Central files

INDIANA & MICHIGAN ELECTRIC COMPANY

P. O. BOX 18
BOWLING GREEN STATION
NEW YORK, N. Y. 10004

January 21, 1981
AEP:NRC:00499

Donald C. Cook Nuclear Plant Unit Nos. 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
IE Bulletin No. 80-24
Prevention of Damage Due to Water Leakage Inside Containment

Mr. James G. Keppler, Regional Director
U.S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region III
Glen Ellyn, Illinois 60137

Dear Mr. Keppler:

This letter and its attachment provide our response to IE Bulletin No. 80-24 which addresses the potential for accumulation of water on the containment floor without the operators' knowledge. On January 5 and 6, 1981, during discussions with Mr. Boyd and Mr. Ridgeway of your staff, we requested and were granted a few days extension in providing our response to the subject Bulletin.

The attachment supports our belief that any significant accumulation of water within the containment could not occur without the operators' knowledge of the event and that any leaking Non-Essential Service Water Components or Systems could be isolated prior to such an accumulation.

The manpower expended in the conduct of the review and preparation of the attached report has been estimated as 220 man-hours.

Very truly yours,

R. S. Hunter
Vice President

cc: attached

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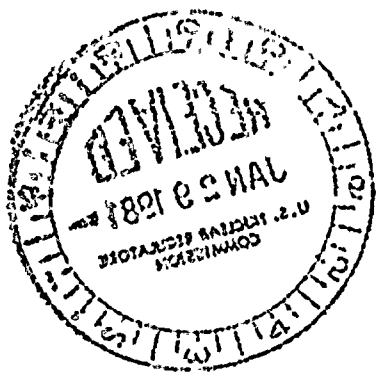
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JAN 29 1981
U.S. NUCLEAR REGULATORY COMMISSION

cc: V. Stello - NRC
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John E. Dolan - Columbus
R. W. Jurgensen
D. V. Shaller - Bridgman
NRC Region III Resident Inspector - Bridgman

STATE OF NEW YORK)

)

COUNTY OF NEW YORK)

R. S. Hunter , being duly sworn, deposes and says he is the Vice President of Licensee Indiana and Michigan Electric Company, that he has read the foregoing response to NRC IE Bulletin 80-24 and knows the contents thereof, and the said contents are true to the best of his knowledge and belief.

R. S. Hunter

Subscribed and sworn to before me this 21st day of January 1981 in New York County, New York.

Kathleen Barry

Notary Public

KATHLEEN DARRY
NOTARY PUBLIC, State of New York
No. 41-4606792
Qualified in Queens County
Certificate filed in New York County
Commission expires March 30, 1981

RESPONSE TO ACTION ITEM 1:

The only open cooling water system inside the containment is the Non-Essential Service Water (NESW) System. The NESW System supplies cooling water to the following components located within the containment:

1) Two (2) Instrumentation Room Ventilation Units
2) Four (4) Upper Containment Ventilation Units
3) Four (4) Lower Containment Ventilation Units
4) Four (4) Reactor Coolant Pump (RCP) Motor Air Coolers
5) Four (4) Reactor Coolant Pump (RCP) Motor Fire Suppression Units
6) Two (2) Charcoal Filter Fire Suppression Units

ITEM 1a

During normal power operation, the water supplied to each ventilation unit is regulated so as to maintain the containment and instrumentation room air temperatures at the desired values. The water to the RCP Motor Fire Suppression Units and to the Charcoal Filter Fire Suppression Units is for fire protection and does not receive flow during normal operation or during a LOCA. One of the Upper Ventilation Unit's supply line inside the containment supplies water to the two Charcoal Filter Units and each of the supply lines to two of the four Lower Containment Ventilation Units supplies water to two RCP Motor Fire Protection Units. Hence, any leak in the fire protection units would be indicated as a leak in the corresponding supply lines to the ventilation units. The service water to all the Ventilation Units, Fire Protection Units, and to the RCP Motor Air Coolers is isolated when the containment pressure increases to the Phase B containment isolation setpoint value of 2.9 psig.

ITEM 1b

The source of water for the NESW System is Lake Michigan. Table 1 lists the maximum, minimum, and average values for the various constituents in Lake Michigan water. The values were computed from analyses of samples taken from several locations during the period of 1967 to 1976. Since this period, the analyses of lake water samples taken weekly at Cook Plant indicate that the water characteristics have not changed.

