# CIPIMS/ITAAC Verification Demonstration Program
# Workstreams for Study

## Introduction

The NRC issued a Draft 10 CFR Part 52 Construction Inspection framework document in May 2003 to be used as the guiding document for the creation of construction inspection manual chapters and inspection procedures to support the 10 CFR Part 52 licensing process. Many of the issues and assumptions described in the framework document are recommendations rather than final staff positions. The staff published this document for comment and discussed it with stakeholders in an August 27 public workshop. After evaluating stakeholder comments, the staff intends to revise and reissue the framework document in calendar year 2004.

The U.S. Power Companies recognize that a well-understood and streamlined Construction Inspection Program is a critical item to ensure successful project implementation for new nuclear build. The untried processes of 10 CFR Part 52 related to ITAAC verification, combined with the advancements in construction techniques whereby 60-70% of a new nuclear plant will be fabricated in modules in factories throughout the world complicate the task of NRC oversight of construction. To facilitate a common understanding of the ITAAC verification process the Nuclear Energy Institute (NEI) prepared a draft White Paper: ITAAC Implementation and Transition to Full Power Operations Under Part 52.

To facilitate development of the Construction Inspection Program (CIP), the associated Information Management System (CIPIMS) and their framework document, the NRC has agreed to work with the industry in a "virtual" construction inspection / ITAAC program. This pilot program will assess aspects of ITAAC verification within the framework of the overall construction inspection program, including the NRC's information management system (CIPIMS). Westinghouse believes that this initiative will provide the NRC and its licensees with an excellent forum to work out some of the issues associated with Construction Inspection management and ITAAC verification under the framework of the Construction Inspection Program and the NEI White Paper.

NRC and NEI have each hosted meetings to develop the overall working relationships for this pilot program. Under NEI direction, EPRI has contracted with Westinghouse to lead the industry's detailed input to the program. The first phase of the pilot project will be to develop a detailed ITAAC verification plan for a number of sample ITAAC. These sample ITAAC will be used to demonstrate the entire process of their scheduling, performance, inspection planning and management, and their verification and completion. These sample ITAAC will be placed into virtual plant construction workstreams that cover the time from plant order by the COL licensee to ITAAC verification by NRC. They will be used, in the next phase of this pilot program to "practice" information transfer between a COL applicant and holder and the NRC. NRC will use the information to optimize the development and use of CIPIMS and determine appropriate inspection management methods for a new plant build.

Following selection of appropriate example workstreams ending in example ITAAC, a prototypic "virtual" construction schedule will be loaded with activities and milestones for the construction and inspection tasks leading to successful verification of the ITAAC. The basic starting place will be the AP1000 Level 3 Standard Schedule on Primavera 3.1. A CIPIMS/.ITAAC version of this schedule will be crated by copying the current AP1000 schedule. Activities will be added to reflect the workstreams selected, including procurement and construction activities necessary to reflect the ABWR ITAAC workstreams. As this program continues, activities may be added to reflect the level of detail necessary to implement the connection between the virtual licensee/constructor and the NRC construction inspection

program. Within the overall schedule, including its logic and constraints, the subset of activities that directly relate to workstreams will be "tagged" with an appropriate Activity Code.

Paper and electronic reports of these subsets will then be shared with the NRC. A determination will be made between NRC and the industry on the level of detail to be used for interactions with NRC during a real plant build based upon these virtual examples. The examples will also be evaluated against the guidance identified in the Construction Inspection Framework document and the NEI White Paper. An industry interaction with NRC to review the integration of construction and construction inspection activities will be part of a public workshop and will include representatives from power companies and industry as appropriate. Westinghouse will then document the results of the workshop as a lessons-learned industry report and submit it to EPRI and NEI. It is expected that NEI will provide the report to the NRC as part of interactions related to the Construction Inspection Program Framework Document.

## Workstream Selection

A "workstream", for the purpose of this pilot project, is the set of scheduled activities leading to satisfaction of an ITAAC. Workstreams start with plant or long lead item order and end with a given ITAAC. Activities in a workstream are those that contribute directly to the ITAAC even though there may be many more activities related to proper procurement, fabrication, erection, test and operation of a plant item.

An "ITAAC", for the purpose of this pilot project, is the specific selected table line item from Tier 1 material for ABWR or AP1000. It may not represent the entire set of ITAAC table line items necessary to verify 10CFR52 verification of a given component, system or structure. The "ITAAC" selected for this pilot program are those that can be used to generically answer questions of CIPIMS or inspection detail. They may also be used to demonstrate CIPIMS, CIP and ITAAC process and documentation. They are selected to represent broad classes of ITAAC.

Based upon the definitions above, worksteams selected for this pilot project can be identified by the ITAAC (table line item) that defines their end point. The number, nature and level of detail of the activities in each workstream will be the focus of the next step in this pilot project. For ease of reference, each workstream will be designated by a four-digit identifier. The first three digits represent their component, system or structure. The final digit is a simple sequence number.

Workstreams were selected to represent ITAAC table line items. At one point, workstreams were contemplated to also be selected to represent discrete components or commodities. We subsequently recognized that the order, procurement, fabrication, installation and test of a given component may feed a large number of ITAAC, as well as number of activities that do not correspond to ITAAC. In order to focus on specific ITAAC selected for demonstration purposes, and since the lessons learned from one workstream can be applied to all related ones, selected workstreams are identified by their ITAAC, not their component or commodity. All of the workstreams selected fall into one or more of these broad groups: component, system, structure, safety-related, non-safety-related, radioactive fluid boundary, non-radioactive fluid boundary, single inspection verification, multiple inspection verification, on-site inspection, off-site inspection, pre-COL, post-COL, single vendor and multiple vendor. The full text of each selected ITAAC table line item is included in an attachment at the end of this report.

