



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

April 2, 1997

APPLICANT: Westinghouse Electric Corporation

FACILITY: AP600

SUBJECT: SUMMARY OF FEBRUARY 5, 1997, MEETING WITH WESTINGHOUSE TO DISCUSS  
ISSUES RELATED TO THE AP600 INSPECTIONS, TEST, ANALYSES, AND ACCEPTANCE  
CRITERIA (ITAAC)

The Nuclear Regulatory Commission (NRC) staff and representatives of Westinghouse Electric Corporation held a meeting on February 5, 1997 at Westinghouse's office in Rockville, Maryland, to discuss issues associated with the AP600 ITAAC. Attachment 1 is a list of meeting attendees. Attachment 2 are the handouts provided by Westinghouse during the meeting.

The purpose of the meeting was to discuss the major problems that the staff had with Westinghouse's ITAAC. The problems, which were documented in a November 26, 1996, letter to Westinghouse, included: 1) the ITAAC did not address all areas required by the regulations, 2) the Human Factors Engineering (HFE) ITAAC were incomplete, 3) the approach used for the AP600 ITAAC departed significantly from that used for the evolutionary designs, and 4) there was no information in the submittal that cross referenced the important design information and parameters in the standard safety analysis report to their treatment in Tier 1.

Westinghouse provided a plan to resolve the staff's concerns in a December 20, 1996, letter, and during the meeting Westinghouse provided more specific details on the changes in the ITAAC that they would be making to address items 1 and 3 above. For item 2 Westinghouse agreed to provide ITAAC on the four incomplete elements of the HFE program. Concerning item 4 Westinghouse agreed to provide the cross references with the next revision to the ITAAC.

Westinghouse then provided details on how they intended to change their ITAAC. Westinghouse indicated that they would modify their ITAAC to include additional systems that are required by regulations, represent an important probabilistic risk assessment assumption or insight, or are important in preventing or mitigating severe accidents. The staff reiterated its position that ITAAC must also be supplied for every system within the scope of the AP600 design. Westinghouse agreed to approach the issue in the same manner as the evolutionary plants and will provide an entry for every system that is within the scope of the AP600 design with some entries underlined to indicate that there is no Tier 1 commitment. In addition, the staff stated that Westinghouse must identify the structures and systems that are wholly or partially outside the scope of the AP600 design.

Westinghouse then discussed the details of the additional ITAAC that they intended to provide. In some areas the staff provided feedback to Westinghouse on their approach. For example, while the staff agreed with Westinghouse that a

**NRC FILE CENTER COPY**

April 2, 1997

communication ITAAC should be added it stated that the ITAAC should also verify communications from the remote shutdown workstation as well as from the control room.

Westinghouse indicated that the revision to the ITAAC would primarily result in additional ITAAC being written, and was interested in obtaining the staff's comments on the remaining ITAAC. The staff indicated that major comments from individual branches would be available by the middle of February. Although Westinghouse was scheduled to provide a revision to their ITAAC by the end of February Westinghouse indicated that they may delay the revision to address the comments from the individual branches. A draft of this meeting summary was provided to Westinghouse to allow them the opportunity to ensure that the representations of their comments and discussions were correct.

original signed by:

Joseph M. Sebrosky, Project Manager  
Standardization Project Directorate  
Division of Reactor Program Management  
Office of Nuclear Reactor Regulation

Docket No. 52-003

Attachments: As stated

cc w/attachments:

DISTRIBUTION:

See next page

DOCUMENT NAME: A:FB ITAAC.SUM

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

OFFICE	PM:PDST:DRPM	SPA:PDST:DRPM	D:PDST:DRPM				
NAME	JMSebrosky:sg	JNWilson	TRQuay				
DATE	4/1/97	4/1/97	4/2/97				

OFFICIAL RECORD COPY

Westinghouse Electric Corporation

Docket No. 52-003

cc: Mr. Nicholas J. Liparulo, Manager  
Nuclear Safety and Regulatory Analysis  
Nuclear and Advanced Technology Division  
Westinghouse Electric Corporation  
P.O. Box 355  
Pittsburgh, PA 15230

Mr. B. A. McIntyre  
Advanced Plant Safety & Licensing  
Westinghouse Electric Corporation  
Energy Systems Business Unit  
Box 355  
Pittsburgh, PA 15230

Ms. Cindy L. Haag  
Advanced Plant Safety & Licensing  
Westinghouse Electric Corporation  
Energy Systems Business Unit  
Box 355  
Pittsburgh, PA 15230

Mr. M. D. Beaumont  
Nuclear and Advanced Technology Division  
Westinghouse Electric Corporation  
One Montrose Metro  
11921 Rockville Pike  
Suite 350  
Rockville, MD 20852