ITEM 1c

The pipe material is Carbon Steel (A106 Grade B). Unless we receive contrary information from the NSSS vendor we are sure that the tube material in the RCP Motor Air Coolers is arsenical copper (ASTM B-111, Alloy 142).

The tube material used for the ventilation units in the upper containment and for the instrumentation room is copper (ASTM B-152, Alloy 110) and the tube material used for the ventilation units in the lower containment is copper (ASTM B-75, Alloy 172). The tubing header material at the ventilation units is copper (ASTM B-88, Type M).

ITEM 1d

There has been no indication of leakage in the NESW System within the containment since the initial operation of Units 1 and 2.

ITEM 1e

There have been no repairs involving NESW leakage from equipment located inside the containment since the initial operation of Units 1 and 2.

ITEM 1f

FSAR Figure 9.8-6 (attached) depicts the supply and return NESW piping for the ventilation unit coolers, fire suppression systems, and the RCP Motor Air Coolers. The supply and return piping for each cooler can be isolated by closing either the air operated globe valve(s) or by manually closing the butterfly valve(s) of which one of each is located in the supply and in the return cooler lines outside the containment. Each air operated valve is controlled by a separate switch or controller.

ITEM 1g

Each of the air operated globe valves and each of the check valves on FSAR Figure 9.8-6 (attached) is leak tested in accordance with Type C requirements of Appendix J to 10 CFR 50.

ITEM 1h

The systems and/or equipment available for detection of leakage and/or a significant accumulation of NESW in the containment are:

1) Level alarms for the Reactor Cavity, Lower Containment, Recirculation, Instrumentation Room, and Pipe Tunnel Sumps.
2) Event Time Recorders (Pump Running Times) for Lower Containment, Reactor Cavity, and Containment Pipe Tunnel Sump Pumps.
3) For detection of gross leakage, the NESW System is equipped with mismatch flow alarms.

ITEM 1i

The NESW System does not have provisions to detect radioactive contamination since these lines can be isolated as indicated in Items 1a and 1f above.

ACTION ITEM 2

ITEM 2a

There are four sumps located in the containment that have either sump pumps and alarms or only alarms associated with them.

First, there is the Pipe Tunnel Sump located outside the missile barrier with a bottom elevation of approximately 591'. This sump has two 50 GPM pumps in it, each operated by its own controller. Associated with the level control on each pump is an abnormal alarm that comes from the level controller if the sump level has not been pumped down within two minutes of a pump start signal. Also associated with this sump are two level alarms, one high level and one low level. Therefore, this sump has two individually controlled sump pumps each with abnormal alarms as well as a separate high and low level annunciator.

Second, there is the Lower Containment Sump, located inside the missile barrier with a bottom elevation of approximately 589'. This sump is connected to the recirculation sump by an eight inch open ended pipe. The Lower Containment Sump also has two 50 GPM sump pumps which operate on a staggered basis from a common controller. This sump also has separate high and low level alarms. The Recirculation Sump which is attached to the Lower Containment Sump has six level indicators which show successive water elevations in the sump. A modified level indication system has been authorized for the containment which will meet the requirements of NUREG-0578. The Lower Containment Sump in conjunction with the attached Recirculation Sump has two pump abnormal alarms, a high and low level alarm, and indicating sump level lights.

Third, there is the Reactor Cavity sump located at an elevation of approximately 565'. This sump has two 25 GPM pumps. Each of the sump pumps has its own controller. These sump pumps also have abnormal alarms that alarm two minutes after a pump start signal is received if the sump level hasn't been pumped down. The sump has a high and low level alarm which is separate from the sump pump level controllers.

Fourth, there is the Instrument Room Sump which contains three level sensors which also alarm. The water flowing into this sump drains by gravity to the Pipe Tunnel Sump. An overflow drain pipe to the Reactor Cavity Sump is also provided.

A fifth sump, the recirculation sump, possesses a fifteen-step level indication,six-level indicator, system which does not alarm.

Each of the sumps described above are in separate compartments. The Pipe Tunnel and Lower Containment Sump would require a significant accumulation of water before overflowing to one of the other sumps. A leak in one of the Upper Containment Ventilation Units resulting in water accumulation in the Lower Containment Sump would have to flood to elevation 610'-0" (approximately 325,000 gallons) before it would overflow into the Reactor Cavity Sump.

