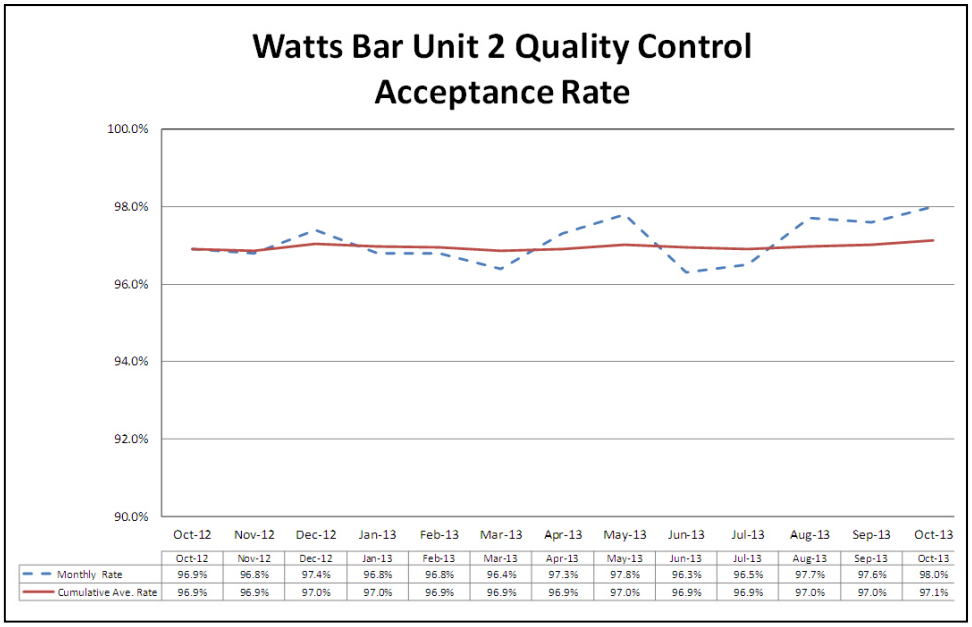
- More effective use of the project's Corrective Action Program (CAP) to capture actions and identify trends; and
- Improved employee knowledge of safety trends, lessons learned, and safety expectations.

[1] Recordable Injury Rate is a rate-based measure of employee safety. It tracks the number and types of work-related injuries reported by TVA employees and contractors through TVA's record keeping system for safety statistics.

Quality

The quality of WBN2 work remains high as measured by the Quality Control (QC) acceptance rate (see the chart below). This rate measures the percentage of work that has passed the QC inspection process for each month. For the quarter the acceptance rate was better than 97 percent.

The Quality Assurance group in TVA's Nuclear Construction organization has increased its oversight of the process for releasing systems for testing and for component testing activities.



The Quality Assurance group recommended improvements in areas of acceptance criteria and component test performance. The project has developed and implemented actions to address these recommendations.

Cost

The project is trending to a completion cost between $3.96 to $4.23 billion, which is within the range included in the new ETC.

Fiscal year 2013 expenditures totaled $570.5 million compared to a yearly budget of $562.6 million, a difference of 1.4 percent.

The increased spending was approved to better align expenditures with priorities, which included increasing engineering and construction staffing levels to support early completion, release, and testing of selected systems. The new priorities are a result of the project transitioning from mostly bulk construction work to a higher portion of work guided by system completion and testing.

