REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8004080337 DOC.DATE: 80/04/03 NOTARIZED: NO DOCKET #
FACIL:50-305 Kewaunee Nuclear Power Plant, Wisconsin Public Servic 05000305
AUTH.NAME AUTHOR AFFILIATION
MATHEWS,E.R. Wisconsin Public Service Corp.
RECIP.NAME RECIPIENT AFFILIATION
DENTON,H.R. Office of Nuclear Reactor Regulation

SUBJECT: Forwards addl info requested at 800305 meeting w/NRC re implementation of short-term Lessons Learned Task Force requirements.Info involves Tech Specs 2.1.3,2.1.6 & 2.1.8.

DISTRIBUTION CODE: A039S COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 15
TITLE: Resp to Lesson Learn Task Force - Westinghouse

NOTES: I & E - 3 CYS OF ALL MATL

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
ACTION:	10 BC ORB#1	7	7			
INTERNAL:	01 REG FILE	1	1	02 NRC PDR	1	1
	05 OLSHINSKI,J.	1	1	06 KERRIGAN,J.	1	1
	07 BURDION,J.	1	1	08 WILLIS,C.	1	1
	17 I & E	2	2	20 CORE PERF BR	1	1
	21 ENG BR	1	1	22 REAC SFTY BR	1	1
	23 PLANT SYS BR	1	1	24 EEB	1	1
	25 EFLT TRT SYS	1	1	ANDERSON,N.	1	1
	FIELDS,M.	1	1	O'REILLY,P.	1	1
	OELD	1	0	TELFORD,J.T.	2	2
EXTERNAL:	03 LPDR	1	1	04 NSIC	1	1
	26 ACRS	16	16			

APR 9 1980

App 2

TOTAL NUMBER OF COPIES REQUIRED: LTTR ~~45~~ 48 ENCL ~~44~~ 47

60

WISCONSIN PUBLIC SERVICE CORPORATION Public Service

P.O. Box 1200, Green Bay, Wisconsin 54305

April 3, 1980

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Plant
Additional Information on Implementation
of NUREG 0578

Representatives of your staff, headed by Mr. Newton Anderson, met with Wisconsin Public Service Corporation personnel on March 5, 1980, to review our implementation of NUREG 0578. During that meeting there were several items which your staff felt needed further clarification and documentation. They requested that this information be submitted about the first of this month. This letter contains that requested information.

Very truly yours,

E.R. Mathews

E. R. Mathews, Vice President
Power Supply & Engineering

snf

Attach.

A039
S
1/1

8004080 337

2.1.3.a Pressurizer Safety Valve Position Indication and Pressurizer Power Operated Relief Valve Position Indication

Figure 8.2-3 of the FSAR indicates the electrical sources for instrumentation power within the Kewaunee Plant. That figure clearly indicates that all instrumentation power is supplied by vital bus sources. The Pressurizer Safety Valve Indication System is supplied DC power by Cabinet BRB-103.

The Pressurizer Power Operated Relief Valve Position Indication is supplied DC electrical power by cabinet BRA-103 for the "B" valve and by cabinet BRB-103 for the "A" valve. The PORV position indication switch is qualified for the normal operating environment at the valve location. The environmental qualification of the Pressurizer Safety Valve Indication System are unresolved since the test program is in progress by Babcock & Wilcox the supplier of the system.

The existing operating procedures for the Kewaunee Plant as well as the operator training program address the diagnosis of an open valve at the top of the pressurizer. The operators have been informed as to the safety significance of such an occurrence as well as the ability of the high head safety injection system to assure core integrity during such events.

2.1.3.b Subcooling Meter

The Kewaunee Plant has installed two subcooling indication systems which calculate the amount of subcooling present within the Reactor Coolant System utilizing thermocouples located within the reactor vessel above the active fuel and wide range reactor coolant system pressure indication transmitters located on the main loop piping. One subcooling indication system is a microprocessor device which indicates degrees subcooling in the reactor coolant system on a digital display located on mechanical vertical panel "A" in the control room (Figure 7.7-1 of FSAR). The attached table provides documentation of the subcooling monitor. In addition the plant computer has been programmed to display subcooling margin on an analog recorder on mechanical console "C" (Figure 7.7-1 of the FSAR). In addition a saturation table is provided in the emergency procedures with instructions on its use, and steam tables are available in the control room for operator use.

