



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555

April 1, 1992

Docket No. 52-001 (formerly 50-605)

APPLICANT: GE Nuclear Energy
PROJECT: Advanced Boiling Water Reactor (ABWR)
SUBJECT: SUMMARY OF MEETING HELD ON FEBRUARY 27, 1992

On February 27, 1992, the Nuclear Regulatory Commission (NRC) staff met with representatives of GE Nuclear to discuss interfaces and inspections, tests, analyses, and acceptance criteria, (ITAAC) for the Advanced Boiling Water Reactor (ABWR) in Rockville, Maryland. Enclosure 1 is a list of those who attended and Enclosure 2 is the agenda for the meeting. The following are highlights of the items discussed during the meeting.

SYSTEM ITAAC

The staff indicated that not all systems will require ITAAC. GE agreed to provide Tier 1 descriptions in their ITAAC submittal for all systems identified in the Standard Safety Analysis Report (SSAR). The staff discussed system ITAAC that it proposed for addition to the set of approximately 90 system ITAAC which GE is preparing for submittal to the staff. GE agreed to provide one additional system ITAAC for Control Rod Blade Design. It was agreed that GE would provide a "roadmap" showing where the staff's issues as listed in Enclosure 3 would be incorporated into the system ITAAC. The staff indicated that no additional system ITAAC would then be needed.

The staff indicated that, based on the importance of selected ITAAC, GE should provide several system ITAAC by the end of March instead of the end of May. These systems were: all electrical systems, Primary Containment System, Standby Gas Treatment System, Nuclear Boiler System, Recirculation Flow Control System, Control Rod Blade System, and Fuel System. GE indicated that it would be difficult to accelerate the schedule but would consider the request.

GENERIC ITAAC

For generic ITAAC, the staff provided a list of suggested additions, contained in Enclosure 4. GE's response to the recommendations are included in Enclosure 3. GE committed to providing the following generic ITAAC: Instrument Setpoint Methodology, Software, Safety System Logic and Control, Multiplexing, Seismic/Non-Seismic Interactions, Seismic Category I Buildings, and Equipment Qualification. The following ITAAC were requested but remain as open items: Non-Safety System Multiplexing, heating, ventilation, and air conditioning (HVAC) Supports Structural Design, Cable Tray and Conduit Support Structural Design, High Energy Line Break, Leak Before Break, and Welding.

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It was agreed that Quality Assurance (QA) would not be needed as a separate ITAAC. The assurance of quality in the GE design would be assured through audits of GE's design process. The staff stated that it had performed several audits of aspects of GE's QA design process to date. It was agreed that GE would incorporate design aspects of QA into specific DAC areas. The staff also stated that it would review and evaluate the QA program for the remaining design, for construction, and for operation as part of the combined operating license (COL) review.

GE committed to providing "roadmap" entries for generic concerns which are being included in either systems or other generic ITAAC. GE also indicated that it would consider splitting up the Equipment Qualification ITAAC into three separate ITAAC based on a staff recommendation. The staff also voiced a generic concern on motor operated valves which GE indicated would be included in the "roadmap." The staff indicated that a generic ITAAC would not be required because a COL applicant would address these items as part of the facility application.

INTERFACES

The staff presented a discussion of the definition of interfaces as per 10 CFR Part 52, Enclosures 5 and 6. It was indicated that both the staff and GE had improperly identified most interface items in the draft safety evaluation reports (DSER) and in the SSAR Table 1.9-D. The staff and GE basically agreed upon the categories that the interfaces would be reclassified into. Those categories are: Interfaces as defined by 10 CFR Part 52, ITAAC or design acceptance criteria (DAC), COL action items, site parameters, or unresolved design issues. GE indicated that further discussions are needed for most items identified as unresolved design issues or ITAAC items on the staff's list. Based on the number of items involved and the time required to discuss each item, it was decided that it would be more productive to discuss the list of interfaces in conference calls between the staff and GE beginning the week of April 5th. In the next management meeting with GE the discussions will focus on those remaining items where GE and the staff disagree on interface reclassification and disposition. In the meantime a master list is being generated by the staff to consolidate the DSER and SSAR interface items.

OTHER ISSUES

The overlap of ITAAC with the pre-operational phase of the Initial Test Program (ITP) was discussed. The staff is investigating whether additional requirements should be incorporated into the system and generic ITAAC based on its review of the ITP.

