Illinois Power Company
Clinton Power Station
P.O. Box 678
Clinton, IL 61727
Tel 217 935-8881

ILLINOIS POWER

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Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Illinois Power 120-Day Response to Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions"

Dear Sir:

This letter is providing Illinois Power's (IP's) 120-day response to GL 96-06 which requires that addressees determine:

(1) if containment air cooler cooling water systems are susceptible to either waterhammer or two-phase flow conditions during postulated accident conditions;

(2) if piping systems that penetrate containment are susceptible to thermal expansion of fluid so that overpressurization of piping could occur.

Regarding Issue (1), IP provided an initial response via letter U-602654 dated October 28, 1996. Additional discussion relative to Issue (1), based on industry information and discussions with NRC staff, are included in Attachment 2.

Regarding issue (2), IP evaluated all Clinton Power Station (CPS) containment penetrations for susceptibility to overpressurization. From this review, IP identified twenty-one penetrations as being potentially susceptible. Appropriate actions to assure operability of these penetrations will be completed prior to restart from refueling outage 6 (RF-6). Details concerning IP action taken to address this susceptibility to overpressurization are included in Attachment 2.

A072

U30033

Attachment 1 provides an affidavit supporting the facts set forth in this letter.

Sincerely yours,

Richard J. Shaw

Wilfred Connell for
Vice President

JSP/krk

Attachments

cc: NRC Clinton Licensing Project Manager
NRC Resident Office, V-690
Regional Administrator, Region III, USNRC
Illinois Department of Nuclear Safety

Richard F. Phares, being first duly sworn, deposes and says: That he is Manager - Nuclear Assessment at Illinois Power; that this letter supplying information for Generic Letter 96-06 has been prepared under his supervision and direction; that he knows the contents thereof; and that to the best of his knowledge and belief said letter and the facts contained therein are true and correct.

Date: This 28th day of January 1997.

Signed: Richard F. Phares
Richard F. Phares

STATE OF ILLINOIS) SS.
DeWitt COUNTY)

" OFFICIAL SEAL "
Jacqueline S. Matthias
Notary Public, State of Illinois
My Commission Expires 11/24/97

Subscribed and sworn to before me this 28th day of January 1997.

Jacqueline S. Matthias
(Notary Public)

The requested actions from Generic Letter (GL) 96-06, along with Illinois Power's (IP's) 120-day responses are provided below. Also provided is additional discussion relative to Issue (1) based on industry information and discussions with NRC staff.

(1) if containment air cooler cooling water systems are susceptible to either waterhammer or two-phase flow conditions during postulated accident conditions;

Background

In September 1996, the NRC issued GL 96-06, "Assurance of Equipment Operability and Containment Integrity During Design Basis Accident Conditions."

The following excerpts are from IP's 30-day response to this GL provided in IP letter U-602654 dated October 28, 1996:

> CPS does not rely on safety-related coolers for containment cooling...
>
> ...It should, however be noted that CPS Emergency Operating Procedure 4402.01 (EOP-6) allows for the defeating of containment isolation interlocks of the non-safety Drywell Cooling (VP) system and supplemental drywell cooling (WO) if drywell temperature cannot be held below 135°F. The design of the WO and VP systems are closed loops with compression tanks that maintain a positive pressure in the system. As such, the lines would not drain down causing vapor cavities in the piping in containment or drywell. Therefore, waterhammer would not be postulated to occur in these two systems.

Emergency Operating Procedures (EOPs) are plant procedures that direct operators to take actions necessary to mitigate the consequences of transients and accidents that have caused plant parameters to exceed reactor protection system setpoints, engineered safety limit setpoints or other established limits. In some cases, these procedures may include the use of non-safety systems if there is a reasonable likelihood that these systems will be both available and of benefit. Use of the non-safety related WO and VP systems are two such non-safety related systems that meet this criterion (reasonable likelihood of availability and of benefit) for drywell cooling, when their containment isolation interlocks are bypassed. There is no requirement to design non-safety systems specified in the EOPs to safety related criteria.

There is a small likelihood that waterhammer of the type described in GL 96-06 may occur when the WO and VP systems are operated as directed by EOP-6. For these phenomena to occur, the system would have to be isolated for a substantial amount of time with the drywell temperature near design bases in order to have significant steam voiding to occur leading to potential waterhammer. Notwithstanding, the waterhammer would most likely dampen out without causing catastrophic failure of any piping or components. Analysis shows that in the unlikely event that a waterhammer were to occur,

the ability to provide containment isolation and integrity would be maintained. Therefore, the worst possible result would be the inability for WO and VP to perform drywell cooling functions. No credit is taken for these systems to provide drywell cooling during design bases events. Therefore, they do not provide a design basis safety function. Consequently, EOP guidance allowing the use of these coolers to reduce drywell temperature is appropriate.