A comment is warrented in regards to selection of the input signals to the microprocessor subcooling monitor. Top core thermocouples are employed to monitor $F_{\Delta H}$. That measurement is related to the temperature variation across the core. To accurately measure that variation the thermocouples employ a controlled reference junction, which when combined with cross calibration corrections of thermocouple variations provide accurate relative ΔT measurements. The addition of a subcooling monitor to a thermocouple results in the addition of a seperate reference junction, thereby, an inaccuracy for the affected thermocouple. Four representative thermocouples, one from each quadrant, have been selected for input to the subcooling monitor. The microprocessor unit was acquired with provisions for four thermocouple inputs. The existing subcooling monitor can only accept those four thermocouple inputs. Since the Kewaunee Reactor core is a loose lattice (non-canned) quarter core symetric design, four thermocouples provide independent indication of top core temperature conditions which are representative of the general margin to saturation within the system. The selection of the number of thermocouple inputs considered the effect upon the designed purpose of the thermocouples, which is accurate measurement of regional core ΔT to determine $F_{\Delta H}$, plus the desire to provide indication of subcooling margin to the operators. The NRC staff clarification of Lesson's Learned provided by Mr. Denton's letter of October 30, 1979 constituted the only guidance in regards to saturation meter inputs prior to our commitment to purchase the equipment. That guidance only addresses the desire to have multiple thermocouples without specifying a number. The current staff position of demanding eight thermocouples is arbitrary and without sound technical basis. The NRC staff has not provided a design performance criteria but attempted to specify a design without identifying the justification for the design.

INFORMATION REQUIRED ON THE SUBCOOLING METER

Subcooling Meter

Display

Information Displayed (T-Tsat, Tsat, Press, etc.)	Subcooled Margin Temperature or Pressure
Display Type (Analog, Digital, CRT)	Digital
Continuous or on Demand	Continuous
Single or Redundant Display	Single
Location of Display	Control Room - Mechanical Vertical Panel "A"
Alarms (include setpoints)	15^oF, 10^oF Subcooled Margin
Overall uncertainty (°F, PSI)	<20^oF - See Note
Range of Display	4 digits, floating decimal
Qualifications (seismic, environmental, IEEE323)	IEEE 323-1974 IEEE 344-1975 Seismic Class 1

Calculator

Type (process computer, dedicated digital or analog calc.)	Microprocessor
If process computer is used specify availability. (% of time)	not applicable
Single or redundant calculators	single
Selection Logic (highest T., lowest press)	High Temperature Low Pressure
Qualifications (seismic, environmental, IEEE323)	IEEE 323-1974 IEEE 344-1975 Seismic Class 1
Calculational Technique (Steam Tables, Functional Fit, ranges)	Steam Tables

Input

Temperature (RTD's or T/C's)	Top Core Thermocouples
Temperature (number of sensors and locations)	4 Total 1 per core quadrant
Range of temperature sensors	100F - 700F

Note: Uncertainty of display can only be estimated due to nonlinear dependence of subcooling margin on pressure and temperature.

Uncertainty* of temperature sensors (°F at 1)	$\pm$ 3°F
Qualifications (seismic, environmental, IEEE323)	
Pressure (specify instrument used)	Reactor Coolant Pressure
Pressure (number of sensors and locations)	2 sensors
Range of Pressure sensors	0 - 3000 psi
Uncertainty* of pressure sensors (PSI at 1)	$\pm$ 13 psi
Qualifications (seismic, environmental, IEEE323)	

<u>Backup Capability</u>

Availability of Temp & Press	Yes
Availability of Steam Tables etc.	Yes
Training of operators	Yes
Procedures	Yes