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GE also indicated that it would include in the "roadmap" for ITAAC where severe accident design features, design basis accidents, and PRA insights have been incorporated into the systems and generic ITAAC.

Original Signed By:

Thomas H. Boyce, Project Manager
Standardization Project Directorate
Division of Advanced Reactors
and Special Projects
Office of Nuclear Reactor Regulation

Enclosures:

1. Attendees List
2. Agenda
3. GE/NRC ITAAC Discussions
2/27/92
4. Generic ITAAC
5. Scope of ABWR (GE)
6. Note to Jack Fox and
Tony Jamer, GE

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ITAAC MEETING ATTENDEES

FEBRUARY 27, 1992

<u>NAME</u>	<u>ORGANIZATION</u>
Chet Poslusny	NRR/PDST
Vic McCree	NRR/PDST
Rebecca Nease	NRR/PDST
Ray Ramirez	NRR/DLPQ/LQEB
Anthony Mendiola	NRR/DLPQ/LQEB
Steven Stein	NRR/PMAS/PTSB
Robert Perch	NRR/DST
William Beckner	NRR/DREP
William Burton	NRR/DST/SPLB
Seung Lee	NRR/DET/ESGB
Frederick Hasselberg	NRR/PDST
Howard Richings	NRR/SRXB
George Thomas	NRR/SRXB
Larry Phillips	NRR/SRXB
Jim Stewart	NRR/SICB
Jim Lyons	NRR/SPLB
Jerry Wilson	NRR/PDST
Dale Thatcher	NRR/DST/SELB
Tom Boyce	NRR/PDST
Jack Fox	GE
Tony James	GE
Mark Rubin	NRR/SRXB
Gary Zech	NRR/LPEB
Ed Butcher	NRR/DREP
Tim Polich	NRR/LPEB
Dennis Willett	PNL
Tony DiPalo	NRR/RES
Tom Tai	Bechtel/DOE
J. Alan Beard	Halliburton NUS
Adrian Heymer	NUMARC
Norman Fletcher	DOE

AGENDA

INTRODUCTION (8:00 - 8:05)

SYSTEM ITAAC (8:05 - 9:15)

- NUMBER OF SYSTEM ITAAC
DESIGN DESCRIPTION REQUIREMENTS FOR SSAR SYSTEMS
ITAAC REQUIREMENTS
- SCHEDULE FOR SUBMITTAL OF SYSTEM ITAAC
ELECTRICAL SYSTEMS
NUCLEAR BOILER, CONTROL RODS, RECIRC FLOW CONTROL SYSTEMS
- SELECTED ISSUES FOR SYSTEM ITAAC
- "ROADMAP" FOR ANALYSES/ISSUES

GENERIC ITAAC (9:20 - 10:25)

- DST LIST OF GENERIC ITAACS
- DET LIST OF GENERIC ITAACS
- HANDLING OF GENERIC ISSUES (SOLDERING, PAINTING, ETC.) IN DESIGN
- "ROADMAP" FOR ANALYSES/ISSUES

DESIGN INTERFACES (10:30 - 11:15)

- RECLASSIFICATION OF "INTERFACES"
- COMPARISON OF GE/NRC LISTS OF INTERFACES

ACTION PLAN ON ITAAC/INTERFACES (11:15 - 11:30)

- GE DOCUMENTATION OF SYSTEM, GENERIC ITAAC ISSUES
- SCHEDULE FOR SUBMITTAL OF REQUIRED INFORMATION

OTHER ISSUES

- "ROADMAP" FOR SELECTED ANALYSES IN SSAR AND ITAAC
SEVERE ACCIDENTS, DESIGN BASIS ACCIDENTS, PRA INPUTS/KEY ANALYSES
- ITAAC OVERLAP WITH INITIAL TEST PROGRAM

GE/NRC ITAAC DISCUSSIONS 2/27/92NRC COMMENT

1. In SSAR Section 1.10 interface information, two items (#20, Loose Parts Monitoring System, and #25, Steam Isolation Valve Testing are listed as interfaces. In light of recent DAR guidance, we concur that the loose parts monitoring system is part of the Nuclear Island and its design should be provided by GE.

With respect to steam isolation valve testing, the functional performance of the steam isolation valves should be incorporated into the RCIC ITAAC and deleted from the interface category.