Based on the above and the previous CPS response to GL 96-06, Issue (1), waterhammer is not an issue at CPS. In addition, two-phase flow effects are not an issue since CPS does not rely on containment coolers to perform design bases safety-related cooling functions.

(2) if piping systems that penetrate containment are susceptible to thermal expansion of fluid so that overpressurization of piping could occur.

All containment piping penetrations have been reviewed to determine susceptibility to these phenomena. The list of penetrations reviewed along with justifications for those removed from consideration is provided in Attachment 3. Twenty-one penetrations were identified as being potentially susceptible to these phenomena. The penetrations were dispositioned as follows:

- Further investigation identified that penetrations 1MC-048, 204, 205, and 208 do not receive isolation signals during a LOCA. These penetrations are for the cooling water supplies to the safety related combustible gas compressor room coolers. Overpressurization of piping could potentially occur for these penetrations during surveillance testing if both the inside and outside containment isolation valves were closed at the same time. CPS procedures are being revised to prevent isolation of multiple valves simultaneously, during surveillance testing, thereby eliminating the possibility of the subject scenario. Caution statements and guidance are also being added to the system operating procedures to assure that the phenomena are not inadvertently introduced during maintenance or other system evolutions.

- Penetrations 1MC-116, 078, and 088 are not required post-LOCA or during normal plant operation. These penetrations will be drained prior to restart from the current CPS refueling outage (RF-6) and subsequently will not be susceptible.

- The piping for penetrations 1MC-056, 081, 082, 052, and 053 was modified to eliminate the overpressurization concern by adding air chambers to the potentially affected piping. These air chambers will provide a compressible volume of air to accommodate the thermal expansion of water. The potential pressure increase will now be limited to that for the compressibility of air which will not be significant. Therefore, this concern is no longer an issue for these penetrations.

- Holes were drilled on the inboard disc face side of the inboard flexible wedge containment isolation valves (CIV) for penetrations 1MC-046, 047, and 085. As the fluid between the CIVs thermally expands, the outboard face of the inboard disc will be pushed off its seat and the pressure will be relieved through the hole in the opposite (inboard) disc face before the penetration assembly would be overpressurized.

- Analyses for penetrations 1MC-050, 065, 069, 070, 103, and 104 show the current measured CIV leakage to be sufficient to prevent overpressurization. Since these analyses are based on current leakage rates, re-evaluation will be required each time new leakage data is obtained or if maintenance is performed that could affect the leakage rate. To eliminate this need for continued monitoring and reanalyzes, CPS will modify these penetrations prior to re-start following refueling outage (RF-7).

In addition to the above actions, relieving devices (e.g., relief valves) were installed in non-safety piping systems located inside containment that could potentially experience the subject phenomena. This action serves to eliminate the potential for these phenomena to affect the safety related containment isolation function for the containment penetrations of these non-safety related systems.

Actions described above, required to assure operability of the penetrations, will be completed prior to restart from our current refueling outage.

