McGuire Nuclear Station
Units 1 and 2

Proposed change to Technical Specification 4.5.1.2.c.1
Concerning the Setpoint for Upper Head Injection
Accumulator Automatic Isolation

SURVEILLANCE REQUIREMENTS (Continued)

b. At least once per 31 days and within 6 hours after each solution volume increase of greater than or equal to 1% of tank volume by verifying the boron concentration of the solution in the water-filled accumulator;

c. At least once per 18 months by:

1) Verifying that each accumulator isolation valve closes automatically when the water level is 76.25 $\pm$ 4.5 inches above the bottom inside edge of the water-filled accumulator with atmospheric pressure in the accumulator, and

2) Verifying that the total dissolved nitrogen and air in the water-filled accumulator is less than 80 scf per 1800 cubic feet of water (equivalent to 5×10^{-5} pounds nitrogen per pounds water).

d. At least once per 5 years by replacing the membrane installed between the water-filled and nitrogen bearing accumulators and verifying that the removed membrane burst at a differential pressure of 40 $\pm$ 10 psi.

Discussion and Justification

The setpoint and setpoint tolerance for Upper Head Injection (UHI) accumulator automatic isolation is chosen to insure that the water delivered to the reactor during a large break LOCA is within the analysis assumptions. The large break ECCS performance analysis performed for the McGuire FSAR has been extended in order to justify greater uncertainty in the UHI water volume delivered. A review of the complete spectrum of breaks previously analyzed assuming that imperfect mixing of UHI water occurs in the reactor vessel upper head revealed that the C_D = 0.4 DECLG case is by far the limiting case; its calculated peak clad temperature (PCT) is 170°F greater than any other result with imperfect mixing obtained for McGuire. Therefore, if the C_D = 0.4 DECLG case can be shown to be acceptable at a particular lower bound value of UHI water delivery volume, all other imperfect mixing breaks will likewise be acceptable and need not be reanalyzed.

Results obtained for the C_D = 0.4 DECLG imperfect mixing case are summarized in Attachment 1. The previously identified limiting case (C_D = 0.6 DECLG, perfect mixing) from the McGuire FSAR, which produced a calculated PCT of 2188°F, remains more limiting than any imperfect mixing case. The allowable range for the delivery of UHI water stretches from 790 cubic feet (this analysis) to 1011 cubic feet (the perfect mixing case) when all uncertainties are properly considered.

After establishing the allowable range for the delivery of UHI water, uncertainties must be verified not to exceed this allowable range. McGuire FSAR Table 15.4.1-7 (See Attachment 2) shows the UHI water volume total uncertainty and the sources of error. It has been determined that the uncertainties can be revised by redistributing the error allowances related to the level switch which automatically actuates the UHI accumulator isolation valves during a blowdown condition. Attachment 3 lists the revised error sources that were used to determine the total uncertainty in the water volume to be delivered.

The error sources in Attachment 2 which are associated with the level switch are:

- Tank Level Instrumentation Accuracy
- Instrument Setting Tolerance, and
- Tank Level Reading Accuracy.

This level instrument is only used for switch actuation; therefore these error sources can be revised to the following error sources (see Attachment 3):

- Instrument Setting Tolerance, and
- Level Switch Repeatability

The instrument Setting Tolerance is based upon the accuracy of the test equipment used to perform the calibration of the level switch.

After establishing the level switch error sources, the Level Switch Repeatability error was maximized without exceeding the total error allowable (1011 - 790 = 221 ft^3). The setpoint tolerance of $\pm$ 4.5 inches is equivalent to the level switch repeatability error shown in Attachment 3. The setpoint of 76.25 inches corresponds to a nominal

delivered water volume of 898.5 ft^3. Note that the level switch calibration is performed with atmospheric pressure in the accumulator. Therefore, the nominal level during accumulator blowdown is 73.7 inches due to the additional weight of nitrogen which is more dense due to pressurization.

LARGE BREAK - IMPERFECT MIXING CD = 0.4 DECL

Attachment 1

Results

Peak Clad Temperature (^{o}F)	2119.
Peak Clad Location (Ft.)	7.25
Local Zr/H_2O Reaction (max)%	5.36
Local Zr/H_2O Location (Ft.)	7.5
Total Zr/H_2O Reaction (%)	<0.3
Hot Rod Burst Time (sec)	87.4
Hot Rod Burst Location (Ft.)	5.75

Calculation Assumptions

Core Power (Rod Heatup Calculation), MWT, 102% of	3411
Peak Linear Power kw/ft 102% of	12.63
Peaking Factor (At License Rating)	2.32
Accumulator Water Volume (Cold Leg, Nominal Setpoint Value)	1120 ft^3 per accumulator
Accumulator Water Volume Delivered (UHI, Delivered Value)	790 ft^3

Attachment 2

TABLE 15.4.1-7

UHI WATER VOLUME UNCERTAINTY

	SOURCE	ASSOCIATED VOLUME-FT^3
	SINGLE FAILURE	
	TRAIN FAILURE	+ 42
36	ONE VALVE CLOSES PREMATURELY	- 39
	TANK LEVEL INSTRUMENTATION ACCURACY	± 24
44	REFERENCE LEG HEIGHT	± 4.5
	INSTRUMENT SETTING TOLERANCE	± 5
	TANK VOLUME TOLERANCE	± 19
36	HYDRAULIC ISOLATION VALVE STROKING TIME	± 10
	TANK LEVEL READING ACCURACY	+ 13, - 6
44	TOTAL ERROR	225
	TOTAL ERROR AT .95 PROBABILITY	149

Attachment 3

UHI WATER VOLUME UNCERTAINTY

SOURCE	ASSOCIATED VOLUME-FT^3
SINGLE FAILURE	
TRAIN FAILURE	+42
ONE VALVE CLOSES PREMATURELY	-39
REFERENCE LEG HEIGHT	$\pm$ 4.5
TANK VOLUME TOLERANCE	$\pm$ 19
HYDRAULIC ISOLATION VALVE STROKING TIME	$\pm$ 10
INSTRUMENT SETTING TOLERANCE	$\pm$ 1.9
LEVEL SWITCH REPEATABILITY	$\pm$ 66.4
TOTAL ERROR	284
TOTAL ERROR AT .95 PROBABILITY	221.