GE RESPONSE

LOOSE PARTS MONITORING - INTERFACE ITEM IN THE COL APPLICANT ACTION ITEM CATEGORY

ISOLATION VALVE TESTING - ISSUE NOT UNDERSTOOD. RCIC ITAAC TO COVER ISOLATION VALVES.

NRC COMMENT

2. Stability of Offsite, SSAR Subsection 8.1.4.1, in a Part 52 interface. GE needs to do the following for the interface area involving offsite power:
 - Specify the interface requirements
 - Provide a conceptual design
 - Provide the method for developing ITAAC for site specifics

GE RESPONSE

SAR DOES (WILL) CALL OUT INTERFACING REQUIREMENTS (8.2.3)

CONCEPTUAL DESIGN OF SWITCHYARD EQUIPMENT IS (WILL BE) INCLUDED (8.2.1)

CONCEPTUAL DESIGN OF GRID IS UTILITY/SITE DEPENDENT AND CANNOT BE PROVIDED

TIER 1 TREATMENT

SWITCHYARD COVERED BY ELECTRICAL POWER DISTRIBUTION SYSTEM (2.12.1)

GRID REQUIREMENTS WILL BE COVERED BY AN INTERFACE ITAAC

NRC COMMENT

List of ITAAC Proposed by DET

Generic ITAAC

- G1 Seismic Category I Structures (or alternatively, building-specific ITAAC)
- G2 Motor-operated valves
- G3 EQ (both environmental and seismic qualification of equipment)
- G4 Seismic (site adequacy)
- G5 Seismic (component adequacy)
 - piping
 - HVAC
 - cable trays
 - conduit
- G6 Seismic/non-seismic interaction (including impact of the turbine building and internal structures on condenser and main steam bypass piping)

Design ITAAC

- D1 Piping (stress analyses, high-energy line break, and leak-before-break)
- D2 HVAC structural design of ducting and supports
- D3 Cable trays and supports structural design
- D4 Conduit and supports structural design
- D5 Seismic Category I Building Design Details (rebar, joint details, wall sizing)

GE RESPONSE

- G1: CONCUR: BUILDING SPECIFIC TREATMENT
- G2: DO NOT CONCUR: TREAT IN SYSTEM ITAAC USING TIER 1 SELECTION CRITERIA
- G3: CONCUR
- G4: CONCUR: WILL INCLUDE IN BOUNDING SITE ENVELOPE ITAAC
- G5: CONCUR: PIPING
DO NOT CONCUR: OTHERS
- G6:
- D1: DO NOT CONCUR WITH DAC: GENERIC PIPING ITAAC WILL CONFIRM DESIGN ADEQUACY
- D2: }
- D3: } DO NOT CONCUR. GE DOES NOT BELIEVE THESE ISSUES MEET CRITERIA FOR
- D4: } DAC TREATMENT
- D5: }

GE/NRC ITAAC DISCUSSIONS 2/27/92

NRC COMMENT

1. In addition to the generic ITAAC on equipment qualification, the following areas should be addressed in the ITAAC, either generically or for the individual systems/buildings:
 - Flooding
 - Fire protection (barriers, fire dampers, etc.)
 - Spurious operation or rupture of the fire suppression systems
 - External phenomena (tornadoes, external floods, etc.)
 - Pipe breaks (steam impingement flooding, pipe whip)
 - Missiles

Reason for inclusion: Similar to Seismic and Environmental Qualification

GE RESPONSE

- | | |
|---------------------------|---|
| FLOODING | - CONSIDER IN EACH BUILDING ITAAC |
| FIRE PROTECTION | - SAME |
| SPURIOUS FIRE SUPPRESSION | - COVER IN FIRE PROTECTION SYSTEM |
| EXTERNAL PHENOMENA | - A) TREAT AS APPROPRIATE IN INDIVIDUAL ITAAC
B) COVER IN ANALYSES FOR SITE PARAMETERS |
| PIPE BREAKS | - COVER IN INDIVIDUAL ITAAC (PIPE WHIP COVERED BY GENERIC PIPING ITAAC) |
| MISSILES | - COVER IN INDIVIDUAL ITAAC |

GE/NRC ITAAC DISCUSSIONS 2/27/92

NRC COMMENT

2. The electrical Distribution System should encompass the Items 2.12.3 through 2.12.10 which GE indicates will not have ITAAC's. These items should be covered by inspections, tests, etc., for separation, voltage drop, overcurrent protection and breaker coordination, degraded grid protection, etc.