Mr. Sterling Franks  
U.S. Department of Energy  
NE-50  
19901 Germantown Road  
Germantown, MD 20874

Mr. S. M. Modro  
Nuclear Systems Analysis Technologies  
Lockheed Idaho Technologies Company  
Post Office Box 1625  
Idaho Falls, ID 83415

Mr. Charles Thompson, Nuclear Engineer  
AP600 Certification  
NE-50  
19901 Germantown Road  
Germantown, MD 20874

Mr. Frank A. Ross  
U.S. Department of Energy, NE-42  
Office of LWR Safety and Technology  
19901 Germantown Road  
Germantown, MD 20874

Mr. Ronald Simard, Director  
Advanced Reactor Program  
Nuclear Energy Institute  
1776 Eye Street, N.W.  
Suite 300  
Washington, DC 20006-3706

Ms. Lynn Connor  
Doc-Search Associates  
Post Office Box 34  
Cabin John, MD 20818

Mr. James E. Quinn, Projects Manager  
LMR and SBWR Programs  
GE Nuclear Energy  
175 Curtner Avenue, M/C 165  
San Jose, CA 95125

Mr. Robert H. Buchholz  
GE Nuclear Energy  
175 Curtner Avenue, MC-781  
San Jose, CA 95125

Barton Z. Cowan, Esq.  
Eckert Seamans Cherin & Mellott  
600 Grant Street 42nd Floor  
Pittsburgh, PA 15219

Mr. Ed Rodwell, Manager  
PWR Design Certification  
Electric Power Research Institute  
3412 Hillview Avenue  
Palo Alto, CA 94303

DISTRIBUTION w/attachment:

Docket File

PUBLIC

PDST R/F

TKenyon

WHuffman

DJackson

JSebrosky

DISTRIBUTION: w/o attachment:

SCollins/FMiraglia, 0-12 G18

RZimmerman, 0-12 G18

AThadani, 0-12 G18

TMartin

MSlosson

Ted Quay\*

JNWilson

JMoore, 0-15 B18

WDean, 0-17 G21

ACRS (11)

JPeralta, 0-9 A1

HLBrammer, 0-7 H15

TCheng, 0-7 H15

DTerao, 0-7 E23

MGareri, 0-8 H3

MChiramal, 0-8 H3

HLi, 0-8 H3

JBongarra, 0-9 H15

JLyons, 0-8 D1

GThomas, 0-8 E23

TBoyce, 0-12 F4

NTrehan, 0-7 E4

DThatcher, 0-7 E4

CHinson, 0-10 D4

WLong, 0-8 H7

JSGuo, 0-8 D1

SBSun, 0-8 E23

CYLi, 0-8 D1

JHRaval, 0-8 D1

HWalker, 0-8 D1

080043

WESTINGHOUSE AP600 PRA INSIGHTS  
MEETING ATTENDEES  
FEBRUARY 5, 1997

<u>NAME</u>	<u>ORGANIZATION</u>
ROGER SCHREIBER	WESTINGHOUSE
BRIAN MCINTYRE (PART TIME)	WESTINGHOUSE
CHARLES THOMPSON (PART TIME)	DEPARTMENT OF ENERGY
RUSS BELL	NEI
JUAN PERALTA	NRR/DRCH/HQMB
H. L. BRAMMER	NRR/DE/ECGB
THOMAS CHENG	NRR/DE/ECGB
DAVID TERAQ	NRR/DE/EMCB
MARIO GARERI	NRR/DRCH/HICB
MATTHEW CHIRAMAL	NRR/DRCH/HICB
HULBERT LI	NRR/DRCH/HICB
JIM BONGARRA	NRR/DRCH/HHFB
JERRY WILSON	NRR/DRPM/PDST
JIM LYONS	NRR/DSSA/SRXB
GEORGE THOMAS	NRR/DSSA/SRXB
TED QUAY (PART TIME)	NRR/DRPM/PDST
TOM BOYCE	NRR/DISP/PIPB
NARIN TREHAN	NRR/DE/EELB
DALE THATCHER	NRR/DE/EELB
CHARLIE HINSON	NRR/DRPM/RPB
WILLIAM LONG	NRR/DSSA/SCSB
J. S. GUO	NRR/DSSA/SPLB
S.B. SUN	NRR/DSSA/SRXB
CHANG-YANG LI	NRR/DSSA/SPLB
J. H. RAVAL	NRR/DSSA/SPLB
HAROLD WALKER	NRR/DSSA/SPLB



# AP600 Certified Design Material

---



Westinghouse Presentation to NRC Staff

February 5, 1997

## Meeting Objectives

---



- Review NRC staff's initial reaction to Westinghouse ITAAC submittal (November 26 letter)
- Review Westinghouse's response to each item (December 20 letter)
- Provide detailed implementation plans and preview of expected results
- Review action items from November meeting
- Obtain further feedback from staff's ongoing review

## Staff Comments on Initial Submittal

---



- Does not address all areas required by regulations
- Human Factors section incomplete
- Methodology different from evolutionary plants
- No cross reference to tier 2



## ITAAC Conformance to Regulations

---



### **Staff Comment:**

- 10 CFR 52.97 requires ITAAC to be "...sufficient to provide reasonable assurance that the facility has been constructed...in conformity with...regulations."
- AP600 submittal does not address all regulations.