## Selected Workstreams

TGS1 – Functional Arrangement of the ABWR Turbine Gland Seal System

This is line item 1. from Table 2.10.9 of ABWR Tier 1 Section 2.10.9 (Attachment 2). It is a system, non-safety-related, radioactive fluid boundary, single inspection, on-site, post-COL, single vendor inspection.

TGS2 – Turbine Gland Seal System Displays for the ABWR

This is line item 2. from Table 2.10.9 of ABWR Tier 1 Section 2.10.9 (Attachment 2). It is a system, non-safety-related, multiple inspection, on-site, post-COL, single vendor inspection.

CVS1 – Component ASME Code Status for the AP1000 Chemical and Volume Control System

This is line item 2.a). from Table 2.3.2-4 of AP1000 Tier 1 Section 2.3.2 (Attachment 3). It is a component, safety-related and non-safety-related, radioactive fluid boundary, multiple inspection, off-site, post-COL, multiple vendor inspection. For this pilot project, the scope of this workstream will be limited to 3 remotely operated valves (at least 1 installed at site and 1 installed in a module), 1 ion exchanger and 1 heat exchanger.

CVS2 – Pipe weld ASME Code Status for the AP1000 Chemical and Volume Control System

This is line item 3.b). from Table 2.3.2-4 of AP1000 Tier 1 Section 2.3.2 (Attachment 3). It is a piping, safety-related, radioactive fluid boundary, multiple inspection, off- and on-site, post-COL, multiple vendor inspection. For this pilot project, the scope of this workstream will be limited to the welds associated with the components in CVS1.

CVS3 – Seismic Qualification of AP1000 Chemical and Volume Control System Valves

This is line item 5) from Table 2.3.2-4 of AP1000 Tier 1 Section 2.3.2 (Attachment 3). It is a component, safety-related, radioactive fluid boundary, multiple inspection, on- and off-site, post-COL, multiple vendor inspection. For this pilot project, the scope of this workstream will be limited to the 3 remotely operated valves selected for Workstream CVS1.

CVS4 – Make-up capability of the AP1000 Chemical and Volume Control System

This is line item 8.a) from Table 2.3.2-4 of AP1000 Tier 1 Section 2.3.2 (Attachment 3). It is three system, non-safety-related, non-radioactive fluid boundary, single inspection each, on-site, post-COL, single vendor inspections.

CVS5 – Operation Check of AP1000 Chemical and Volume Control System Valves

This is line item 11.a) from Table 2.3.2-4 of AP1000 Tier 1 Section 2.3.2 (Attachment 3). It is a component, safety-related, radioactive fluid boundary, multiple inspection, on-site, post-COL, single vendor inspection. For this pilot project, the scope of this workstream will be limited to the 3 remotely operated valves selected for Workstream CVS1.

RVH1 – AP1000 Reactor Vessel Head Arrangement

This is line item 2.c). from Table 2.1.3-2 of AP1000 Tier 1 Section 2.1.3 (Attachment 4). It is a component, safety-related, radioactive fluid boundary, single inspection, on-site, post-COL, single vendor inspection.

RVH2 – ASME design and construction of AP1000 Reactor Vessel Head

This is line item 3.). from Table 2.1.3-2 of AP1000 Tier 1 Section 2.1.3 (Attachment 4) for the Reactor Vessel Head only. It is a component, safety-related, radioactive fluid boundary, multiple inspection, off- and on-site, pre- and post-COL, multiple vendor inspection.

RVH3 – Reactor Internals Vibration

This is line item 7.). from Table 2.1.1d of ABWR Tier 1 Section 2.1.1 (Attachment 1). It is a component, safety-related, non-radioactive fluid boundary, multiple inspection, off- and on-site, pre- and post-COL, multiple vendor inspection.

STR1 – Building Physical Arrangement

This is line item 1. from Table 2.15.10 of ABWR Tier 1 Section 2.15.10 (Attachment 5). It is a structure, multiple inspection, on-site, post-COL, single vendor inspection.

STR2 – Nuclear Island Critical Sections

This is line item 2.a) from Table 3.3-6 of AP1000 Tier 1 Section 3.3 (Attachment 6). It is a structure, multiple inspection, on-site, post-COL, multiple vendor inspection.

STR3 – Fire Area Boundaries

This is line item 3. from Table 2.15.10 of ABWR Tier 1 Section 2.15.10 (Attachment 5). It is a structure, multiple inspection, on-site, post-COL, single vendor inspection.

STR2 – Building Waterproofing

This includes line items 5.a), 5.b), and 5.c) from Table 3.3-6 of AP1000 Tier 1 Section 3.3 (Attachment 6). It is a structure, multiple inspection, on-site, post-COL, single vendor inspection.

## Next Steps

These workstreams have received conceptual concurrence from NRC during a telephone conference on March 3, 2004. These workstreams may be modified or refined during the performance of this pilot project. The next activity for Westinghouse is to identify relevant activities from a virtual overall plant construction schedule in Primavera. Following identification, the activities will be tagged or added and tagged. A unique identifier (tag) will be added in Primavera to each selected activity's Activity Code database. Schedules and reports of the tagged activities will be used for discussions of level of detail, data transfer and veracity of the workstreams for use in the virtual CIPIMS and ITAC demonstration.