ITAAC “Surge” Analysis

Brian Bedford

Westinghouse Electric Company

December 9, 2010

Westinghouse Non-Proprietary

Westinghouse

ITAAC Closure Process

ITAAC Performed within Normal Work Processes:

- Construction Inspections
- Pre-Op Tests
- Engineering Analyses
- etc

Licensing Collects Documentation & Assembles ITAAC Completion Package. Provides to Licensee.

NRC Performs In-Process Construction Inspections

Licensee Approves Package, Submits ITAAC Closure Letter to NRC

NRC Reviews Closure Letter and Inspection Records. Approves ITAAC Closure.

Westinghouse Non-Proprietary

DOE Project Overview

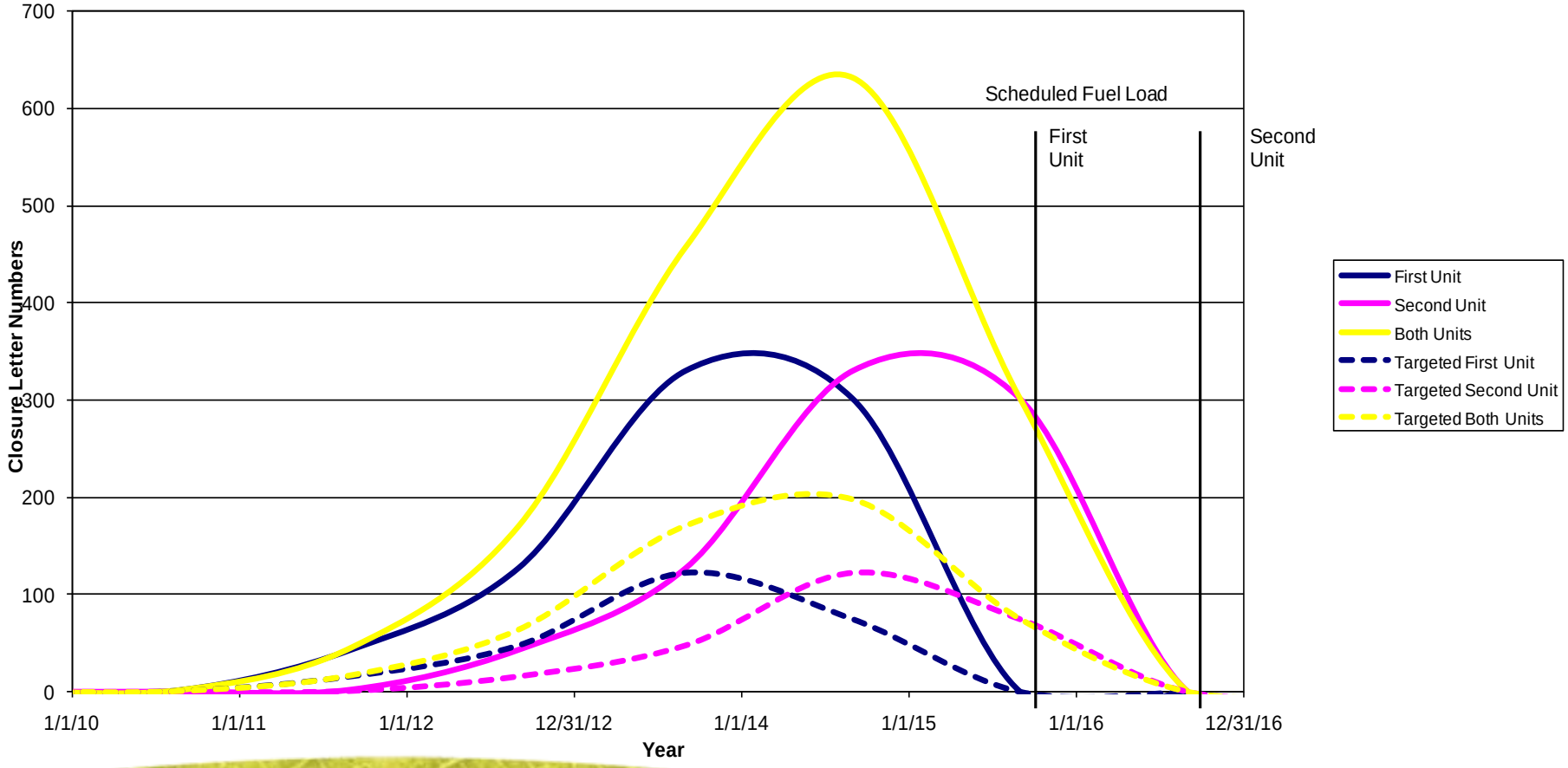
- Simulate ITAAC completion and NRC Inspection of ITAAC activities
- Test the NRC processes for:
  - ITAAC Closure Letters
  - Handling of ITAAC Related Construction Findings
  - Interaction between Headquarters Office and Region 2
- **Evaluate the surge in ITAAC closure submittals during the last year of construction**