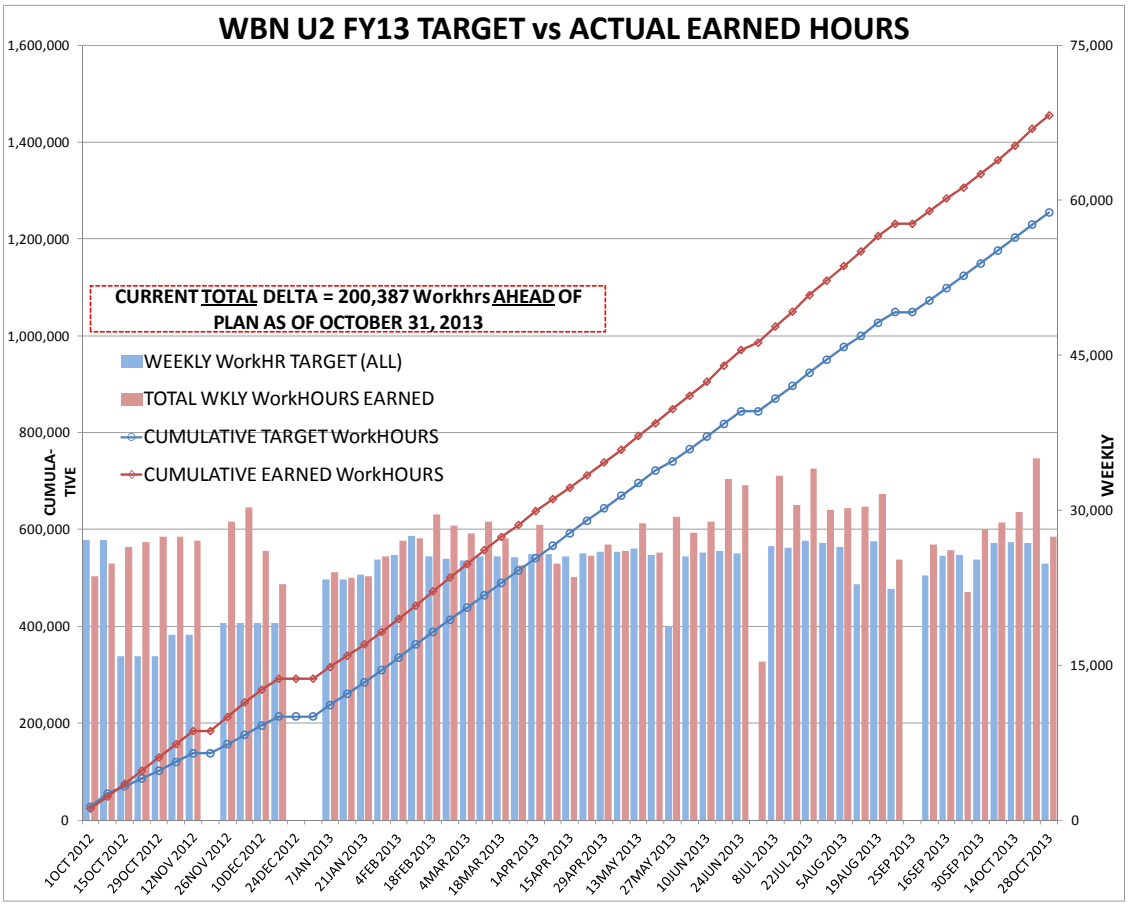
Staffing plans are being developed to ensure systems are completed as planned and within approved costs during the transition. A decrease in engineering and construction staffing is anticipated in 2014 while startup and completion staffing will increase to conduct the testing and documentation necessary to achieve the goal to load fuel in 2015.

Schedule

During the quarter, the WBN2 team was focused primarily on system completion and the release to testing needed to support the early target for OVT, the project's first major milestone.

Two systems were turned over to testing ahead of schedule during the quarter. They were System 72 - Containment Spray and System 74 - Residual Heat Removal.

The chart on the right compares actual earned hours per week to the number of hours targeted to be earned.



Overall, the remaining hours scheduled in order to complete WBN2 continue to be less than the number of hours predicted in the new ETC. Schedule performance continued to track to a most likely fuel load date of June 2015, followed by commercial operation in December 2015. The confidence in achieving this schedule did not significantly change during the quarter.

The schedule of critical path milestones supports a more aggressive fuel load date of April 2015 and a November 2015 date for commercial operation.

Commodity Quantity Analysis

The project team reviews the quantity of physical commodities installed each quarter as a way to monitor progress on the project.

The review for this quarter represents the full transition from bulk quantity installation to an exclusive focus on system related quantities required to allow release to startup testing. This transition ensures not only that quantities are installed according to the plan, but that the right quantities are identified and installed to support the priority systems.

The quantity identification and scope growth process was improved this quarter to ensure system release pre-requisites are scoped and budgeted. The project has implemented a monthly budget review of the commodity accounts. This single review helps to ensure that control tools are in alignment and that quantity changes are rolled up and processed into a single Change Control Board package. The first of these monthly exercises occurred in September of this quarter. This single package approach allows the management team to more easily see changes and requires less time to prepare and approve than multiple individual changes.