ITEM 2b

The measurement of water removal from the Pipe Tunnel, Lower Containment, and Reactor Cavity Sumps is performed by noting the run time for any of the six sump pumps (two per sump) as indicated on a Strip Chart Recorder and multiplying this value by the pump capacity and then by the number of pumps per sump operating during the time period under consideration.

ITEM 2c

The procedure for checking containment sump flows utilizes the method described in Item 2b to determine the total daily sump water removals. These volumes are logged and plotted in Unit 1 and 2 operating procedures OHP.4030.STP.030 Check Off Sheet 6.5 and Unit 1 Operating Procedure 1-OHP.4030.STP.030 Check Off Sheet 6.6. These Check Off Sheets are reviewed daily by a Senior Licensed Operator. Leakage limits are those specified in the applicable Technical Specifications.

ITEM 2d

The containment system water level indicators, the sump pump run time meters described in Items 2a and 2b above in addition to the NESW equipment in the containment with mismatch flow alarms for gross leakage comprise the containment leak detection systems. Isolation of the leaking components can be accomplished by the methods described in Items 1a and 1f above.

ITEM 2e

The detection of leakage is monitored daily as described in Items 2b and 2c above.

ITEM 2f

PMI-7030, Condition Reports, sets forth the criteria for reporting conditions adverse to the established quality and/or safety. Any service water leaks generating a Condition Report classified as Category "A" are reportable to the NRC via a special licensee event report within 24 hours with a written report in 14 days.

ACTION ITEM 3

The Cook Plant has experienced only two incidents of large leakage volumes:

1) Feedwater elbow cracking: The leakage was detected by monitoring the operation of the containment sumps and it was also indicated on the Containment Humidity Recorder. Initially we thought the leakage was service water but as conductivity decreased with time, sampling indicated leakage was feedwater and the Unit was immediately shutdown.

2) Prior to the last outage of Unit 1, there existed some leakage in the containment which we suspected came from a valve on the Steam Generator Blowdown since chemical analysis indicated it was neither lake water nor reactor coolant. We were able to quantify the leak and recorded it weekly. During the outage of Unit 1, it was confirmed that the source of leakage came from a bonnet leak on the Steam Generator No. 4 Shell Drain Valve. This valve was replaced during the unit outage.

TABLE 1
LAKE MICHIGAN WATER CHEMISTRY

PPM

	MAXIMUM	MINIMUM	AVERAGE
IODINE (I_2)	.1	< .1	-
SILICA (S_iO_2)	37.6	.024	4.6
IRON OXIDE (Fe_2O_3)	1.7	.04	.42
ALUMINUM OXIDE (Al_2O_3)	29.6	.06	4.9
MANGANESE OXIDE (MnO_2)	.022	.002	-
CALCIUM (Ca)	48.0	30.1	35.7
MAGNESIUM (M_g)	17.6	2.7	11.8
SODIUM (N_a)	11.3	2.5	6.2
POTASSIUM (K)	2.3	.7	1.18
BICARBONATE (HCO_3)	157.8	125.0	137.6
SULFATE (SO_4)	35.0	15.5	19.5
CHLORIDE (Cl)	14.7	6.9	9.73
FLUORIDE (F)	.28	Nil	-
NITRATE (NO_3)	2.4	.4	-
DISSOLVED SOLIDS	239.0	186.2	186.2
HARDNESS AS ($CaCO_3$)	162.5	112.1	-
NET IGNITION LOSS	39.2	12.9	33.0
BORON (B)	.09	.02	.05
ORGANIC MATTER (2)	2.38	.80	1.55
pH @ 25°C	8.05	8.0	-
SP. COND. @ 25°C, mho	350	245	281
LANGELIER INDEX @ 70°F	+.40	-2.22	- -
110°F	+.74	-1.81	-
140°F	+.88	-1.55	-