CONTAINMENT PENETRATIONS

PENETRATION NUMBER	SYSTEM	DESCRIPTION (REF. USAR Table 3.8-5)	JUSTIFICATION
1MC-001		Equipment Hatch	10
1MC-002		Personnel Lock	10
1MC-003		Personnel Lock	10
1MC-004		Fuel Transfer Tube	20
1MC-005	MS	Main Steam "C"	2
1MC-006	MS	Main Steam "A"	2
1MC-007	MS	Main Steam "D"	2
1MC-008	MS	Main Steam "B"	2
1MC-009	FW	Feedwater "A"	3
1MC-010	FW	Feedwater "B"	3
1MC-011	RH	RHR Pump Suction "A"	4
1MC-012	RH	RHR Pump Suction "B"	4
1MC-013	RH	RHR Pump Suction "C"	4
1MC-014	RH	RHR Shutdown Suction	5
1MC-015	RH	RHR LPCI "A"	12
1MC-016	RH	RHR LPCI "B"	12
1MC-017	RH	RHR LPCI "C"	1
1MC-018	RH	RHR Test to Supp. "A"	7
1MC-019	RH	RHR Test to Supp. "C"	12
1MC-020	RH	RHR Test to Supp. "B"	7
1MC-021	RH	RHR "A" P.R.V	7
1MC-022		Spare	6
1MC-023	RH	RHR "A" P.R.V.	7
1MC-024	RH	RHR "A" P.R.V.	7
1MC-025	RH	RHR "B" P.R.V. (Pump Suction)	7
1MC-026	RH	RHR "B" P.R.V. (Heat Exchanger)	7
1MC-027	RH	RHR "B" P.R.V. (Shutdown Return)	7
1MC-028	RI	RCIC Pump Suction	4
1MC-029	RH	RHR "C" P.R.V. (Pump Suction)	7
1MC-030	RH	RHR "C" P.R.V. (Pump Discharge)	7
1MC-031	RH	RHR "B" P.R.V. (Crosstie to RCIC)	7
1MC-032	LP	LPCS Pump Suction	4
1MC-033	HP	HPCS Test to Supp.	7
1MC-034	SF	Suppression Pool Clean Up	4
1MC-035	HP	HPCS Pump Discharge	1
1MC-036	LP	LPCS Pump Discharge	1
1MC-037	HP	HPCS Pump Suction	4
1MC-038	LP	LPCS P.R.V. (Pump Discharge)	7
1MC-039		Spare	6
1MC-040	RI	RCIC Min. Flow	7
1MC-041	RI	RCIC Turbine Steam Exhst.	8
1MC-042	RI	RCIC Head Spray	1
1MC-043	RI	RCIC Turbine Steam Supply	8
1MC-044	RI	RCIC Turbine Vacuum breaker	9
1MC-045	MS	Main Steam Drain	14
1MC-046	CC	CC Supply	22
1MC-047	CC	CC Return	22
1MC-048	SX	SX Service Water Supply	19
1MC-049	RA	Breathing Air	10
1MC-050	MC	Make-up Condensate (MC)	23
1MC-051		Spare	6
1MC-052	FC	Fuel Pool Cooling & Cleanup	21
1MC-053	FC	Fuel Pool Cooling & Cleanup	21
1MC-054		Spare	6
1MC-055		Spare	6
1MC-056	FP	F.P. Containment Standpipe	21

PENETRATION NUMBER	SYSTEM	DESCRIPTION (REF. USAR Table 3.8-5)	JUSTIFICATION
1MC-057	IA	Instrument Air	10
1MC-058	IA	Instrument Booster Air	10
1MC-059	SA	Service Air	10
1MC-060	RT	RWCU Pump Supply	17
1MC-061	RT	RWCU Pump Return	17
1MC-062	HG	Hydrogen Recombiner to Cont.	10
1MC-063	RD	C.R.D. Pump Discharge	15
1MC-064	RT	RWCU to RHR Return	17
1MC-065	WX	Radwaste Repro. & Disposal	23
1MC-066		Spare	6
1MC-067	SA	Containment SA (Cnmt. Press)	10
1MC-068	PS	PS - CNTM ATMOS	10
1MC-069	RE	Cont. Equipment Drains RE	23
1MC-070	RF	Containment Floor Drains RF	23
1MC-071	HG	Hydrogen Recombiner from Cont.	10
1MC-072	HG	Hydrogen Recombiner to Contnt.	10
1MC-073		Spare	6
1MC-074		Decontamination	11
1MC-075		Spare	6
1MC-076	RH	RHR P.R.V. (Drain)	7
1MC-077		Spare	6
1MC-078	CC	Component Cooling Water	16
1MC-079	SF	Suppression Pool Clean-Up	4
1MC-080		Spare	6
1MC-081	FP	Fire Protection	21
1MC-082	FP	Fire Protection	21
1MC-083		Spare	6
1MC-084		Spare	6
1MC-085	CY	Cycle Condensate	22
1MC-086	RT	RWCU to Condenser	17
1MC-087	RH	RHR "A" P.R.V.	7
1MC-088	CC	CCW Return	16
1MC-089	RH	RHR Ht. Exch. Shell Vent	18
1MC-101	VR	Cont. Vent Air Supply	10
1MC-102	VQ	Cont. Vent Air Purge & Exhaust	10
1MC-103	WO	Cont. Cooling Chilled Water Supp.	23
1MC-104	WO	Cont. Cooling Chilled Water Return	23
1MC-105		Spare	6
1MC-106	VR	Continuous Cnmt. Purge Air Exh.	10
1MC-107	VF	Drywell Cooling Water Supp.	12
1MC-108	VP	Drywell Cooling Water return.	12
1MC-109	VP	Drywell Cooling Water Supp.	12
1MC-110	VP	Drywell Cooling Water return.	12
1MC-111		Spare	6
1MC-112		Spare	6
1MC-113	VR	Cnmt. Purge Air Supply	10
1MC-114		Spare	6
1MC-115		Spare	6
1MC-116	SC	Standby Liquid Control	16
1MC-150	CM	Cnmt. Pressure Monitors	10
1MC-151	CM	Cnmt. Pressure Monitors	10
1MC-152	CM	Containment Monitoring	10
1MC-153	CM	Drywell Pressure	10
1MC-154		Spare	6
1MC-155		spare	6
1MC-156	VG	Conmnt.Pressure (SGTS Train A)	10