Commodity Quantity Analysis

DATA AS OF: 10/27/2013

Commodity Description	UOM	Board Approved (As of 10/2/11)	To Go as of October 27, 2013	Percent Reduction Since April 2012
Misc Steel	LB	109,855	22,390	80%
LB Pipe Weld	EA	322	152	53%
LB Hanger Install	EA	151	50	67%
LB Hanger Remove	EA	229	34	85%
LB Hanger Modify	EA	506	181	64%
SB Pipe	LF	2,043	704	66%
SB Weld	EA	2,959	646	78%
SB Hanger	EA	233	59	75%
SB Hanger Remove	EA	105	15	86%
SB Hanger Modify	EA	375	89	76%
LB Valve	EA	74	52	30%
SB Valve	EA	470	157	67%
Conduit	LF	43,992	12,298	72%
Conduit Support	EA	7,386	2,601	65%
Cable	LF	311,255	164,824	47%
Cable Terms	EA	33,386	22,459	33%
Instruments Mechanical	EA	1,941	878	55%
Tubing	LF	22,932	13,196	42%
Tubing Inspect	LF	20,556	3,402	83%
Instr SB Pipe	LF	10,967	3,281	70%
Instr SB Pipe Weld	EA	4,443	1,441	68%
Tubing Support	EA	3,965	1,386	65%
Instr SB Pipe Support	EA	2,589	623	76%
Duct Mods	EA	206	22	89%

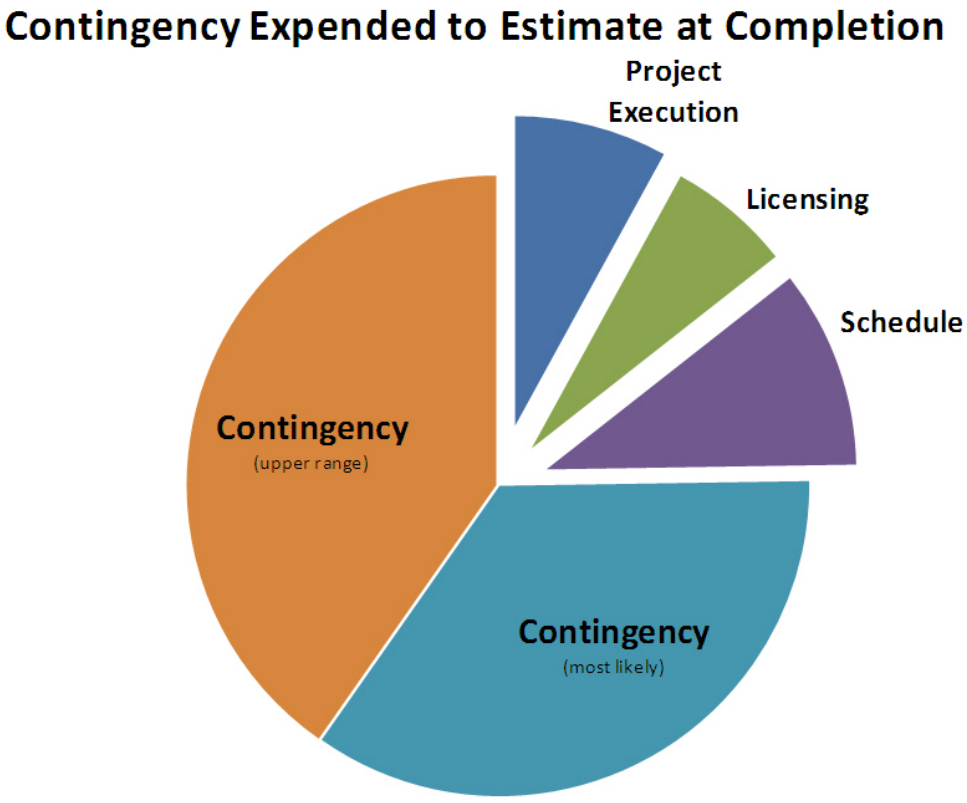
LB = Large Bore, SB = Small Bore, EA = each, LF = linear foot

Overall, the commodity work-off met expectations this quarter, keeping the project on track to achieve dates for release of critical systems to pre-operational testing. Construction made significant installation progress this quarter, particularly in the area of small bore pipe for mechanical and cable pulls for electrical. The commodities were successfully installed to allow release of System 74 - Residual Heat Removal and significant progress has been made on System 62 - Chemical and Volume Control and System 63 - Safety Injection, which are the most extensive pre-requisites for OVT.

