Westinghouse Electric Corporation Energy Systems

Box 355
Pittsburgh Pennsylvania 15230-035

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U.S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: T. R. QUAY

SUBJECT: SHORT TERM AVAILABILITY CONTROLS FOR HYDROGEN IGNITERS

Reference: 1. Letter from NRC to Westinghouse, "AP600 Hydrogen Igniter Power Supply," dated April 3, 1997.

Dear Mr. Quay:

The AP600 hydrogen control system consists of passive autocatalytic recombiners (PARs) to address design basis accidents and igniters to address severe accidents. The PARs are covered by Tier 1 descriptions, ITAACs, the initial test program, and the Technical Specifications (TS). The hydrogen igniters are covered by Tier 1 descriptions, ITAACs, the initial test program, and the design reliability assurance program. The hydrogen igniters are not included in the TS.

The referenced letter cited four reasons for including the hydrogen igniters in the AP600 TS. The purpose of this letter is to explain why it would be inappropriate to include that subsystem in the TS and to provide short term availability controls as an alternative.

In the referenced letter, the NRC requests a hydrogen igniter TS based on the following criteria:

a) Operating experience at Three Mile Island (TMI).
b) 10 CFR 50.34(f).
c) NRC Policy Statement on TS Improvements, criterion 4.
d) Precedent set by the System 80+ design certification..

a) Operating experience at TMI is a valid reference for considering a TS for hydrogen control, but not specifically for the hydrogen igniters. The percent zirconium-water reaction experienced during the TMI incident was not more than 52%. On a dry containment basis, 52% zirc water reaction results in 7% hydrogen in containment. Accounting for steam pressure, the hydrogen in containment would be about 3.5%, which is within the hydrogen control capability of the AP600 PARs. Considering operating experience related to hydrogen control and NUREG-1431 inclusion criterion 4, Westinghouse has included the PARS in the AP600 TS.

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b) 10 CFR 50.34(f) provides additional TMI-related requirements. This regulation imposes, among other things, a requirement for a hydrogen control mitigation system that can accommodate a 100% fuel-clad metal water reaction. While this regulation applies to the AP600 plant design, it does not constitute a requirement that this system be included in the TS. There are numerous regulations which were reviewed by the NRC when developing the NRC Policy Statement on TS Improvements and the TS inclusion criteria which are a part of that policy statement. Those criteria are:

1) Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary. *The hydrogen igniters do not meet this inclusion criteria.*

2) A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analyses that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. *The hydrogen igniters do not meet this inclusion criteria.*

3) A structure, system, or component (SSC) that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. *The hydrogen igniters do not meet this inclusion criteria.*

4) Structures, systems, and components which operating experience or probabilistic safety assessment (PSA) has shown to be important to public health and safety. See item C for more discussion.

c) The July 1993 NRC Policy Statement on TS Improvements, criterion 4, stated above, deals with two aspects. One is operating experience, which was discussed previously (see item a above), and the other is related to the PSA. Since June 1992, the AP600 TS have stated, "The AP600 structures, systems, and components selected in accordance with the fourth criterion and included in the TS are those which have been found to be necessary to meet the NRC core melt frequency goal." Since the AP600 PRA does not show that the hydrogen igniters are required to meet the CDF goal, *the hydrogen igniters do not meet this inclusion criteria.*

d) In the referenced letter, the NRC referred to the precedent set by the System 80+ TS. The AP600 TS emulate NUREG-1431, the Standard Technical Specifications for Westinghouse Plants, issued in April 1995. The AP600 TS contain an LCO for the PARS, consistent with NUREG-1431 LCO 3.6.8 for hydrogen recombiners but need not contain an LCO for a hydrogen ignition system since NUREG-1431 LCO 3.6.10 applies only for ice condenser plants, which the AP600 is not. During creation of that NUREG, much consideration was given to what would be included in the Westinghouse TS. Design basis, not severe, accident mitigation forms the basis for the TS. This approach is solidified with NRC issuance of the policy statement which provides the four criteria discussed above.

