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 FACIL: 50-331 Duane Arnold Energy Center, Iowa Electric Light & Pow 05000331  
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 MCGAUGHY, R.W. Iowa Electric Light & Power Co.  
 RECIP. NAME RECIPIENT AFFILIATION  
 DENTON, H. Office of Nuclear Reactor Regulation, Director

SUBJECT: Requests delay of submittal of rept describing plans & schedules for modifying water level instrumentation in response to Generic Ltr 84-23, "Reactor Vessel Water Level Instrumentation in BWRs."

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 TITLE: OR Submittal: Inadequate Core Cooling (Item II.F.2) GL 82-28

NOTES: 05000331  
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Iowa Electric Light and Power Company

May 3, 1985  
NG-85-2079

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

Subject: Duane Arnold Energy Center  
Docket No: 50-331  
Op. License No: DPR-49  
Generic Letter 84-23: Reactor Vessel Water  
Level Instrumentation in BWRs  
Reference: 1) Letter, R. McGaughy to H. Denton, same  
subject, NG-84-5403, December 5, 1984  
2) Report, S. Levy, Inc., SLI-8211, "Review  
of BWR Reactor Vessel Water Level  
Measurement System," July, 1982  
File: A-107d

Dear Mr. Denton:

In our original response to Generic Letter 84-23 (Reference 1), we stated that we intended to provide the NRC a report describing our plans and schedules for modifying our water level instrumentation coincident with our next semiannual update of our Integrated Plan, due May 3, 1985. Given the importance of the concerns raised in the Generic Letter, we feel that all practical engineering alternatives should be thoroughly investigated. Our investigations to date have led us to eliminate many of the solutions mentioned in the S. Levy report (Reference 2) as impractical or unattractive for the DAEC (see attached summary). In addition, we recently became aware of an alternative solution to those presented in the S. Levy report. A brief description of this alternative approach is provided as part of the attached summary.

Based upon these considerations, we request that we delay submittal of our final report until such time as we can complete our evaluation of these alternatives. Since reactor water level instrumentation is also subject to the Reg. Guide 1.97 requirements of Supplement 1 to NUREG-0737, our final design will address these requirements as well as those of Generic Letter 84-23. Therefore, we will provide you with our final plans and schedules as part of our submittal on Reg. Guide 1.97 Schedule of Implementation Dates, which is due 90 days after Cycle 8 startup. Given our current schedule for plant restart, we expect to make this submittal in September of this year. We will factor the results of our detailed engineering design studies into our Integrated Plan database to determine our schedule for implementation. However, due to the level of engineering and procurement which the remaining alternatives require, we feel that we will not be able to fully implement these modifications until our Cycle 9/10 Refueling Outage, currently scheduled for the fall of 1988.

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Mr. Harold Denton  
May 3, 1985  
NG-85-2079  
Page Two

Although full implementation may not take place until startup of Cycle 10, we may be able to partially implement these modifications during the Cycle 8/9 outage scheduled for spring of 1987. We will keep you informed of our progress through our semiannual updates to the Integrated Plan schedule.

Generic Letter 84-23 also requested licensees to review their operating experience with their mechanical level equipment to determine if such equipment should be replaced with an analog system. We have reviewed the operating history of the existing mechanical level transmitters, both narrow and wide-range systems, for the past five years. The results of this review show that no instrument failures have occurred and that very good performance regarding setpoint drift has been experienced. Therefore, we conclude that our present instrumentation has a high reliability and that its replacement with analog units is not warranted at this time. We will continue to monitor the performance of these instruments through our Preventative Maintenance Program to ensure that high reliability is maintained.

If you wish further information regarding this matter, please contact this office.

Very truly yours,



Richard W. McGaughy  
Manager, Nuclear Division

RWM/RAB/ta\*

- Attachments: 1) Summary of Preliminary Engineering Evaluations of Enhancements to Existing Reactor Water Level Instrumentation  
2) Description of Sealed  $\Delta P$  System and Description of Ambient Reference Column System

cc: R. Browning  
S. Tuthill  
L. Liu  
M. Thadani  
NRC Resident Office  
Commitment Control No. 840360

SUMMARY OF PRELIMINARY ENGINEERING EVALUATIONS  
OF ENHANCEMENTS TO EXISTING REACTOR WATER LEVEL INSTRUMENTATION

The S. Levy report (Ref. 2 to NG-85-2079) considered a number of alternatives to resolve the concerns with the existing water level indication systems. The following represents the results of our evaluations conducted to date of these alternatives.

These alternatives are not considered to be practical, effective, or cost beneficial solutions for the DAEC:

- a) Minimize the vertical drop of the cold reference leg within the drywell.
- b) Insulate the reference legs.
- c) Injecting cooling water into the reference leg.
- d) Addition of cooling jackets around the reference legs.
- e) Additional instrumentation for high instrument line temperatures.
- f) Use three leg instrumentation.
- g) Extend the variable leg drop.
- h) Replace mechanical level instrumentation with newer electronic instrumentation.

These alternatives are presently being evaluated for use at the DAEC:

- a) Use of a sealed  $\Delta P$  system. (A brief description of the system being considered is provided as Attachment 2.)
- b) Relocate instrument line orifices as close as possible to the drywell penetrations.
- c) Modify the level instrumentation logic. (Note: This modification is not required to satisfy GL 84-23; however, the alternative chosen will be compatible with this improvement, which may be required later.)
- d) Use of the Ambient Reference Column system. (This is a new alternative not considered in the S. Levy report. A brief description of this system is provided as Attachment 2.)

### DESCRIPTION OF SEALED $\Delta P$ SYSTEM

An alternate water level measurement system is the sealed differential pressure analog system. This method utilizes instrument taps on vessel nozzles at various points. These pressures are converted to analog signals which are processed by a digital computer utilizing a model of the reactor core. Because a core model is extremely complex, the accuracy is dependent on the care taken in constructing this core model. Iowa Electric will pursue this alternative by inquiring on the availability of accurate core models and examining the difficulties in design of the sealed differential pressure system.

### DESCRIPTION OF AMBIENT REFERENCE COLUMN SYSTEM

The Ambient Reference Column (ARC) System consists primarily of a reservoir containing ambient temperature water mounted outside the primary containment at the same elevation as the reactor pressure vessel reference level condensate pot. The reservoir is connected on the top to a steam line which is at the vessel dome pressure and on the bottom to the instrument line for the cold reference leg connection to the water level instrument rack. With this geometry the ARC functions as a basic U-tube with the water level measured passively by an armored gage glass and actively by the present instrumentation. The ARC reservoir is sized to provide an adequate source of refill water for the cold reference leg should flashing occur and is equipped with a low-level alarm to the operator. The ARC system meets all applicable codes and standards for instrumentation lines: ASME Section III upstream of the outboard isolation device and ANSI B31.1 downstream of the outboard isolation device.