Section 4 - Contingency Management

Project contingency money is established to fund risk management and risk occurrence, as well as unforeseen expenditures.

In the chart to the right the relative size of the Contingency "most likely" portion is based upon the amount approved by the TVA board for meeting the "most likely" target cost of project completion listed in Section 2 while the Contingency "upper range" portion is based upon meeting the "upper range" target cost.



The chart shows that the project has only used a moderate portion of the established Contingency "most likely" without using the Contingency "upper range" portion.

The relative sizes of three amounts that have already been transferred from Contingency to the Estimate at Completion[2] are shown as extracted portions in the chart.

Section 5 - Known Risks

No new significant risks were identified during the quarter.

A summary of the status of existing risks is shown in the table to the right. The Fukushima, Waste Confidence, and Operating License risks are categorized as regulatory risks. Additional information on the risks follows.

Risk	Risk Trend
Dual-Unit Operational Readiness	Stable
Fukushima*	Stable
Waste Confidence*	Improving
Operating License	Improving

*[Not specific to Unit 2—affects all nuclear units]

[2] Estimate at Complete (EAC) = Actual Costs of work completed + ETC

Dual-Unit Operational Readiness Risk

The ability to transition Watts Bar to dual-unit operations is a challenge for TVA, and this area is being currently designated as a high risk. Its resolution is receiving a significant amount of management attention and resulted in the formation of a Dual-Unit Operational Readiness Team (DUORT). This team has the structure, staff, processes, and procedures to facilitate integration and transition activities which promote safe and reliable dual-unit operations.

During the quarter, the DUORT completed planning and developed metrics for operational readiness activities, scheduled assessments and internal inspections, and held weekly meetings with the operating staff and Unit 2 project personnel to monitor progress. This work will prepare the project for the inspection by the Operational Readiness Assessment Team of the Nuclear Regulatory Commission (NRC).

The DUORT continues to develop power ascension testing procedures; this work is on track for completion next year ahead of unit licensing. Processes for system, area, and program transfers have been approved, and pilot turnovers are in progress. Progress on deliverables is expected to meet the project milestones, though some metrics and commodities will receive ongoing attention by the leadership team.

Regulatory Risks

Obtaining Operating License

Two areas requiring focused attention in order to secure an operating license are resolving concerns regarding river-system hydrology and resolving Inspection Planning and Scheduling items that must be closed with the NRC before fuel can be loaded in WBN2. Progress continues to be satisfactory to meet planned milestones in both of these areas.

Fukushima

The NRC continues its work to fully develop a final regulatory framework for the nuclear industry's response to the events of March 2011 at the nuclear station in Japan. The project has established a path forward that meets NRC requirements to date, resulting in the risk being lowered to moderate and remaining stable. Delays in the implementation schedule at WBN2 would likely cause a delay in NRC inspections and ultimately the receipt of the Operating License.

Waste Confidence

The NRC is in the process of revising its "Waste Confidence Rule," which is a generic determination that spent nuclear fuel can be safely managed on site after a plant is shut down and until a permanent repository is established. The revised Waste Confidence Rule is scheduled to be issued and approved by October 2014. A significant challenge related to the Waste Confidence Rule is a set of contentions raised by external stakeholders. These contentions will not be addressed until the final rule is published. If the contentions are not removed by the NRC at the time the Waste Confidence Rule is "effective," delays are likely to be experienced in the issuance of the Watts Bar Operating License. The WBN2 team along with outside resources is developing contingency options to address the potential delay.

Section 6 - Improvements, Specific Issues, and Challenges

Improvements are continuing with five top priority initiatives: CAP Improvements, Construction Productivity Improvements, Paper Closure, Change Paper Tracking System, and Pipe Hanger Improvement.

Results continue to track to actions developed in improvement plans. These include better readiness to perform work, improvements in the work order process, better identification of gaps in work scope, increased completion of work orders, and an improved quality acceptance rate for pipe hanger installation.