GE RESPONSE

TIER 1 MATERIAL FOR 2.12.1, ELECTRICAL POWER DISTRIBUTION SYSTEM, WILL COVER ALL THESE ISSUES:

- SEPARATION
- VOLTAGE DROP
- OVERCURRENT PROTECTION
- BREAKER COORDINATION

ITEMS 2.12.3 THROUGH 2.12.9 COVER COMPONENTS OF 2.12.1. DETAILS ARE DEPENDENT ON AS-PROCURED EQUIPMENT.

- TIER 1 TREATMENT NOT APPROPRIATE

PENETRATIONS WILL BE COVERED BY THE REACTOR BUILDING TIER 1 (2.15.10)

GE/NRC ITAAC DISCUSSIONS 2/27/92

NRC COMMENT

3. The Unit Auxiliary Transformers and the Reserve Auxiliary Transformer should be combined with other aspects such as the main generator breaker and incoming lines from the offsite to the onsite Class 1E system and should be called "Offsite Interconnection System" or similar to describe their function in terms of transferring power from the grid.

GE RESPONSE

UNIT AUXILIARY AND RESERVE AUXILIARY TRANSFORMERS (2.12.2) COVERED BY 2.12.1 - ELECTRICAL POWER DISTRIBUTION SYSTEM

CURRENT APPROACH IS BASED ON GE PRODUCT STRUCTURE

GE/NRC ITAAC DISCUSSIONS 2/27/92

NRC COMMENT

4. The following items should be verified as being encompassed by existing ITAAC systems or added as new ITAACs:
- Containment Electric Penetrations, including their special protective requirements. Reason for inclusion: Containment Integrity Concern.
 - Scram and MSIV Solenoid Power Supply, including the Electrical Protection Assemblies (EPAs). Reason for inclusion: Critical to Scram meeting single failure.
 - Diesel Generator Auxiliaries, including Engine Fuel Oil Storage and Transfer, Emergency Diesel Engine Cooling, Engine Starting, Engine Lubrication, Air Intake and Exhaust System. These systems are not included in the scope of the Emergency Diesel Generator System Pilot ITAAC submitted by GE, and they do not appear to be included in the list of systems to be provided. Reason for inclusion: Critical to EDG performance.

GE RESPONSE

PENETRATIONS - TO BE COVERED BY REACTOR BUILDING ITAAC (2.15.10)

SOLENOID POWER - WILL BE COVERED BY VITAL AC POWER SUPPLY SYSTEM TIER 1
SUPPLY MATERIAL (2.12.15)

D/G AUXILIARIES - AUXILIARIES ARE SUPPLIED WITH THE EQUIPMENT AND ARE
AS-PROCURED DETAILS. NECESSARY TIER 1 TREATMENT IS COVERED BY
THE EMERGENCY D/G SYSTEM (2.12.13)

GE/NRC ITAAC DISCUSSIONS 2/27/92

NRC COMMENT

5. We understand that the Control Rod Drive System ITAAC will contain only the hydraulic part of the system such as pumps, piping and valves, and will not contain the control rod blades. GE was informally requested and agreed to include the control blades in the ITAAC systems list at the January 28-29, 1992, meeting

GE RESPONSE

GE AGREES.

CONTROL BLADES WILL BE A SEPARATE ITAAC.

NRC COMMENT

6. The Nuclear Boiler System should encompass the safety relief valves.

GE RESPONSE

GE AGREES.

NBS WILL COVER THE SAFETY RELIEF VALVES.