Example: No ITAAC on post accident sampling,  
as required by 10 CFR 50.34(f)(2).

# ITAAC Conformance to Regulations

---



## **Westinghouse Response:**

- We will review 10 CFR and the GDCs to identify items not included in ITAAC
- Preliminary review complete; independent verification is underway
- Examples of identified items follow.....

# ITAAC Review Against Regulations

---



10 CFR Section	Requirement	Action
50.34(f)(2)(v)	Automatic bypass & inoperable status	Create new ITAAC for Data Display & Monitoring System
50.34(f)(2)(viii)	Post-accident sampling	Create new ITAAC for Primary Sampling System
50.34(f)(2)(xix)	Post-accident monitoring	Add all PAMS instrumentation to appropriate system ITAAC
GDC 30	RCS leak detection	Create new ITAAC on RCS integrity monitoring
GDC 62	Prevention of criticality in fuel storage & handling	Add to Fuel Handling System ITAAC



### **Staff Comment:**

- AP600 submittal lacks ITAAC on four incomplete elements of HFE program

### **Westinghouse Response**

- ITAAC being expanded to include the additional items
- Draft ITAAC for task analysis element FAXed on 12/19
- Verbal reaction - it meets reviewer's expectations

### **Additional Feedback?**

# ITAAC Selection Process

---



## **Staff Comment:**

- AP600 used different methodology and screening criteria than evolutionary plants
  - Resulted in too few ITAAC
  - Limits use of staff's previous experience in conducting review

## **Westinghouse Response:**

- Will revise methodology and screening criteria





### **Selection will consider features that:**

- Are necessary to satisfy the NRC's regulations in Parts 20, 50, 52, 73 or 100
- Perform a safety or defense-in-depth function
- Are non-safety related but perform a function for which credit is taken in the design basis safety analysis
- Represent an important PRA assumption or insight
- Are important in preventing or mitigating severe accidents

.....underline indicates new criterion



### **Reviews Being Conducted of:**

- Design Basis Accident Analysis
- Probabilistic Risk Assessment
- Severe Accident Analysis
- Flood Protection
- Fire Protection
- ATWS Analysis

**Important data to be summarized in SSAR 14.3**



### **2.1 Reactor Systems**

- PAMS instruments
- Fuel rack seismic design and criticality prevention
- Fuel & control assembly seismic design



### **2.2 Nuclear Safety Systems**

- PAMS instruments
- Fracture toughness of containment steel
- Other changes minimal

## Summary of Major Additions

---



### **2.3 Auxiliary Systems**

- Fire detectors, backup power, alarms
- Liquid radwaste holdup capacity, release monitoring
- Nine new systems



## Summary of Major Additions

---



### **New ITAAC:**

#### 2.3.11 Gaseous Radwaste

- Figure/functional arrangement ITAAC
- Processing capacity
- Release isolation function

#### 2.3.12 Solid Radwaste

- Figure/functional arrangement ITAAC
- Storage capacity

## Summary of Major Additions

---



### **New ITAAC:**

#### 2.3.13 Primary Sampling

- Figure/functional arrangement ITAAC
- Post accident RCS and containment sampling

#### 2.3.14 Demineralized Water Makeup

- Figure/functional arrangement ITAAC
- PAMs instruments

# Summary of Major Additions

---



## **New ITAAC:**

### 2.3.15 Compressed Air

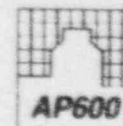
- Figure/functional arrangement ITAAC
- PAMS instruments

### 2.3.16 Potable Water

- Verification that no part of system is located in containment or "dirty" part of auxiliary building

## Summary of Major Additions

---



### **New ITAAC:**

#### 2.3.17 Waste Water System

- Verification that connection for temporary hookup to liquid radwaste is blanked off

#### 2.3.18 Plant Gas

- Verification that compressed gas tanks are not located on nuclear island.