Electrical Cable and Conduit Installation

As construction proceeded, it became clear earlier in the project that installation of electrical conduit and cable would be critical to successfully readying systems for testing. Therefore, a revised and detailed schedule for this work was developed, and this schedule continued to be used during the quarter with positive results. Construction management closely monitors these results on a daily basis and refines the implementation of this more detailed schedule. Even so, the continued large volume of unplanned electrical work being identified presents a challenge.

Additional emphasis similar to this effort is also being placed on the installation of instruments and controls.

Managing Complex Work

An increased amount of complex and infrequently performed work is taking place in November and December. Conditions in the field will be frequently changing as systems are released for pre-operational testing and as tests are set up and conducted. Equipment will be energized, pressurized, and manipulated to meet changing test conditions. To address these challenges, more attention and management oversight is being focused on the safe performance of these activities, with strong focus on preventing detrimental effects on the reliable operation of Unit 1. Furthermore, a significant amount of re-planning and additional emergent work is being identified upon execution of existing work orders. This unplanned increase in work hours is a challenge.

Remaining on Budget and Schedule

Management expects to continue maintaining the balance between expending additional overtime work and achieving milestones on time. Providing extra attention to closer coordination between planning estimates, near-term accounting, and labor time management has allowed the project to better meet fiscal year budget targets. The challenge to maintain this balance is expected to intensify in the spring of 2014 when the bulk of systems are scheduled to be released for pre-operational testing.

Section 7 - Project Oversight

Through observations conducted, the WBN2 Project Assurance (PA) group concluded, in general, that the project schedule and cost continue to support the new ETC.

During the quarter, two systems required for OVT were released for pre-operational testing. Work Order completion and package closure rates were sufficient to support the early release of these systems.

Two major systems required for OVT and remaining to be released are scheduled to be turned over in December. Construction productivity shortfalls, coupled with the large volume of engineering paperwork, could present challenges in achieving these goals.

Observations identified several opportunities for improvement which were provided to WBN2 management. Those included:

The Project Assurance group is independent of the WBN2 organization.

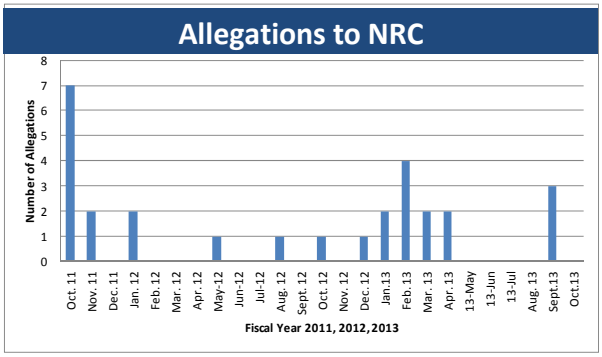
The group continually assesses various facets of project performance and reports its findings to the Senior Vice President of Watts Bar Operations & Construction.

- An improvement opportunity exists in the trending of lower level safety events before more serious injuries occur and in the analysis of negative safety trends. PA discussed the improvement opportunity with the WBN2 Safety Manager focusing on the need to thoroughly analyze negative safety trends in order to take early action to prevent more serious injuries. WBN2 safety personnel initiated a Problem Evaluation Report in the CAP to evaluate adverse safety trends.
- Currently, the project's focus is on completing the two remaining major systems required for OVT. Detailed metrics are in place to track the remaining items needed to complete these systems. Some systems released for pre-operational testing prior to the new ETC have a large amount of incomplete work that could present a risk to completing testing, including OVT. Also, completion metrics do not exist for these systems. As a result, these previously released systems may not be receiving adequate management attention to ensure readiness for OVT.
- As systems continue to be released for pre-operational testing, the volume of component testing is increasing. Additional visibility of startup test performance metrics will be needed to ensure there is adequate progress in the testing phase of the project. The need for the Startup and Completion group to transition from a "bulk" type testing schedule to a critical path, logic-tied schedule, similar to what was done as construction transitioned from bulk construction to system completion, will become more important.

Section 8 - Project Organizational Health

Nuclear Safety Culture

The Employee Concerns Program (ECP) received 70 concerns during the months of August, September, and October. This is fewer than the 89 concerns received in the previous reporting period, however actions taken during the quarter to improve communications with employees appears to be the impetus behind the reduction in concerns.