GE/NRC ITAAC DISCUSSIONS 2/27/92

NRC COMMENT

7. GE has indicated that they intend to add generic ITAACs which are not reflected in the current list. These include:

- Instrument Setpoint Methodology
- Software
- Equipment Qualification (including electromagnetic compatibility, surge withstand capability and mild environment considerations)
- Safety System Logic and Control (including instrument sensing lines and racks)
- Essential Multiplexing System
- Certain non-safety-related I&C topics (Alternate Rod Control, Nonessential multiplexer diversity from EMS)

GE RESPONSE

	<u>GENERIC ITAAC</u>
INSTRUMENT SETPOINTS	YES
SOFTWARE	YES
EQ	YES
SSLC*	YES
ESSENTIAL MULTIPLEXING	YES - SYSTEM
NON-SAFETY I&C TOPICS	NO GENERIC ITAAC PLANNED

* INSTRUMENT LINES TO BE COVERED IN NUCLEAR BOILER SYSTEM

GE/NRC ITAAC DISCUSSIONS 2/27/92

NRC COMMENT

3. The following items, formerly called interfaces, need to be addressed by GE in appropriate ITAACs or by other means:

<u>Category</u>	<u>Former Interface</u>	<u>ITAAC?</u>
C	Diesel Generator Reliability	No
Deleted	Class 1E Feeder Circuits	-
Deleted	Non-Class 1E Feeders	-
Deleted	Specific ABWR Std. Plant remainder of plant power system interface	-
C	Interrupting Capability of Electrical Distribution Equipment	No
C	Diesel Generator Design Details	No
C	Certified Test of Cable Samples	No
C	Electrical Penetration Assemblies	No
C	Analysis Testing for Spatial Separation per 384	No
C	DC Voltage Analysis	No
C	Seismic Qualification of Eye Wash Equipment in the Batter Room	No
C	Diesel Generator Load Table	No
C	Offsite Power Supply Arrangements	No
C	Diesel Generator Qualification Testing	Yes
F	Defective Refurbished Circuit Breakers	-
C	Minimum Starting Voltage for Class 1E Motors	No
C	Identification and Justification of Associated Circuits	No
C	Administrative Control of Bus Grounding CBs	No
C	Testing of Thermal Overload Bypass Contact for MOVs	No
C	Emergency Operating Procedures for SBO	No
C	Common Industrial Standards Referenced in Purchase Specification	No
C	Separated Power Feeds for 6.9 KV Switchgear (Recommend delete; Section 8.2.3.1, Paragraph 13)	No

GE RESPONSE

ALL INTERFACES FROM TABLE 1.9-1 NEED TO BE CATEGORIZED.
TIER 1 TREATMENT MUST BE HANDLED CASE-BY-CASE.

