CENTRAL FILES

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

Docket Nos. 50-03
50-247

NOV 26 1979

Consolidated Edison Company of
New York, Inc.
ATTN: Mr. W. J. Cahill, Jr.
Vice President
4 Irving Place
New York, New York 10003

Gentlemen:

The enclosed IE Circular No. 79-24 is forwarded to you for information. No written response is required. Should you have any questions related to your understanding of the recommendations on this matter, please contact this office.

Sincerely,

Robert W. Carlson
for Boyce H. Grier
Director

Enclosures:
1. IE Circular No. 79-24 w/Attachment
2. List of Recently Issued IE Circulars

CONTACT: W. H. Baunack
(215-337-5253)

cc w/encls:
L. O. Brooks, Project Manager, IP Nuclear
W. Monti, Manager - Nuclear Power Generation Department
M. Shatkouski, Plant Manager
J. M. Makepeace, Director, Technical Engineering
W. D. Hamlin, Assistant to Resident Manager (PASNY)
J. D. Block, Esquire, Executive Vice President - Administration
E. J. Sack, Esquire

ENCLOSURE 1

Accession No: 7910250492
SSINS No. 6830

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

IE Circular No. 79-24
Date: November 26, 1979

PROPER INSTALLATION AND CALIBRATION OF CORE SPRAY PIPE BREAK DETECTION EQUIPMENT ON BWRs

Description of Circumstances:

During 1976 the Iowa Electric Light and Power Company identified and corrected a potential problem involving the core spray (CS) pipe break detection system at the Duane Arnold Energy Center (DAEC). The problem relates to the setpoint, function, and installation of the differential pressure (dp) instrument which monitors for a CS pipe break that is located in the annulus area of the reactor vessel (i.e., located outside the core shroud but inside the reactor vessel). The installed instrument, range of 0 - 24 psid, was found deflecting downscale (i.e., reading negative psid) during operation.

The licensee's investigation of the downscale deflection revealed that the original piping arrangement and calibration did not adequately take into account the effect of density changes of the water in the pressure leg connections. The original installation had the high pressure side of the dp instrument (see attached Figure 1) connected to the reference leg in the vessel (Figure 1 Connection X) and the low pressure side to the core spray piping outside the vessel but inside the drywell (Figure 1 Connection Y). With the piping intact, this arrangement senses the pressure difference between bottom and top of core. With a break in CS piping in the annulus area the instrument then senses the additional pressure drop across the separators (dp $\approx$ 7 psi additional) and dryers (dp $\approx$ 7-inches water). This installation was in accordance with GE design requirements.

Also in accordance with GE instructions the calibration of the dp instrument was performed with the reactor in the cold condition and the alarm was set to trip at 5 psid increasing. Because of this cold calibration the dp instrument then indicated full downscale negative during operation. This negative dp was due to the heat up of the reference leg (Figure 1 Connection X) which caused the fluid density to decrease as the plant reached hot conditions. The magnitude of this dp was determined to be about 3.5 psid following completion of the modification discussed below.

Adding the 3.5 psi downscale deflection to the 5 psi alarm setpoint results in a total required deflection of 8.5 psi to initiate the alarm at the setpoint. Since the total dp available across the separators and dryer is only 7 psi

(1.5 psi less than the total required deflection), the alarm would not be actuated by a CS pipe break in the annulus. Therefore, the original installation, including calibration procedure, was deficient.

To correct the problem, Iowa Electric modified the installation by interchanging the pressure leg connections and resetting the alarm to trip at 2 psid decreasing. In this orientation it was found that going from cold to hot produced a 3.5 psid positive deflection. The technical specifications were changed to reflect the revised alarm setpoint.

Further review by the NRC has revealed that the above described lack of trip which precipitated the piping modification and technical specification change at DAEC, exists on other operating BWRs and that BWRs under construction have or will have piping arrangements on the core spray system (i.e., high pressure core spray system on BWR 5's and 6's) that will potentially generate the same problem.