During the same reporting period, three NRC allegations were initiated as shown in the accompanying graph. An evaluation was conducted to determine if there was any correlation in the reduction in employee concerns and an increase in NRC allegations. No cause and effect was identified.

As stated previously, the decrease in the number of concerns expressed during the quarter appears to be influenced by initiatives designed to increase communications with employees. Management has been conducting monthly briefings with employees in work staging areas, and a special session was held during the quarter where senior managers provided status updates to employees at their work locations. Based in part on positive employee feedback following the communications efforts, the three allegations made to the NRC were determined not to be due to employee concerns about ECP.

ECP conducted 294 encounters during the quarter, with 99 percent of the employees who responded saying they would report a nuclear safety or quality concern.

Common themes expressed showed a desire for better communication and more positive reinforcement.

An independent self-assessment of the WBN2 ECP program was conducted during the quarter to evaluate its functionality. The assessment found the program is healthy and an effective option for addressing concerns and that it meets most industry expectations as set forth in industry best practices. Improvement opportunities were identified in documentation of case files, activities that reflect a learning organization, and identification of trends. Corrective actions have been initiated to address the issues and keep the ECP a viable alternate path for employees and contractors to report concerns.

Project Completion Incentive Program

The WBN2 Project Completion Incentive Program was implemented in October 2012 to help ensure safety and that the construction timeline and budget remain on track. The program is designed to help retain skilled workers and encourage them to complete their work as planned.

An extensive review has validated that approximately 2,600 workers have exceeded the 1,000 hours worked minimum requirement in the WBN2 Project Completion Incentive Program. These individuals are assigned and dedicated to the project, and depending on the hours they work and provided they remain with the project until their work is completed, they could receive an incentive after the project begins commercial operation.

The Watts Bar 2 PCIP would be funded by savings realized by the project if it is completed in a safe, quality, cost-effective, and timely manner. For any incentive payout to be made to eligible program participants, commercial operation must be certified by TVA by December 31, 2015 and the project must be completed at or below $4.4 billion.

Section 9 - Going Forward

Work to complete plant systems and release them for testing will continue during the next quarter. Completion of System 62 - Chemical and Volume Control in December will have a high priority because it is the final system required in order to conduct OVT in the spring. Other work required for OVT, such as electrical, control, and monitoring, are scheduled for partial or full completion during the next quarter.

Testing also will be conducted on the subsystems, structures, and components that make up the seven operational and safety systems and twelve support systems required for OVT. These component and logic tests are to validate that the equipment works as designed and that their functions are controlled and monitored in the plant control room as required. These are important first steps in the pre-operational startup tests that will verify the full systems meet regulatory requirements before their control is turned over to the Watts Bar Operations group.

Complex and infrequently performed work is taking place in November and December to flush the pipes in System 70 - Component Cooling Water, to establish adequate flow and pressure in System 67 - Essential Raw Cooling Water, and to prepare these systems for pre-operational testing. Parts of these two safety-related systems are shared by Unit 1 and Unit 2, and therefore require close coordination between the operating and construction unit. A significant amount of attention and management oversight will be focused on the conduct of these activities, which can have a direct effect on the safe operation of Unit 1, and their integration into the overall Watts Bar schedule.

Conditions in the field will be constantly changing as systems are released for pre-operational testing and as tests are set up and conducted. Equipment will be energized, pressurized, and manipulated to meet test conditions, requiring continued focus on working safely. A variety of methods will be used to emphasize to workers the need to look out for each other, stay aware of plant conditions and work plans, and stop when something unexpected or unaccounted for is encountered.

Work scheduled during the next quarter to establish regulatory compliance and dual-unit operational readiness includes:

- An NRC special inspection of the TVA flood control and hydrology program in December. Watts Bar has been working with Sequoyah Nuclear Plant and the TVA Nuclear Power Group to address programmatic and site-specific issues in the way we plan for, prepare for, and respond to floods.
- Preparations for a TVA internal inspection of the site's readiness to operate two units and the capability of the Watts Bar site organization to continue to meet operational and regulatory requirements during the transition to dual-unit operation.