*Uncertainties must address conditions of forced flow and natural circulation

INFORMATION REQUIRED ON THE SUBCOOLING METER

Prodac Computer

Display

Information Displayed (T-Tsat, Tsat, Press, etc.)	Subcooled Margin Temperature or Pressure
Display Type (Analog, Digital, CRT)	Analog (digital optional)
Continuous or on Demand	Continuous
Single or Redundant Display	Single (Redundant optional)
Location of Display	Analog-control console C (digital - operators console
Alarms (include setpoints)	Subcooled margin 40^{o}F or 575 psi
Overall uncertainty (°F, PSI)	<20^{o}F - See Note
Range of Display	Analog - 0-100^{o}F subcooling digital - 5 digits, to nearest tenth
Qualifications (seismic, environmental, IEEE323)	

Calculator

Type (process computer, dedicated digital or analog calc.)	Process Computer
If process computer is used specify availability. (% of time)	greater than 95%
Single or redundant calculators	single
Selection Logic (highest T., lowest press)	optional: maximum or average temp., pressure
Qualifications (seismic, environmental, IEEE323)	
Calculational Technique (Steam Tables, Functional Fit, ranges)	Functional fit

Input

Temperature (RTD's or T/C's)	Normally use thermocouples Hot Leg RTD's optional
Temperature (number of sensors and locations)	39 Top Core T/C's 8 hot leg RTD's
Range of temperature sensors	T/C: 0-1700 RTD's: 50-650^{o}F

Note: Uncertainty of display can only be estimated due to nonlinear dependence of subcooling margin on pressure and temperature.

Uncertainty* of temperature sensors (°F at 1)	T/C: $\pm$ 3°F RTD: $\pm$ 2°F
Qualifications (seismic, environmental, IEEE323)	RTD: IEEE 279-1968
Pressure (specify instrument used)	Pressurizer pressure or Loop pressure
Pressure (number of sensors and locations)	3 in pressurizer 2 in hot leg
Range of Pressure sensors	1700-2500 for pzr 0-3000 for hot leg
Uncertainty* of pressure sensors (PSI at 1)	$\pm$ 13 psi
Qualifications (seismic, environmental, IEEE323)	Pzr Press IEEE 279-1968

Backup Capability

Availability of Temp & Press	Yes
Availability of Steam Tables etc.	Yes
Training of operators	Yes
Procedures	Yes

*Uncertainties must address conditions of forced flow and natural circulation

2.1.6.a Integrity of Systems Outside Containment Likely to Contain Radioactive Materials

The December 31, 1979 response letter in regards to Lessons Learned, identified the systems which were subject to leak testing. Those systems include all systems which provide safety functions post accident or which could prove useful in post accident operations. All systems which could potentially provide core cooling have been included in the testing program if they could become contaminated. Other systems within the NSSS are designed for 1% failed fuel and should not be employed when greater fuel damage exists.

The following systems were excluded from leak testing:

1. Liquid Waste disposal system
2. Component Cooling System
3. Boron Recycle System
4. Main Steam System

The volume control tank relieves to the waste gas vent header which is on the suction of the waste gas compressor. The gas is compressed and directed to the Gas Decay Tanks. This entire system was leak tested.

2.1.6.b Design Review of Plant Shielding

The Kewaunee Plant FSAR addresses the application of General Design Criteria 19 in section 7.2.1.

The shielding evaluation considered radioactive materials with TID source terms in the system designed to function post accident or systems which could potentially aid in heat removal. The shielding review did not include an assumption that major errors would be made by operational personnel in transferring highly radioactive water through filters, demineralizers or to storage tanks within the auxiliary building. The systems assumed to contain radioactive material post accident were consistant with the responses to item 2.1.6.a.

The evaluations indicate that the control room, the temporary and final technical support center, emergency power sources and sample locations are accessible post accident.

The emergency core cooling systems including the Containment Spray System were assumed to contain TID source term fluids during the original plant design effort. The necessary equipment, required to function to support emergency core cooling operations was purchased to specifications indicating radiation resistance adequate to assure operability post accident. All significant sources of radiation were considered in the determination of radiation dose to equipment.

