UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

DAVIS BESSE
SEPT 24, 1977

April 5, 1978

Docket No. 50-346

MEMORANDUM FOR: R. C. Knop, Chief, Reactor Projects Section 1

FROM: T. N. Tambling, Reactor Inspector

SUBJECT: RECORDING INSTRUMENTATION TO RECORD PLANNED/UNPLANNED REACTOR TRANSIENTS, DAVIS-BESSE 1

During a recent inspection (Inspection Report 50-346/78-04), it was brought to the licensee's attention that their ability to continuously record systems temperature and pressure parameters during either planned or unplanned transients appeared to be inadequate. Reference to I&E Bulletin 75-08, was made as a basis for this observation (copy had been sent to the licensee during construction phase for information only and no response was required). The inspector requested a licensee's position.

During an exit interview (Inspection Report 50-346/78-07), a representative of the licensee stated the following position:

1. They felt that no further action was required on their part.

2. During normal plant heatups and cooldowns, system parameters are logged from temperature and/or pressure indicating instrumentation to show that Technical Specification requirements are met.

3. An operator has trend recorders that can be used to follow selected parameters.

4. The station alarm and trend computer can be used to alarm and printout when selected plant parameters exceed pre-established limits.

5. This subject had been addressed in 1976 and 1977 with NRR during the pre-license review of the generic issue on over-pressurization protection, reference was made to a letter to J. Stolz from L. E. Roe dated April 7, 1977, serial no. 260.

I have reviewed this letter and it does reference Table 7-8 in the FSAR.1/ This table lists recording and indicating instrumentation available for readout of system parameters, (copy of table attached).

1/ Paragraph 11, page 13, Interim Solutions for Enclosure 1.

8001170912

Q

It was pointed out to the licensee that availability of continuously recording instrumentation was also to their advantage so that there would be data to show that unplanned transients fit pre-analyzed transient and/or component cycle limitations. Specific examples cited were the September 24, 1977 sudden depressurization of the reactor system and November 29, 1977 loss of reactor coolant flow. As it happens during these events a reactimeter/data acquisition system was being used at the time and provided very useful data. The reactimeter will be returned to B & W at the end of power ascension testing. The licensee did state that they were looking into the feasibility of a data acquisition system but that there were no definite plans.

The specific areas that the licensee's recording instrumentation appears to be inadequate are:

1. Reactor coolant loop temperatures are recorded only in the 520-620°F range.
2. Recorded temperatures are averages of loops.
3. Pressure wide range recorder is the average of the loops with a maximum pressure of 2500 psig.
4. Steam generator pressures are not recorded.
5. Reactor coolant flow is total, not individual loops.
6. Chart scales and recorder chart speeds are good for only slow transients, or maximum-minimum points. (not good for time responses).
   Note: The consequences of many accidents are time dependent.

Since it appears that critical instrumentation at Davis-Besse 1 does not meet the intent of Bulletin 75-08 and Reg Guide 1.97[2/], to aid in determining the cause and consequence of events for post accident investigation, it is recommended that the above information be transmitted to I&E Headquarters for resolution.

2/ Reg Guide 1.97 also suggests extended ranges for certain monitored parameters. It cannot be ascertained as to whether these should be recording ranges or over range protection.

T. N. Tambling

T. N. Tambling
Reactor Inspector

TABLE 7-8

INFORMATION READOUTS AVAILABLE TO THE OPERATOR FOR MONITORING CONDITIONS IN REACTOR, REACTOR COOLANT SYSTEM, CONTAINMENT VESSEL, ECCS SYSTEMS, AND STEAM GENERATOR

Measured Parameter		Type of Readout		Number of Sensor Channels	Indicator Range	Indicator Accuracy, % of Full Scale	Indicator Location
urce range neutron level	(NI)	B,F,E		2	10^{-1} to 10^{+6} cps	±3	A,B,D
urce range startup rate	(NI)	A,F		2	-1 to 10 dpm	±3	A,B,D
termediate range neutron level	(NI)	B,F		2	10^{-11} to 10^{-3} amp	±3	A,B,D
termediate range neutron level	(NI)	E		1	10^{-11} to 10^{-3}	±0.5	B
termediate range startup rate	(NI)	A,F		2	-1 to 10 dpm	±3	A,B,D
wer range neutron level	(NI)	A,F		4	0 to 125% FP	±2	A,B,D
wer range neutron level	(NI)	E		1	0 to 125% FP	±0.5	B
wer range neutron level imbalance	(NI)	A,F		4	60 to +65% FP	±2	A,B,D
loop outlet temperature	**	A,F,	ANN.	4 in each loop	520-620F	±2	A,B,C,D
unit outlet temperature (recorder)		E,F,	ANN.	*	520-620F	±2	B,D
loop inlet temperature		A,F,		4 in each loop	520-620F	±2	B,D
unit inlet temperature		A,F,	ANN.	*	50-650F. 520-620F	±2	B,D
loop average temperature		A,F,	ANN.	*	520-620F	±2	B,D
unit average temperature (recorder)		D,E,F,	ANN.	*	520-620F	±2	B,D
loop temperature difference		A,F,	ANN.	*	0 to 70	±2	B,D
unit temperature difference		A,F,	ANN.	*	-10 to +10F 0 to 70F	±2	B,D
loop pressure ** (recorder)		A,E,F,	ANN.	*	0 to 2500 psig 1700 to 2500 psig	±2	A,B,C,D
loop low range pressure		A		1 in loop two	0 to 500 psig	±2	B
ressurizer level **		A,F,	ANN.	2	0 to 320 in.	±2	B,C,D
ressurizer level (recorder)		A,E,F	ANN	1	0 to 320 in.	±2	B,C,D
ressurizer temperature		A,F		2	0 to 700F	±2	B,D
loop flow		A,F,	ANN.	4 in each loop	0 - 90 x 10^6 lb/h	±3	A,B,D
total flow (recorder)		E,F,	ANN.	*	0 - 180 x 10^6 lb/h	±3	A,B,D

