November 27, 1995

APPLICANT: Westinghouse Electric Corporation

PROJECT: AP600

SUBJECT: SUMMARY OF MEETING TO DISCUSS LONG TERM SAFETY FOR THE AP600

The subject meeting was held in Rockville, Maryland on April 27, 1995, between representatives of Westinghouse and the Nuclear Regulatory Commission (NRC) staff. The purpose of the meeting was to discuss issues involved with long term safety (post-72 hours) for the AP600.

The meeting involved a presentation by Westinghouse of their approach to addressing these issues for the AP600 and questions by the staff seeking clarification of the Westinghouse approach. Attachment 1 is the list of meeting attendees. Attachment 2 contains handouts provided by Westinghouse during the meeting to supplement the presentation and discussions.

The staff expressed a general concern that the equipment used as part of the licensing basis for long-term safety would be outside of the control of the licensee. The staff committed to provide Westinghouse with questions addressing these concerns following the meeting. The NRC questions were sent to Westinghouse in a letter dated May 25, 1995.

original signed by:
Ralph E. Architzel, Section Chief
Standardization Project Directorate
Division of Reactor Program Management
Office Of Nuclear Reactor Regulation

Docket No. 52-003

Attachments: As stated

cc w/attachments:
See next page

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AP600 - WESTINGHOUSE
LONG TERM SAFETY
APRIL 27, 1995
MEETING ATTENDEES

NAME	ORGANIZATION
RALPH ARCHITZEL	NRR/PDST
TIM COLLINS	NRR/SRXB
Y. GENE HSII	NRR/SRXB
A. CUBBAGE	NRR/SRXB
JAMES LYONS	NRR/SPLB
N. TREHAN	NRR/EELB
CHARLES THOMPSON	DOE
CONRAD MCCRACKEN	NRR/SPLB
J. ALLEN BEARD	GE-NE
J. H. RAVAL	NRR/SPLB
ANDREA STERDIS	W AP600 LICENSING
TERRY SCHULZ	W AP600 LICENSING
JIM LAZEVNICK	NRR/EELB
CHANG-YANG LI	NRR/SPLB
BILL HUFFMAN	NRR/PDST
NICK SALTOS	NRR/SPSB
JOHN MONNINGER	NRR/SCSB
JACK KUDRICK	NRR/SCSB
JIM BONGARRA	NRR/HHFB

Attachment 1

AP600

AP600 POST 72 HOUR ACTIONS

T.L. SCHULZ
SYSTEMS ENGINEERING
APRIL 27, 1995

Attachment 2

AP600 POST 72 HOUR ACTIONS

- **Passive Safety-Related Systems Provide Long Term Operation**
  - Maintain safe shutdown following design basis events / accidents
  - Core and containment cooling
    - Available much longer than 72 hours without offsite support
  - Spent fuel cooling, control habitability and post-accident monitoring
    - Available for 72 hr without offsite support

- **Long Term Offsite Support for Passive Safety-Related Systems**
  - Required in some situations after 72 hours
  - Utilize readily available / transportable equipment and supplies
  - Permanent safety-related connections provided to engage temporary equipment

- **Installed Nonsafety-Related Systems NOT Required**
  - Will be used if available

AP600 POST 72 HOUR ACTIONS

- **Safety-Related System Long Term Functions**
  - Core cooling, inventory / reactivity control
  - Containment cooling / ultimate heat sink
  - Containment hydrogen control
  - Main control room habitability
  - Post-accident monitoring
  - Spent fuel cooling

LONG TERM CORE COOLING

AP600

- **Closed Cycle Recirculation Inside Containment**
  - Containment recirculation with ADS operation
  - Core cooling monitored by post accident instrumentation
- **Containment Leakage Can Deplete Water inventory**
  - Less than 36 gal water per day based on Tech Spec allowable leakage
  - Design basis leakage can be accommodated for >3 months
- **Connection Provided for Long Term Water Makeup**
  - Safety-related connection through RNS return line to RCS
  - Accessible with high radiation inside containment