Westinghouse Non-Proprietary

Starting Point – Previous Information

Approximated Curve for ITAAC Closure

- Two Units, based on preliminary schedule information



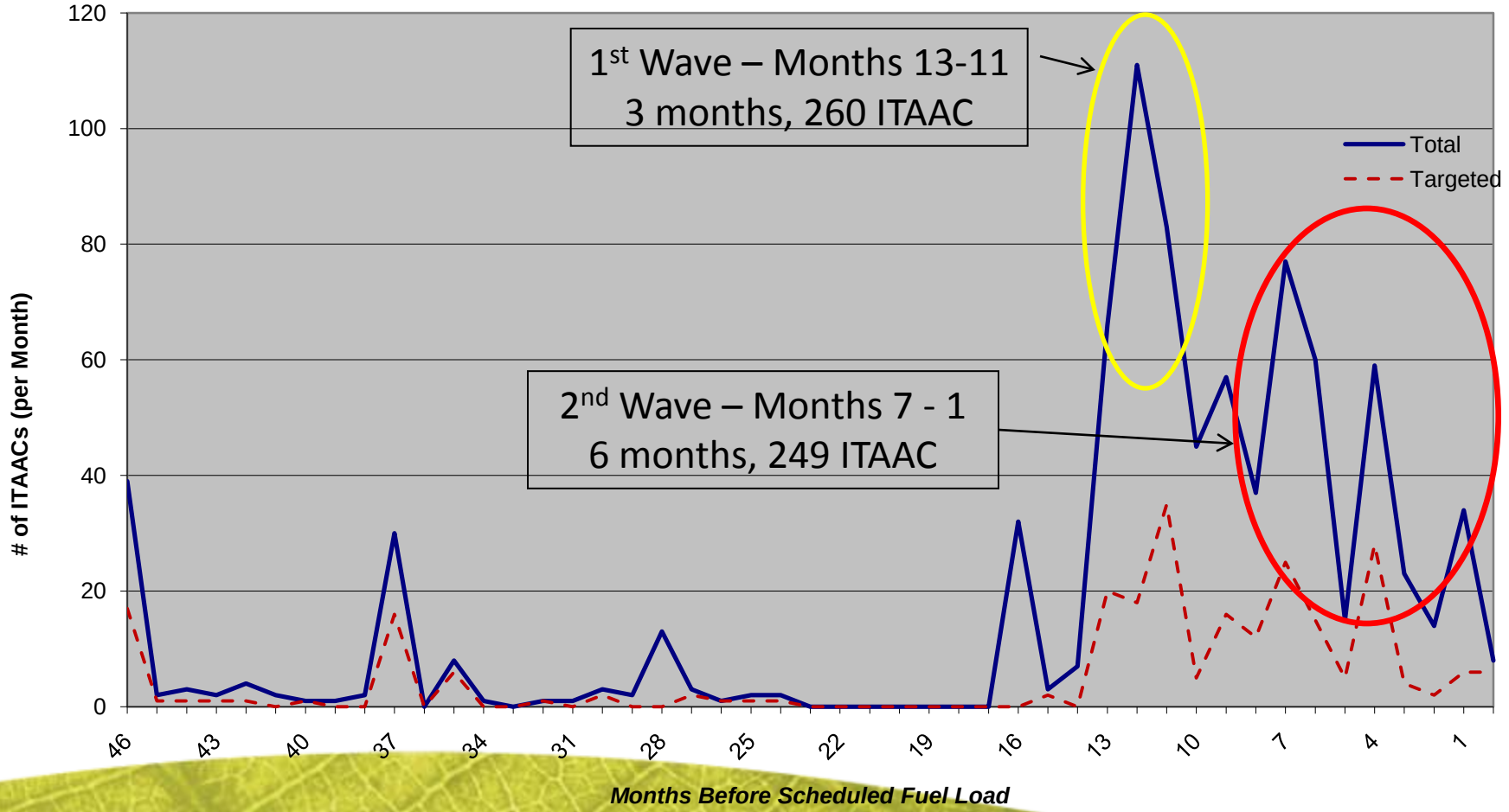
Early 2009 Preliminary Schedule, 2 units