GENERIC ITAAC

INSTRUMENT SETPOINT METHODOLOGY

SOFTWARE

SAFETY SYSTEM LOGIC AND CONTROL

MULTIPLEXING

EMS

OTHER SYSTEMS MULTIPLEXING

"NON-SAFETY RELATED" I&C

ALTERNATE ROD CONTROL

ANALOG DIVERSITY

MULTIPLEXING DIVERSITY

EQUIPMENT QUALIFICATION

EMI/SWC

ENVIRONMENTAL

SEISMIC

GENERIC CONCERNS

MISSILES

FLOODING

FIRE PROTECTION

RUPTURE OF FIRE PROTECTION SYSTEM

EXTERNAL PHENOMENA

PIPE BREAK EFFECTS

SEISMIC CATEGORY I STRUCTURES

REBAR SIZING, JOINT DETAILS, WALL SIZING, CONCRETE CHARACTERISTICS

PIPING

STRESS ANALYSIS

HIGH-ENERGY LINE BREAK

LEAK-BEFORE-BREAK

CONFIRMATION THAT AS-BUILT MEETS DESIGN PER IE BULLETIN 79-14

HVAC SUPPORTS STRUCTURAL DESIGN

CABLE TRAY AND SUPPORTS STRUCTURAL DESIGN

SEISMIC/NON-SEISMIC INTERACTION

INTERNAL STRUCTURES EFFECTS ON CONDENSOR, MSL BYPASS PIPING

DYNAMIC ANALYSIS OF MSL VS STATIC ANALYSIS OF TURBINE BUILDING

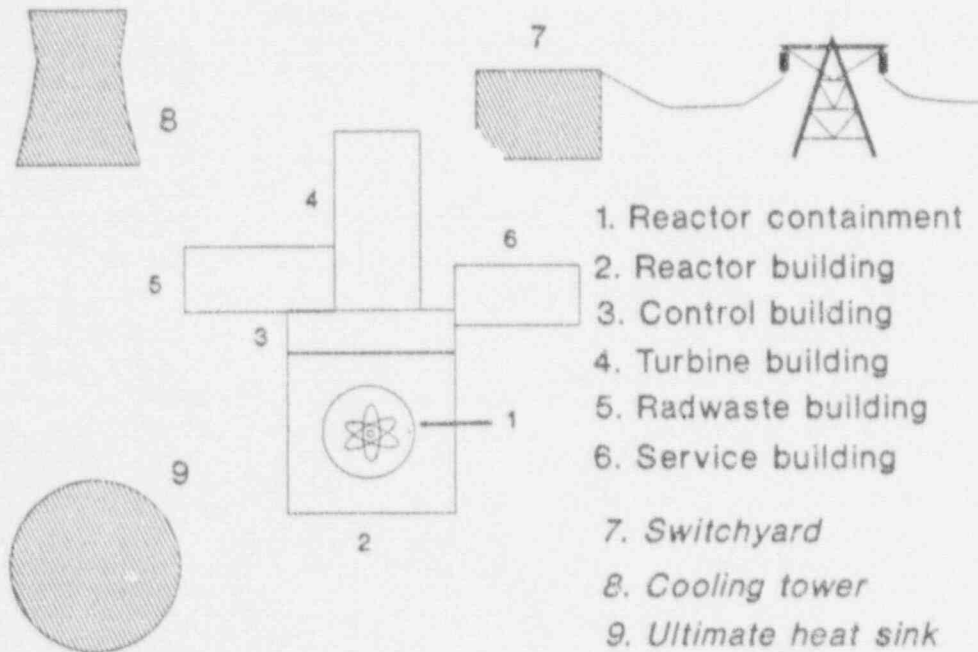
WELDING

QUALITY ASSURANCE

CONCRETE PROPERTIES

SITE PARAMETERS/SITE CONDITIONS

SCOPE OF ABWR (GE)

*A - Interface Requirement*

vii - safety analysis & PRA

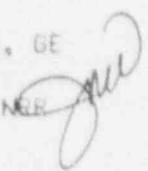
viii - justification compliance verifiable

ix - representative conceptual design

*B - bounding site parameter**C - combined license action item**D - DAC or ITAAC**E - unresolved design issue* -

February 26, 1992

Note to: Jack Fox and Tony James, GE

From: Jerry N. Wilson, PDST, NRE 

SUBJECT: INTERFACE REQUIREMENTS

As a result of our conference call on February 14, I decided to prepare the following clarification of the requirements in 10 CFR 52.47 that relate to interfaces:

The resolution of the design acceptability of the site-specific elements, such as the ultimate heat sink, and the acceptability determination of the respective interface requirements is performed during the combined license review. The resultant ITAAC for the interface requirements and the site-specific design elements are also determined during the combined license review. Whereas, the verification of the acceptable construction of the site-specific design elements and their respective interface requirements is done after the issuance of the combined license.

52.47(a)(1)(vii) - Interface requirements only apply to the site-specific portions of the plant, such as the ultimate heat sink, and other facilities which do not affect the safe operation of the plant, such as warehouses. I believe we only need interface requirements for site-specific elements. The level of detail for the interface requirement must be sufficient to allow for completion of the SSAR and design-specific PRA. Each staff reviewer will decide the adequacy of the level of detail for the interface requirements in their area of responsibility. The resulting interface requirements will be included in the design control document (tier 1) but some of the details of the interface requirement may only be described in the SSAR (tier 2).

52.47(a)(1)(viii) - There are two parts to this requirement. The first part calls for justification that compliance with the interface requirement is verifiable through inspection, testing, or analysis. The point of this requirement is that we need an interface requirement that is measurable or testable, not a reliability or PRA requirement that may be judgmental.

The second part of the requirement states that the method to be used for verification must be included as part of the proposed ITAAC. This is not a requirement to provide the ITAAC for the ultimate heat sink, although that would be an acceptable response to this requirement. Rather, this is a requirement to describe how the interface will be verified. An acceptable response would be a description of a test or measurement that could be used to verify the interface requirement. The bottom line is that we do not want a PRA-type interface requirement that could not be physically verified!

52.47(a)(1)(ix) - This requirement calls for a representative conceptual design for those portions of the plant for which the application does not seek certification, such as the ultimate heat sink, to aid the staff in its review of the SSAR, design-specific PRA, and interface requirements. The adequacy of the conceptual designs will be judged by the responsible reviewers.