While the hydrogen igniters do not meet any of the inclusion criteria for the AP600 TS, the hydrogen ignitor subsystem provides control of hydrogen buildup resulting from severe accidents such that Westinghouse has included the hydrogen igniters in the Design Reliability Assurance Program (SSAR Section 16.2) and intends to submit the attached short-term availability controls for hydrogen igniters in the forthcoming SSAR Section 16.3.

The NRC is requested to review this letter and the attached short-term availability controls and provide a position regarding the medium for ensuring availability of the AP600 hydrogen igniters. This completes Westinghouse action related to Key Licensing issue 11a (see OITS item 4165).

If you have any questions regarding this letter, please contact Robin K. Nydes at 412-374-4125.

Brian A. McIntyre, Manager
Advanced Plant Safety and Licensing

jml

cc: J. M. Sebrosky, NRC
N. J. Liparulo, Westinghouse

TABLE 16.3-2

INVESTMENT PROTECTION SHORT-TERM AVAILABILITY CONTROLS

2.0 Plant Systems

2.8 Hydrogen Ignitors

OPERABILITY: The hydrogen ignitors listed in Table 2.8-1 shall be operable

APPLICABILITY: MODE 1, 2,
MODE 5 with RCS open, level not visible in pressurizer,
MODE 6 with upper internals in place and cavity level less than full

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required hydrogen ignitor inoperable.	A.1 Notify [chief nuclear officer] or [on-call alternate].	72 hours
	AND	
	A.2 Restore required ignitors to operable status.	14 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Submit report to [chief nuclear officer] or [on-call alternate] detailing interim compensatory measures, cause for inoperability, and schedule for restoration to OPERABLE.	1 day
	AND	
	B.2 Document the justification for the actions taken and input provided to O-RAP in plant records.	1 month

TABLE 16.3-2

INVESTMENT PROTECTION SHORT-TERM AVAILABILITY CONTROLS

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 2.8.1 Energize each required hydrogen ignitor and verify the surface temperature is > [1700] F.	Each refueling outage

Table 2.8-1, Hydrogen Ignitors (1)

Location	Hydrogen Ignitors Group 1	Group 2
- Reactor Cavity	note 2	note 2
- Loop Compartment 01	12,13	11,14
- Loop Compartment 02	5,8	6,7
- Pressurizer Compartment	49,60	50,59
- Tunnel connecting Loop Compartments	1,3,31	2,4,30
- Southeast Valve Room & Southeast Accumulator Room	21	20
- East Valve Room, Northeast Accumulator Room, & Northeast Valve Room	18	17,19
- North CVS Equipment Room	34	33
- Lower Compartment Area (CMT and Valve Area)	22,27,28,29,31, 32	23,24,25,26,30
- IRWST	9,35,37	10,36,38
- IRWST inlet	16	15
- Refueling Cavity	55,58	56,57
- Upper Compartment		
- Lower Region	39,42,43,44,47	40,41,45,46,47
- Mid Region	51,54	52,53
- Upper Region	61,63	62,64

Notes:

1) The table lists the hydrogen ignitors. In each location, all of the ignitors in group 1 or group 2 should be available.
2) Ignitors in this location are shared with other locations.

TABLE 16.3-2

INVESTMENT PROTECTION SHORT-TERM AVAILABILITY CONTROLS

2.0 Plant Systems

2.8 Hydrogen Ignitors

BASES:

The hydrogen ignitors should be available to provide the capability of burning hydrogen generated during severe accidents. This function is important because it provides margin in the PRA sensitivity performed assuming no credit for nonsafety-related SSCs to mitigate at-power and shutdown events. The margin provided in the PRA study assumes a minimum availability of 75% for this function.

SSAR section 6.2.4 provides additional information.

The hydrogen ignitor function should be available during MODES 1 and 2 when core decay heat is high and during MODES 5 and 6 when the RCS inventory is reduced. Planned maintenance should not be performed on required hydrogen ignitors during a required MODE of operation; planned maintenance should be performed on redundant hydrogen ignitors (ie ignitors not required to be available). Planned maintenance affecting the redundant hydrogen ignitors should be performed in MODES 3 and 4, MODE 5 with a visible pressurizer level or MODE 6 with the refueling cavity full; these MODES are selected because the reactor is tripped in these MODES and the risk of core damage / hydrogen generation is low.