Westinghouse Non-Proprietary

Westinghouse

Updated Curve for ITAAC Completion

- One Unit, based on current schedule information



SEPT 2010 Schedule – 1 Unit

Westinghouse Non-Proprietary

Westinghouse

Preliminary Analysis

- The ITAAC in each “bow wave” were categorized by system and type to identify trends and areas for improvement
- Identify areas where improvements in ITAAC schedule logic could help “flatten” peak
- Identify mitigating factors based on the types of ITAAC in the surge

Westinghouse Non-Proprietary
Westinghouse

1st Wave Analysis

Statistics	No.	%
Total ITAAC in 3 month period	260	100%
Acceleration Candidates	66	25%
ConstInspect	30	12%
SysTrnvrInspect	65	25%
SysTrnvr with "Yes"	24	9%
ASME	28	11%
PrOpTest	61	23%
Vendor	11	4%
Reference	10	4%
HydroPipe	5	2%

- 260 ITAAC in this 3 month period. Approximately 1/3 can be targeted for Surge mitigation (76 out of 260).
- Target areas are Construction Inspections, Vendor ITAAC, System Turnover Inspections, and Reference ITAAC.

Westinghouse Non-Proprietary
Westinghouse

1st Wave Acceleration Candidates

Statistics	No.	%
Total ITAAC in 3 month period	260	100%
Acceleration Candidates	66	25%
ConstInspect	30	12%
SysTrnvrInspect	65	25%
SysTrnvr with "Yes"	24	9%
ASME	28	11%
PrOpTest	61	23%
Vendor	11	4%
Reference	10	4%
HydroPipe	5	2%

- Construction Inspections are currently linked to the System Turnover walkdown between construction testing and Pre-Op testing. They are actually performed (and the ITAAC completed) when the construction work package installing that equipment is complete.

- "Vendor ITAAC" are performed at the vendor's fabrication facility, but may not complete until components are installed in their as-built location. These activities are currently linked to the system turnover walkdown, but will be complete immediately after shipment or when the installation work package is finished

Westinghouse Non-Proprietary
Westinghouse

1st Wave Acceleration Candidates

Statistics	No.	%
Total ITAAC in 3 month period	260	100%
Acceleration Candidates	66	25%
ConstInspect	30	12%
SysTrnvrInspect	65	25%
SysTrnvr with "Yes"	24	9%
ASME	28	11%
PrOpTest	61	23%
Vendor	11	4%
Reference	10	4%

- There are 65 ITAAC in this wave that are best performed as part of the system turnover walkdown. However, some could be accelerated if necessary (i.e. verifying that certain equipment is on the Nuclear Island, verifying hardware is of different types, etc.)