The sampling system of the Kewaunee Plant was designed for normal plant operation. There was no intent during the design stages of plant development to sample recirculating fluids post accident since there are no unique corrective measures following an accident which should not be inacted regardless of plant sample results. That aspect of consideration has not changed. Nevertheless, post accident sample analysis is now deemed necessary to respond to questions of interested parties such as the news media. On March 14, 1980 clarification was provided as to the Kewaunee Plant post accident sampling arrangements. The equipment necessary to draw a sample is comprised of solid piping or tubing which is qualified for TID source terms. Sample analysis equipment is subjected to high Gamma exposure only during analysis and, therefore, will not experience exposures of the range where radiation damage would be anticipated.

2.1.8.a <u>Post Accident Sampling</u>

A method and procedure exist to draw and analyze a containment atmosphere sample post accident. Hydrogen content and Gamma level will be determinable by these methods and procedures for the containment atmosphere sample.

The sample acquisition time is limited by the activities of arranging the valve alignments per the appropriate procedures. This valve alignment activity will require a number of minutes to accomplish. When combined with analysis the time interval between activity initiation to acquire a sample and analysis is complete should be between one and two hours.

The Kewaunee Plant design includes provision for pH adjustment during an accident by NaOH addition to containment spray or by means of the safety related boron solution handling system. The purpose of NaOH addition is two-fold. First it is an effective agent to assist in rodine removal from the atmosphere and retention of rodine in the sump water as a solute. Secondly the NaOH raises the pH of the solution within containment and the reactor coolant system such that chloride stress corrosion cracking is mitigated. A high chloride concentration will be present post accident due to the washing action on the containment building of break flow or containment spray. pH control is intended to prevent problems due to high chloride concentration. Use of demineralizers to attempt to reduce chloride levels post accident will present a safety hazard in most plants since the demineralizers will collect the fission products or particulates in the water which is being purified to concentration levels above the design criteria for the demineralizers or their associated shielding.

Measurement of hydrogen and oxygen concentrations within the reactor coolant system water following an accident in which significant fuel damage has occurred, results in TID source term levels of radioactive material within the fluid beyond the capability of present systems installed in the Kewaunee Plant. Whereas a small sample can be withdrawn following a severe accident and analyzed for ph, boron concentration, gross gamma level, and isotopic identification by means of minute, depressurized samples without anticipating extreme personnel exposure, the ability to withdraw a sufficient pressurized sample for the purpose of gas content analysis does not exist. We are not aware of micro-sampling methods which could be implemented to measure dissolved hydrogen and oxygen concentration levels post accident to avoid extreme personnel exposure.

2.1.8.b Increased Range of Radiation Monitors

The Kewaunee Plant FSAR includes a description of radiation monitoring equipment installed to monitor releases of radioactive materials during normal operation. Also included in the FSAR are system flow diagrams for all systems which present potential pathways of radioactive material releases during normal operation and post accident. Those diagrams indicate the post accident particulate, rodine or radio-gas effluents could only exit the plant structures or systems from the containment/shield building ventilation stack, the Auxiliary Building stack, and the main steam lines to the secondary system steam releif valves. Each of these cources have installed gamma radiation sensitive detectors with a range from 1 mr/hr to 10^4 R/hr.

The electrical power source for these instruments are instrument bases which are supplied by means of the vital AC power sources within the plant. As indicated in our December 31, 1979 submittal, recorders for each of these newly installed high range effluent monitors are located within the control room. The high range effluent monitors as well as the associated recorders are installed and functional. Calculations relating radiation level at the detector to concentration of radioactive material within the flow path have been performed. Procedures and methods to quantify the actual rebase rate of a potential effluent flow path are in place and responsible individuals have been trained as to the application of those methods of determination of release rate.

The high range effluent monitors have an energy threshold of approximately 50 Kev and sufficient range to monitor releases from TID source term levels of radioactive material.

The high range radiation monitors provide a measure of the concentration of radioactive material within an effluent pathway. System design characteristics such as flow rate, or system parameters such as level changes, when combined with the concentration measurements provide an ability to determine radioactive effluent discharge. Procedures have been prepared to expedite such determinations and senior staff members including the shift supervisor have been provided with instructions as to the implementation of those procedures. All instrumentation readout and equipment necessary to perform the required calculations are present in the control room.