LONG TERM CONTAINMENT COOLING

AP600

- **Passive Containment Cooling**
  - PCS reduces containment to ~10 psig / 190 F at 72 hours
  - Containment cooling monitored by post accident instrumentation
- **Operation of PCS Depletes Cooling Water Supply**
  - Initial PCS water supply sufficient for 72 hr
  - After 72 hr, air cooling alone can cool containment
    - Pressure will increase, but remain below design pressure
  - Water cooling maintains low containment pressure
- **Connection Provided for Long Term Water Makeup**
  - Safety-related connection to PCS tank
  - Accessible with high radiation inside containment
  - Water supply required is ~55 gpm or ~80,000 gal / day
  - Portable pump of 500 gpm (50 HP) transfers water

LONG TERM CONTAINMENT H2 CONTROL

AP600

- **Post Accident Containment Hydrogen Control**
  - Provided by autocatilic hydrogen recombiners
  - No long term offsite support required

LONG TERM CONTROL ROOM HABITABILITY

AP600

- **Requires Main Control Habitability**
  - Compressed air provides control room air quality control
  - Passive heat sinks (walls) provide control room cooling
  - Offsite support required after 72 hr in case of high radiation / hot weather

- **Connections Provided for Long Term Operation**
  - Safety-related line for compressed air makeup to main control room
    - Portable compressed air bottles provide 20 cfm
  - Safety-related connections for control room cooling
    - Portable water cooled air recirculation unit inside control room
    - Portable air cooled refrigeration unit outside control room
    - Control room cooling ~20,000 BTU/hr
  - Safety-related connections for electrical power
    - Portable generator connected to temporary control room units
    - Also powers post accident monitoring equipment and room cooling fan
    - ~50 kw required for all loads
  - Connections accessible with high radiation inside containment

LONG TERM POST ACCIDENT MONITORING

AP600

- **Requires I&C Room Cooling**
  - Required after 72 hours in case of hot weather
  - I&C equipment room cooling

- **Connections Provided for Long Term Operation**
  - Portable fans circulate air through open room doors
  - Electrical power from portable generator (see control room habitability)
  - Connections accessible with high radiation inside containment

LONG TERM SPENT FUEL COOLING

AP600

- **Spent Fuel Cooling**
  - Initial pool water inventory provides extended spent fuel cooling
    - At power BOL; 170 hours
    - During normal refueling; 72 hours
    - During full core offload; 72 hours (water in SFP and refueling cavity)
  - Spent fuel pit water level monitored by post accident instrumentation

- **Connection Provided for Long Term Water Makeup**
  - Safety-related connection to spent fuel pit
  - Accessible with high radiation inside containment and steaming from SFP
  - Water supply required is
    - Normal refueling; ~14 gpm or 20,000 gal / day
    - Full core offload; ~42 gpm or 60,000 gal / day
  - Portable pump of 500 gpm (15 HP) transfers water

SUMMARY OF OFFSITE EQUIPMENT

AP600

- **Water Supply for Containment and Spent Fuel Cooling**
  - ~ 100,000 gal / day for normal refueling
  - ~ 60,000 gal / day for full core offload

- **Portable Pumps with Direct Diesel Drives**
  - 500 gpm (50 Hp) for PCS transfer
  - 500 gpm (15 Hp) for SFP transfer

- **Portable Electrical Generator**
  - 2 x 50 kw, 480 v, 60 Hz

- **Compressed Air**
  - 20 cfm from air bottles

- **Room Cooling**
  - 20,000 BTU/hr air cooler
  - 2 x 1200 cfm fans

SOURCES FOR OFFSITE SUPPORT

AP600

- **Designer Inputs to COL Applicant**
  - Specific equipment / supply requirements (generator kw/voltage/freq, ...)

- **COL Applicant Develops / Maintains Specific List**
  - For each piece of equipment / supply item
    - List of specific sources
      - Locations (including close to plant and away from plant)
      - Model numbers

PROCEDURES FOR OFFSITE SUPPORT

AP600

- **COL Applicant Will Develop / Maintain Offsite Support Procedure**
  - Priority will be onsite equipment (diesels, RNS pumps, ...)
    - Effort to recover will continue until successful
  - Backup is offsite support
    - Closest offsite would be used unless unavailable

- **Timing to Secure Offsite Assistance Would be Event Specific**
  - Local plant failures
    - Possibility of recovery of onsite equipment greater
    - Time to procure offsite support shorter
    - Later initiation of action to procure offsite support
  - Major earth quake / storm that damaged plant and surrounding area
    - Possibility of use of onsite equipment smaller
    - Time to procure offsite support longer
    - Early initiation of action to procure offsite support
  - Specific timing site dependent