The specific concern is that failure of the injection piping would not be detected on the plants in question, because the alarm is the only control room indication involved. The actual differential pressure can only be read at local gauges located on instrument racks in the reactor building.

General Electric has recently sent correspondence to utilities which recommends that:

"1. BWR operators, who have differential pressure (Δ P) instrumentation which reads only positive values, interchange their core spray line break instrument connections so that the high side connection is to the core spray sparger sensing line and the low side connection is to the above the core plate sensing line. This instrumentation should be calibrated for a zero Δ P reading during cold shutdown; it will then give a positive Δ P reading during normal rated power operation and a pegged zero reading for a line break indication during normal rated power operation.

Also, when this change is made, the recommended alarm setpoint (on decreasing Δ P) setting is 0.5 $\pm$ 0.25 PSID; and for those plants that have a value in their technical specifications, > 0 PSID is recommended as a limit.

This change will produce an alarm during normal shutdown. When the plant is returned to service, clearing of the alarm by a positive Δ P reading near rated power will indicate that the instrumentation is working.

"2. BWR operators, who have installed or who prefer to install Δ P instrumentation (e.g., -10 to +10 PSID) that covers their range of negative and positive Δ P values and who continue with the instrument high side connected to the above the core plate sensing line, use the same alarm set point of 0.5 $\pm$ 0.25 PSID (and a technical specification limit, if applicable, of $\leq$ 1 PSID). The instrument should again be calibrated to read zero Δ P during cold shutdown."

Recommended action for BWR licensee's and permit holders considerations:

All holders of operating licenses for BWR power reactor facilities (other than Duane Arnold) should be aware of the potential problems described above. It is recommended that the matter be reviewed at your facility in the following respects:

1. If your facility utilizes a core spray leak detection system similar to that described above, determine if the described problems exist. If so, initiate appropriate corrective action at the next planned refueling outage.

2. Propose changes, as appropriate, to those technical specifications which must be revised as a result of your modifying the item above.

3. For interim operations until full corrective measures have been taken it is recommended that direct readings from dp gauges be periodically taken or setpoints changed along with providing necessary instructions to the operators regarding indications from this system.

All holders of construction permits for BWR power reactor facilities should be aware of this potential problem and initiate appropriate modification prior to the initial fuel loading.

This Circular is being forwarded for information to all other power reactor facilities with an operating license or construction permit. No written response to this Circular is required. If you need additional information regarding this matter, contact the Director of the appropriate NRC Regional Office.