•Reference ITAAC satisfy a design commitment via reference to another ITAAC. Therefore these 10 ITAAC are completed without significant effort.

Westinghouse Non-Proprietary

2nd Wave Analysis

Statistics	No.	%
Total ITAAC in 6 month perio	249	100%
Acceleration Candidates	23	9%
ConstInspect	5	2%
SysTrnvrInspect	13	5%
SysTrnvr with "Yes"	7	3%
PrOpTest	133	53%
Reference	45	18%
Reference to Contmt ILRT	16	
Reference to ElecSep	19	

- ***Not many candidates for acceleration***

- 248 ITAAC in 6 month period
- Special concern because very close to fuel load
- Number may grow if ASME code reports happen later than currently scheduled
- Mitigation Primarily in Pre-Operational Testing and Reference categories

Westinghouse Non-Proprietary
Westinghouse

2nd Wave Mitigation

Statistics	No.	%
Total ITAAC in 6 month perio	249	100%
Acceleration Candidates	23	9%
ConstInspect	5	2%
SysTrnvrInspect	13	5%
SysTrnvr with "Yes"	7	3%
PrOpTest	134	54%
Reference	46	18%
Reference to Contmt ILRT	16	
Reference to ElecSep	19	

- Pre-Operational Tests are over half of the ITAAC in this wave. Mitigating Factors:
  - The Pre-Op test process is well understood with significant NRC inspection involvement
  - ITAAC Completion Package Documentation is minimal; typically a copy of the approved test procedure and results.
  - The Pre-Op schedule is currently preliminary, and may accelerate with refinement (also a potential risk)

•46 (18%) of the ITAAC in this "wave" are closed by reference to other ITAAC. 16 reference the Containment Integrated Leak Rate Test, 19 reference the Electrical Separation ITAAC, plus 11 others.

Westinghouse Non-Proprietary
Westinghouse

PARALLEL ACTIVITIES

1. Work with construction staff to identify possibilities (if any) to shift construction activities to mitigate the ITAAC surge.
2. Refinement of Licensee construction oversight process to highlight ITAAC oversight to provide confidence in ITAAC completion and expedite closure “approval”.
3. Complete a schedule update for ITAAC identified in the preliminary analysis.