## Summary of Major Additions

---



### **New ITAAC:**

#### 2.3.19 Communications

- Verification that test signal can be sent from control room to various locations



## Summary of Major Additions

---



### **Section 2.4 Steam & Power Conversion**

- PAMS instruments
- Other changes minimal



### **Section 2.5 Instrumentation and Control**

- Minimal changes to existing ITAAC
- Two new systems ITAAC added
  - Plant Control System
  - Data Display and Processing System

# Summary of Major Additions

---



## Section 2.6 Electric Power

- PAMS instruments
- Minimal changes to existing ITAAC
- One new system (Lighting)



### **Section 2.7 HVAC Systems**

- PAMS Instruments
- Minimal changes to existing ITAAC
- Three new systems



### **New ITAAC:**

#### 2.7.5 Radiologically Controlled Area HVAC

- Figure/functional arrangement ITAAC
- Verification that system maintains negative pressure at various locations
- Verification that standby filtered exhaust system starts on high airborne radioactivity



## Summary of Major Additions

---



### **New ITAAC:**

#### 2.7.6 Containment Air Filtration HVAC

- Figure/functional arrangement
- Verification of flow rate

#### 2.7.7 Containment Recirculation

- Figure/functional arrangement
- PAMS instrumentation

## Summary of Major Changes

---



- **Section 3.0 Non-System Based ITAAC**
  - Human Factors Engineering
    - Adding four elements
  - Nuclear Island Buildings
    - Expanding treatment of shielding
  - Radiation Monitoring
    - Adding airborne monitors
  - Two new ITAAC being added
    - RCS Integrity Monitoring
    - Design Reliability Assurance Program

## **Actions from Last Meeting**

---



- Three action items were assigned at November 13 ITAAC meeting.
- Westinghouse transmitted our formal response on January 24.
- Summary of major points follows.

## Action Item #1

---



- Wessinghouse will provide an explanation on how the ITAAC and the Initial Test Program (ITP) relate to each other.
  - This explanation is provided in SSAR Section 14.3, which was submitted on August 9.
  - Basically states that testing defined in ITAAC is a subset of the ITP described in SSAR chapter 14.

## Actions Item #2

---



- Westinghouse will provide an explanation on how the safety related connections are addressed in the ITAAC
  - Each system with such a connection has a figure showing the connection
  - ITAAC states that the functional arrangement is per the figure
  - Thus, inspection of system's functional arrangement will verify existence of connection

## Action Item #3

---



- Westinghouse will provide a response to the staff's comments on the pilot ITAAC
  - Comments were contained in three separate letters from branch reviewers
  - January 24 submittal responds to each in detail
  - Following are selected major points



## Basic Configuration ITAAC

---



- Staff objected to term “functional arrangement” instead of “basic configuration”
- Evolutionary plant “basic configuration” covered:
  - ASME Weld quality
  - Seismic & Environmental Qualification
  - MOV type testing
- AP600 ITAAC addresses these within each system
  - Provides same level of commitment
  - More precise, so less potential for misinterpretation

## Systems Covered by ITAAC

---



- Staff interprets 10CFR52.97 to mean that ITAAC must cover every system within scope of AP600 design.
- AP600 submittal will approach this issue in same manner as GE:
  - Entry in Table of Contents for every system
  - Some entries underlined to indicate no tier 1 commitment

## Location of Systems

---



- Staff wants design description to identify building in which system is located
  - ITAAC do verify that seismic equipment is located in a seismic building
  - Otherwise, location is not specified
    - Many systems do not reside within one building
    - In most cases, location is unrelated to function

# Alarms, Displays and Controls

---



- Staff wants all alarms, displays and controls verified
  - Tier 1 is supposed to take a graduated approach
  - ITAAC verify items most important to safety
    - PAMS channels
    - Controls for safety & DID equipment
  - Other instruments and controls are less important to safety, and do not merit tier 1 treatment.

## Electrical Separation

---



- Staff wants ITAAC to specify division assignments for each component
  - AP600 submittal does verify power supply separation for Class 1E equipment
  - Submittal does not specify division assignments
  - This is consistent with evolutionary plant submittals

## Pump Testing, NPSH, Miniflow

---



- Staff wants ITAAC to address these items in same level of detail as evolutionary plants
  - Unlike the evolutionary plants, AP600 has no pumps with an active safety function
  - ITAAC do verify flow rate for pumps with a DID function
  - This is consistent with graded approach to safety



## Numeric Acceptance Criteria

---



- Staff questioned why ITAAC acceptance criteria do not agree with numbers in SSAR
  - Flow rates, heat removal capability, etc.
- SSAR numbers are design values and include margin above required numbers
- ITAAC acceptance criteria are the values required to support the safety function

## Conclusion

---



- Westinghouse is addressing each of the staff's concerns
- Revised submittal will incorporate:
  - Expanded scope and additional ITAAC
  - Revisions in redline/strikeout format so changes are apparent to staff reviewers
  - Preliminary comments from staff task leaders?
- In the meantime, staff can and should continue reviewing November 7 submittal