Attachment:
Figure 1

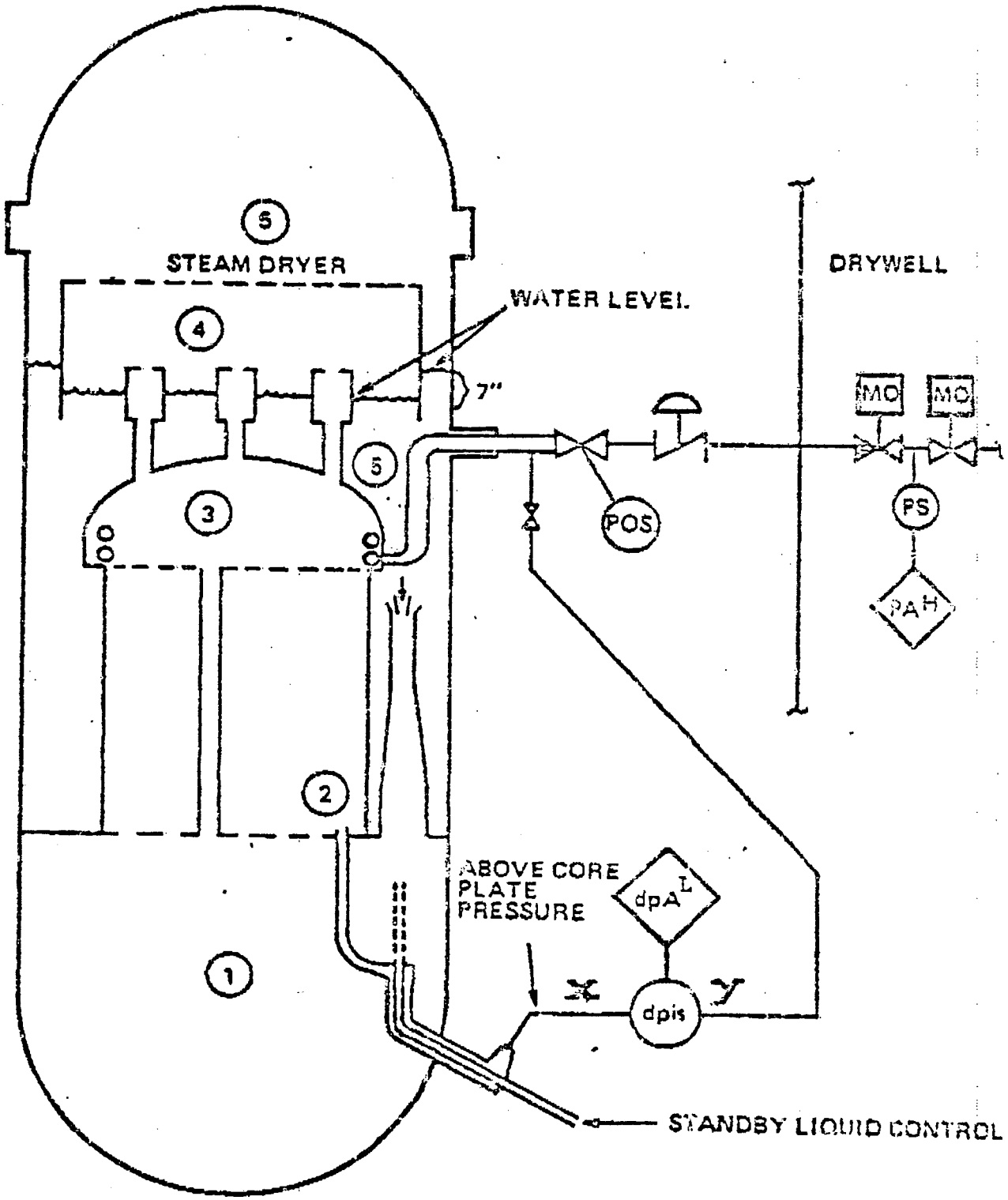

Figure 1 Core Spray System Pipe Break Detection Instrumentation

ENCLOSURE 2

IE Circular No. 79-24
Date: November 26, 1979

RECENTLY ISSUED IE CIRCULARS

Circular No.	Subject	First Date of Issue	Issued To
79-15	Bursting of High Pressure Hose and Malfunction of Relief Valve "O" Ring in Certain Self-Contained Breathing Apparatus	8/8/79	All Materials Priority I, Fuel Cycle and Operating Power Reactor Licensees
79-16	Excessive Radiation Exposures to Members Of The General Public And A Radiographer	8/16/79	All Radiography Licensees
79-17	Contact Problem in SB-12 Switches on General Electric Metalclad Circuit Breakers	8/14/79	All Power Reactor Licensees with an OL or CP
79-18	Proper Installation of Target Rock Safety-Relief Valves	9/10/79	All Power Reactor Licensees with an OL or CP
79-19	Loose Locking Devices on Ingersoll-Rand Pumps	9/13/79	All Power Reactor Licensees with an OL or CP
79-20	Failure of GTE Sylvania Relay, Type PM Bulletin 7305, Catalog 5U12-11-AC with a 120V AC Coil	9/24/79	All Power Reactor Licensees with an OL or CP
79-21	Prevention of Unplanned Releases of Radioactivity	10/19/79	All Power Reactor Licensees with an OL or CP
79-22	Stroke Times for Power Operated Relief Valves	11/16/79	All Power Reactor Licensees with an OL or CP
79-23	Motor Starters and Contactors Failed to Operate	11/26/79	All Power Reactor Licensees with an OL or CP