Westinghouse Non-Proprietary

Parallel Activities for 2nd Wave

- Pre-Op Test (only) ITAAC by System

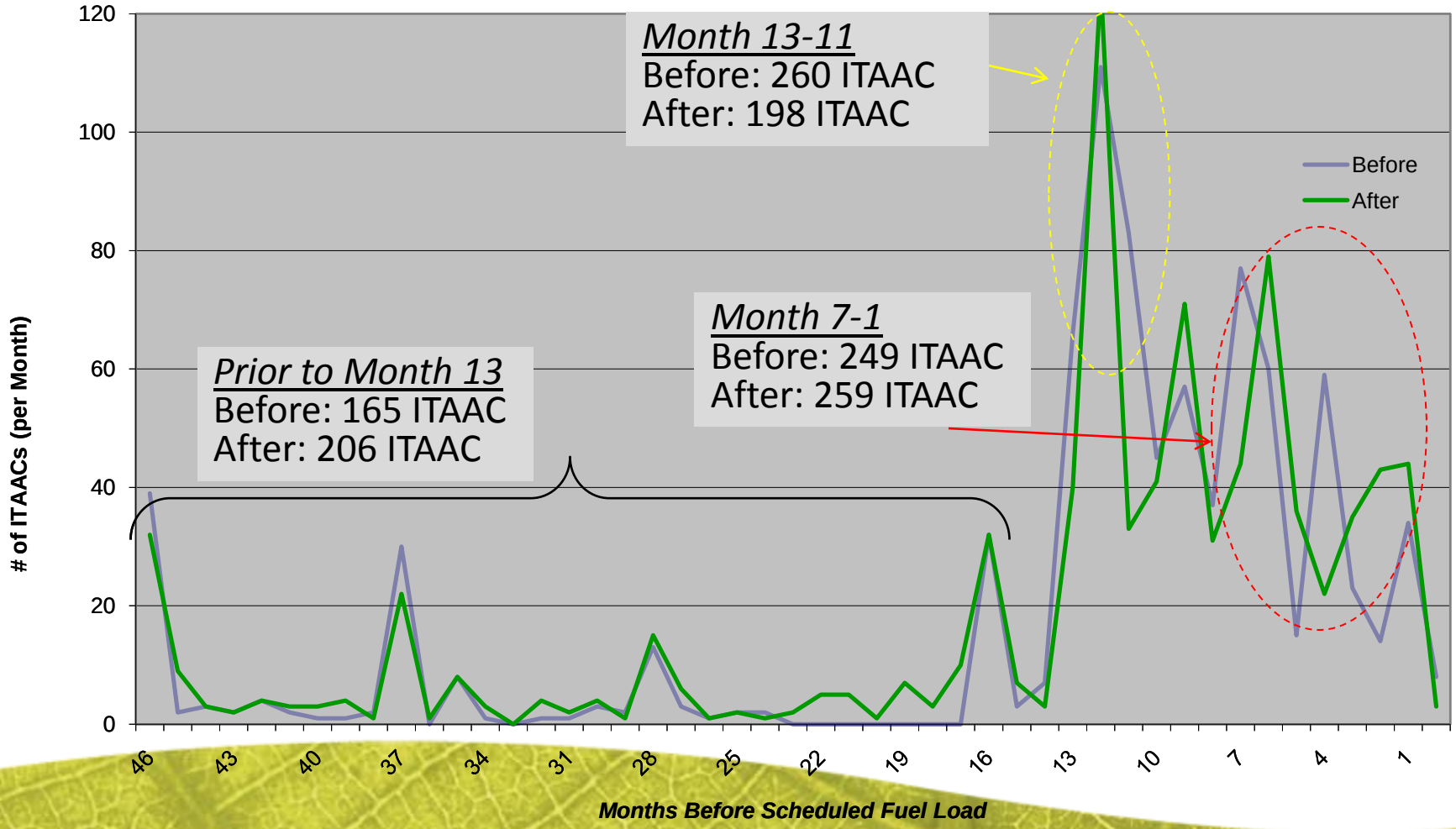
System	Total Pre-Op Tests
PCS	14
RCS	16
PXS	16
RNS	12
PMS	11
IDS	9*

*IDS Tests are mostly on Battery banks, chargers, & inverters – not entire system.

- Other Key Areas
  - **PCS.** 33 ITAAC total.
  - **FPS.** 11 ITAAC, mostly tied to PCS completion.
  - **BLDG** Inspections. (Will benefit from improved schedule logic)

Westinghouse Non-Proprietary
Westinghouse

BEFORE & AFTER



Westinghouse Non-Proprietary

Westinghouse

FUTURE ACTIVITIES

- Continue meeting periodically with Construction and Pre-Operational Test Groups to identify additional improvements
- Focus on streamlining the ITAAC Completion and Closure Letter process during first several ITAAC after COL
- Consider effect of multiple simultaneous units

Westinghouse Non-Proprietary
Westinghouse

Lessons Learned

- The ITAAC Completion Surge that occurs late in the project is significant, and requires special attention.
- Detailed Analysis of the ITAAC surge will yield schedule improvements. Categorizing ITAAC by type is most productive.
- The "2nd wave" cannot be accelerated, but it is mitigated by Reference ITAAC and the Pre-Operational Test process.

Westinghouse Non-Proprietary
Westinghouse

Questions

Westinghouse Non-Proprietary

Westinghouse