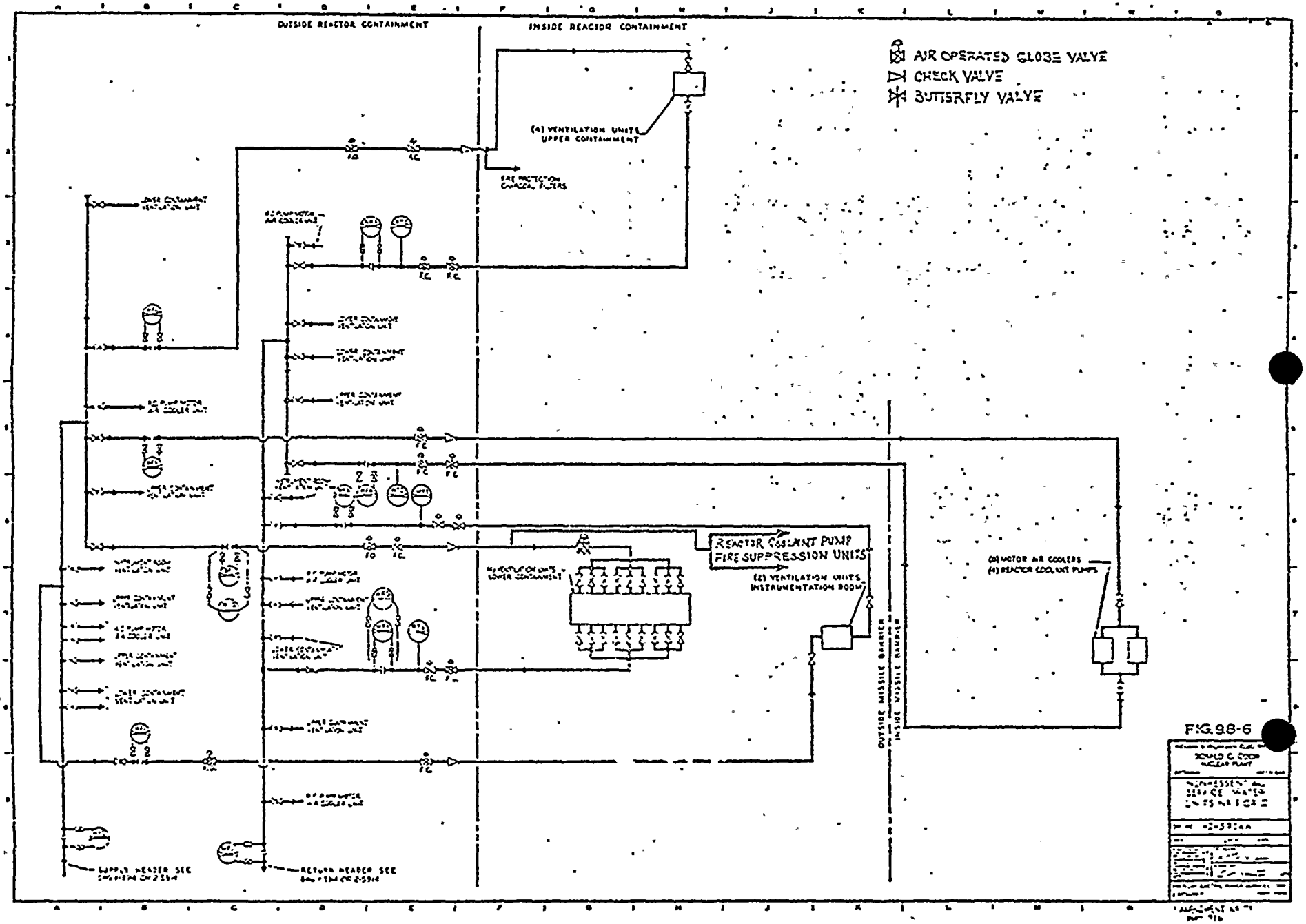
OUTSIDE REACTOR CONTAINMENT
INSIDE REACTOR CONTAINMENT
AIR OPERATED GLOBE VALVE
CHECK VALVE
BUTTERFLY VALVE
(4) VENTILATION UNITS UPPER CONTAINMENT
REACTOR COOLANT PUMP FIRE SUPPRESSION UNITS
(2) VENTILATION UNITS INSTRUMENTATION ROOM
(2) MOTOR AIR COOLERS
(4) REACTOR COOLANT PUMPS
OUTSIDE MISSILE BARRIER
INSIDE MISSILE BARRIER
SUPPLY HEADER SEE
RETURN HEADER SEE

FIG. 9.8-6