CONTAINMENT PENETRATIONS

PENETRATION NUMBER	SYSTEM	DESCRIPTION (REF. USAR Table 3.8-5)	JUSTIFICATION
1MC-157	CM	Suppression Pool Water Level	13
1MC-158		Spare	6
1MC-159		Spare	6
1MC-160	CM	Containment Monitoring System	10
1MC-161		Spare	6
1MC-162		Spare	6
1MC-163		Spare	6
1MC-164	SM	Suppression Pool Makeup	13
1MC-165	VR	Containment Differential Pressure	10
1MC-166	HG	Hydrogen Recombiner from Comnt	10
1MC-167	VG	Contmnt Pressure (SGTS Train B)	10
1MC-168	CM	Containment Differential Pressure	10
1MC-169	VR	Contmnt. Purge Damper Control	10
1MC-170		Spare	6
1MC-171	SM	Suppression Pool Makeup	13
1MC-172	RH	RHR Ht. Exch. Shell Vent	18
1MC-173	CM	Containment Monitoring System	10
1MC-174		Spare	6
1MC-175		Spare	6
1MC-176		Spare	6
1MC-177	RI	Supp. Pool Water Level (RCIC)	13
1MC-178		Spare	6
1MC-179	HP, SM	H.P. Core Spray System & Suppression Pool Make-Up	13
1MC-180	HP	H.P. SUP. PooL LEVEL	13
1MC-181	SM	Supp. Pool Water Level	13
1MC-182		Spare	6
1MC-183	CM	Supp. Pool Water Level	13
1MC-184		Spare	6
1MC-200	RI	Supp. Pool Water Level (RCIC)	13
1MC-201		Spare	6
1MC-202		Spare	6
1MC-203	CM	Containment Monitoring	10
1MC-204	SX	S/D Service Water	19
1MC-205	SX	S/D Service Water	19
1MC-206	IA	Instrument Air	10
1MC-207		Spare	6
1MC-208	SX	S/D Service Water Return	19
1MC-209		Spare	6
1MC-210	PS	Post Accident Sample	10
1MC-211		Spare	6

JUSTIFICATION CODES FOR THERMAL PRESSURIZATION

1 ECCS - check valve will allow expanding trapped fluid out.
2 MSIV, steam N/A.
3 FW containment penetration has check valves that will allow expansion.
4 Suppression pool suction. No inboard isolation. Open ended to pool.
5 Check valve 1E12-F475 provides relief of bottled up fluid.
6 Spare.
7 Suppression pool line. No inboard isolation. Open ended to pool.
8 Steam line. Not water filled.
9 Vacuum breaker line. Not water filled.
10 Not water filled.
11 Temporary penetration. Used only for decon.
12 Relief valve is installed between isolation valves.
13 Pool level monitoring -No inboard isolation. Open ended to pool.
14 If line contains water it will be a hot water steam mixture. Line will cool after a trip so overpressure due to thermal expansion of water is not an issue.
15 Outboard isolation valve is a check valve and there is a relief valve downstream of it.
16 Penetration drained. See Attachment 2, page 2 for additional discussion
17 RWCU is at high temperature and pressure during operation. It serves no safety function. Line will cool after a trip so overpressure due to thermal expansion is not an issue.
18 Line abandoned and blind coupling installed per RH-33. Line not water filled.
19 Valves not closed post LOCA. Surveillance's modified to cycle one valve at a time.
20 Not water filled during normal operation.
21 Air chambers added. See Attachment 2, page 2 for additional discussion
22 Holes drilled in disc. See Attachment 2, page 3 for additional discussion
23 Leakage is sufficient to prevent overpressure. See Attachment 2, page 3 for additional discussion