TABLE 7-8 (Cont'd)

Measured Parameter	Type of Readout	Number of Sensor Channels	Indicator Range	Indicator Accuracy, % of Full Scale	Indicator Location
BWST level	A,F, ANN.	4	0-50 ft	±1.5	B,D |13
Steam generator startup range level **	A,F, ANN.	2 in each loop	0-250 in.	±2	B,C,D
Steam generator operating range level (recorder)	E ANN.	1 in each loop	0-250 in.	±0.5	B,D |25
Steam generator operating range level	F	2 in each loop	0-250 in.	--	D
Steam generator full range level	A, F, ANN.	1 in each loop	0-600 in.	±2	B,D
Station electrical distribution	A,C,F	2	--	±2	B,D
Auxiliary feedwater status **	C,F, ANN.	1 per loop	--	--	B,C,D |10
Containment vessel pressure	A,F, ANN.	4	0-60 psia	±1	B,A,D
Containment vessel hydrogen **	A,F,E, ANN. (recorder)	2	0 - 5%	±2	B,D,A |10|13 |27
Containment vessel radiation	B,F, ANN.	4	††	±1	B,A,D
†Containment vessel post-accident radiation **	B,F,E, ANN (recorder)	2	$10 - 10^6$ cpm	±2	B,D,A |10|13 |20|26
Containment vessel isolation status **	C,F	1 per valve	--	--	B,D
Containment vessel temperature	A,F, ANN.	14	--	±2	B,D
SFAS status **	C,F, ANN.	4	--	--	B,D
Safety features equipment status **	C,F	2	--	--	B,D
RPS status **	C,F, ANN.	2	--	--	B,D
SFRCS status **	C,F	2	--	--	B
HPI system bypass status	C	Manual	--	--	B
LPI system bypass status	C	Manual	--	--	B |20
Containment spray system bypass status	C	Manual	--	--	B
Core flood system bypass status	C	Manual	--	--	B
BWST system bypass status	C	Manual	--	--	B

TABLE 7-8 (Cont'd)

Measured Parameter	Type of Readout		Number of Sensor Channels	Indicator Range	Indicator Accuracy, % of Full Scale	Indicator Location
Containment air recirculation system bypass status	C		Manual	--	--	B
Containment air cooling system bypass status	C		Manual	--	--	B
Emergency ventilation system bypass status	C		Manual	--	--	B
Steam generator outlet pressure **	A,F		1 in each loop	0-1200 psig	±2	B,C,D
Steam generator outlet pressure	F		1 in each loop	0-1200 psig	--	D
High pressure injection flow**	A,F,	ANN.	2 in each loop	0-500 gpm	±2	B,D
Low pressure injection (DHR) flow**	A,F,	ANN.	1 in each loop	0-5000 gpm	±2	B,D
Containment spray flow	A,F,	ANN.	1 in each loop	0-1500 gpm	±2	B,D
Core flood tank pressure	A,F,	ANN.	2 in each tank	0-700 psig	±2	B,D
Core flood tank level	A,	ANN.	2 in each tank	0-14 ft H_2O	±2	B
Decay heat pump suction temp.	A,	ANN.	1 in each loop	0-400F	±2	B
Decay heat cooler outlet temp.	A,	ANN.	1 in each loop	0-400F	±2	B
HPI system pump and valve status**	C,F		1 in each loop	--	--	B,D
LPI system pump and valve status**	C,F		1 in each loop	--	--	B,D
Containment spray pump and valve status**	C,F		1 in each loop	(valves, 2 in each loop)	--	B,D
Core flood valve status**	C,F,	ANN.	1 in each loop	--	--	B,D
BWST valve status**	C,F		1 in each loop	--	--	B,D
Containment emergency sump valve status**	C,F	ANN.	1 in each valve	--	--	B,D
Containment air recirculation fan status**	C,F		1 in each loop	--	--	B,D

TABLE 7-6 (Cont'd)

Measured Parameter	Type of Readout	Number of Sensor Channels	Indicator Range	Indicator Accuracy, % of Full Scale	Indicator Location
Containment air cooling fan status**	C,F	1 in each loop	--	--	B,D
Emergency ventilation system fan and damper status**	C,F	1 in each loop	--	--	B,D

Legends: Type of Readout

A - Linear scale indicator
B - Log scale indicator
C - Indicator light
D - Digital indicator
E - Recorder
F - Station computer output (this output non-Class IE)

ANN. - Audiovisual alarm indication (non-Class IE)

Indicator Location

A - System cabinets
B - Main control boards
C - Auxiliary panel
D - Station computer printout

Notes:
* Two or more signals are combined to produce the indicated parameter
** Indications are required surveillance equipment on safety systems for safe shutdown and post-accident monitoring and utilize the design criteria listed in section 7.5.2.1 (Readout types A, B, and C only).
† Post-accident monitoring by redundant essential sensors with one (1) channel recorded.
†† To be determined after full-power operation.