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Nebraska Public Power District

COOPER NUCLEAR
P.O. BOX 98, BROWNVILLE,
TELEPHONE (402)

LQA8000442

November 24, 1980

Mr. Karl V. Seyfrit, Director
U.S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region IV
611 Ryan Plaza Drive
Suite 1000
Arlington, Texas 76011

Subject:

Dear Mr. Seyfrit:

In our October 22, 1980 letter of response to the Confirmatory Order issued on October 2, 1980, we informed you that we had installed a level switch on each scram discharge volume. We also stated that we would consider the installation and use of UT equipment that we had discussed in our September 11, 1980 letter to you.

We have now received all of the UT equipment and conducted extensive tests on this equipment on a mock-up. Our testing program indicated that the equipment can provide accurate and reliable water level indication from 1" to 7-3/4" at the sensor location. The equipment consists of two redundant sensors on the lower end of each scram discharge volume with associated electronics etc., to provide an alarm in the control room at the desired setpoint. We also have a recorder in the control room that can be activated upon receiving an alarm such that the control room operator can follow water level in the volume. This recorder will provide the operator with timely information such that he can initiate a manual scram prior to losing adequate volume for the full insertion of all rods. This equipment has now been installed and tested. Procedures and actions for its use will be in place prior to December 1, 1980. We believe this equipment fully meets the requirements of the Confirmatory Order.

We are attaching our system description of the two installed systems. Please contact L. C. Lessor at the site if you have further questions about the UT installation or this response.

Sincerely,

J. M. Pilant
Director of Licensing
and Quality Assurance

JMP:LCL:cg
Attachment

SCRAM DISCHARGE HEADER LEVEL MONITORING SYSTEM DESCRIPTION

There are two different means to monitor the Scram Discharge Header water level. The first means is by float type level switches, designated LS-232 A(B). The annunciators for these level switches are located on the 9-5 panel. Due to the respective dead band of the two instruments and the need to have the reset for the alarm at least a half inch above the empty pipe level, the alarm points are 2" on the north header and 1-7/8" on the south header.

The second monitoring device is a Multi-point Sub-Sonic Liquid depth monitor (UT). The system consists of (4) four ultrasonic transducers mounted on the 8" horizontal crosstie between the two legs of the horseshoe shaped scram discharge header, two per header. Information is gathered and compared at two local station modules, one at each header. The module contains (2) two Sub-Sonic depth measuring circuits with analog outputs, (2) two Switch-settable Digital depth comparator circuits and (2) two Analog Panel meters. There is a local alarm at each station. The alarm point is at 1-1/2" of water. Due to the spurious signals generated at water depths of 1" and less, a time delay of 16 seconds is set to preclude annoyance alarms. The alarm must be reset locally. In addition to the local indication, the module has a 4-20 ma output to run a recorder that is located in the Control Room. The multi-point recorder has four channels that will indicate water depth from 0 to 7-3/4". The scale of the recorder is 0-100 and the full range will be utilized. One inch will correspond to 10 and so on. The recorder will be run in automatic and needs no operator input. The alarms will be set at 1.5" or 15 on the recorder scale. Due to the spurious signals below 1" of water level, the recorder may print off and on. Unless the alarm is in for longer than 10 seconds there will not be an annunciator. The recorder automatically shuts off when all points are below the alarm point.

General Electric recommends approximately 3.3 gallons per CRD for sizing the Scram Discharge Header. This corresponds to approximately 2" of water in the Scram Discharge Header. Tests performed by General Electric, as referenced in the "Report on the Browns Ferry 3 Partial Failure to Scram Event on June 28, 1980" by the Office for Analysis and Evaluation of Operational Data, indicates expected responses to scrams with varying degrees of water in the Scram Discharge Header. With a 40% reduction in free volume in the header over varying degrees of seal leakage a full scram is still possible. The free volume needed that would correspond to a 40% reduction in design requirements is 137 gallons per header. This corresponds to a level of somewhere between 5 and 6 inches. The following table indicates free volume versus level.

SCRAM DISCHARGE HEADER LEVEL MONITORING
SYSTEM DESCRIPTION (continued)

Level in Inches	Free Volume per Header
2"	228.6 gallons
4"	188 gallons
5"	156 gallons
6"	120.5 gallons
7"	85.2 gallons

The above referenced report indicates at low CRD leakage levels a 70% reduction in required free volume will still allow full insertion of control rods. This corresponds to free volume of 76 gallons or 7 inches.

Operator actions for System 1, the float type level switches, consists of (1) verifying the SDV vent and drain valves are open, and (2) manually starting the sub-sonic level recorder.

Operator actions for System 2 (UT) consists of (1) verifying the SDV vent and drain valves are open, (2) checking alarms from System 1, (3) reducing power at 4" in either SD header, (4) scramming reactor at 5" in either SD Header, and (5) confirm alarm by performing SDV air test.