NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1): Clinton Power Station

DOCKET NUMBER (2): 0 5 0 0 0 4 6 1

PAGE (3): 1 OF 2 0

TITLE (4): Potential Inability of Safety-Related Air Operated Valves and Other End-Use Devices to Function Due to Failure to Fully Communicate and Evaluate Air Regulator Full-Open Failure

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR
0 3	0 7	9 0	9 0	— 0 0 4	— 0 2	0 5	0 8	9 1

OTHER FACILITIES INVOLVED (8)	
FACILITY NAMES	DOCKET NUMBER(S)
None	0 5 0 0 0
	0 5 0 0 0

OPERATING MODE (9): 4

POWER LEVEL (10): 0 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

20.402(b)	20.405(c)	50.73(a)(2)(i)	73.71(b)
20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(ii)	73.71(c)
20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(iii)	X OTHER (Specify in Abstract below and in Text, NRC Form 366A)
20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	10CFR21
20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
J. R. Langley Director - Design and Analysis Engineering, Extension - 3728	AREA CODE 2 1 7 9 3 5 - 8 8 8 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
B	D A	S O L	P 3 0 4	N		B	L H	I S V	F 1 3 0	N	
B	D A	S O L	F 1 3 0	N		B	L E	R G	F 1 3 0	N	

SUPPLEMENTAL REPORT EXPECTED (14)

		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e. approximately fifteen single-space typewritten lines) (16)

Investigation of Information Notice 88-24 revealed that the maximum operating pressure differential (MOPD) of 73 solenoid operated valves (SOVs) supplying air to active safety-related air operated valves (AOVs) and dampers was less than the maximum Instrument Air (IA) system pressure (max IAp). The SOVs would be subjected to max IAp in the event of air regulator (AR) failure. Loss of air had been previously considered as a failure mode; overpressurization had not. Further investigation identified that AOV components and other safety-related end-use devices also have the potential for overpressurization if their upstream ARs fail open. The overpressurizations (AOV components, SOVs, and other end-use devices), may result in failure of safety-related devices to reposition to their safety positions. The potential for overpressurization was the result of errors by vendors, the Nuclear Station Engineering Department, and the Architect Engineer (AE), and miscommunication with the AE. Corrective actions include installing rupture disks and/or high MOPD SOVs, and replacing ARs with safety-related, seismically qualified, ARs. The potential overpressurization of the AOVs and two end-use devices has been determined to be reportable in accordance with the provisions of 10CFR21.

INTRODUCTION

Nuclear Regulatory Commission (NRC) Information Notice (IN) 88-24, "Failures of Air-Operated Valves Affecting Safety-Related Systems," was issued by the NRC on May 13, 1988. This Information Notice was provided to alert licensees of potential problems with air operated valves (AOVs) [V] in safety-related systems. These problems result from overpressurization of solenoid [SOL] operated valves (SOVs) which may result in a subsequent failure of associated AOVs to reposition to their safety positions. When the rated maximum operating pressure differential (MOPD) of the SOVs is exceeded, the SOVs become overpressurized. The MOPD is the maximum differential pressure between the inlet and outlet sides of the solenoid valve against which the solenoid is rated to operate. Initial analysis of the failure modes of the SOVs included an evaluation of a loss of air, but as discussed in the Information Notice, overpressurization had not been considered.

Illinois Power Company's (IP's) investigation of the applicability of Information Notice 88-24 to Clinton Power Station (CPS) identified three areas of concern.

1. The potential for overpressurization of low MOPD SOVs when exposed to maximum Instrument Air system (IA) [LD] pressure could result in a subsequent failure of the AOVs to reposition to their safety positions.

2. The potential for overpressurization of AOVs when exposed to pressures exceeding the pressures specified in product bulletins could result in AOV component damage and failure of the AOVs to reposition to their safety positions.

3. The potential for overpressurization of other IA system end-use devices could result in failure of the devices to perform their safety functions.

The description, cause, and corrective actions for each concern are discussed in separate sections below.

1. SOV OVERPRESSURIZATION

DESCRIPTION OF EVENT

The investigation of the applicability of Information Notice 88-24 to CPS included an evaluation of SOVs, manufactured by Asco Valves and other vendors, with MOPDs less than the maximum IA design pressure (110 pounds per square inch (psi)). (In general, the AOVs, SOVs, and the associated upstream non-safety air regulators (ARs) [RG] are provided by the vendor as an assembly. The vendor

establishes the requirements for the individual components of the assembly, which can be manufactured by another vendor.) The types of SOVs evaluated include: containment isolation valves [ISV] for the IA system, the Service Air system (SA)[LD], the Respirator Air system (RA) [LH], the Containment [NH], Auxiliary [NF] and Fuel Building [ND] Drain (RF) and Equipment Drain systems [WK]; recirculation sample line drywell isolation valves; Reactor Core Isolation Cooling (RCIC) [BN] system turbine [TRB] supply and exhaust drain valves; Standby Gas Treatment System (SGTS) [BH] dampers [DMP]; Main Steam (MS) [SB] safety relief valve [RV] SOVs; Scram Discharge Volume Vent and Drain Safety-Related SOVs; and Shutdown Service Water System [BI] discharge valves.

The investigation identified seventy-three SOVs on active safety-related valves and dampers with MOPDs less than the maximum IA system pressure. Review of the investigation results was completed at 1750 hours, on March 7, 1990. On March 7, 1990, the plant was in Mode 4 (COLD SHUTDOWN) and the reactor [RCT] was at atmospheric pressure and 124 degrees Fahrenheit. The third planned outage (PO-3) was in progress.

Two of the seventy-three SOVs were supplied by Valcor and were previously tested to a maximum differential pressure of 105 psi plus a ten percent margin (115 psi maximum) which is greater than the maximum IA pressure of 110 psi. These two valves were therefore determined to be adequate for use.

One SOV, associated with isolation damper 1VA100Y, was determined to serve a passive function and was incorrectly included in the original seventy-three suspect valves identified. Therefore, no action was required for this SOV.

A walkdown was performed to determine the types of ARs associated with the remaining seventy SOVs which were all manufactured by Asco. The walkdowns determined that the ARs associated with all but four of the SOVs were non-safety Model 67 ARs, manufactured by Fisher Controls Company.

An evaluation was performed which determined reasonable assurance existed that the non-safety Fisher Model 67 ARs (which are passive mechanical components) would function in supporting the sixty-six associated SOVs through the second refueling outage (RF-2). This evaluation centered on remedial actions to address the reliability, seismic qualification and environmental suitability of the Fisher Controls ARs to assure a common mode failure did not exist, along with an evaluation to assure that single failure criteria was met. Based on the results of the evaluation, IP had a high level of assurance that the SOVs and their associated Fisher Controls ARs

would not result in a common mode failure and would support safe plant operation through RF-2. An action plan was developed to replace during RF-2 these sixty-six active safety-related SOVs as well as an additional twenty-four SOVs (Five additional SOVs associated with testable check valves, and nineteen passive SOVs) with SOVs with MOPDs equal to or greater than the maximum IA system pressure.

The four SOVs which were not associated with ARs manufactured by Fisher Controls were: 1FSVFC111 and 1HSVFC111, the 1FC004B Fuel Pool Cooling and Cleanup System (FC) [DA] Filter Demineralizer [FDM] Supply Controls; the solenoid for valve 1FC017, the FC Cleanup Pumps [P] to FC demineralizer tank isolation valve; and the solenoid for valve 1FC023, the FC demineralizer tanks to FC heat exchangers [HX] isolation valve. The single AR associated with 1FSVFC111 and 1HSVFC111 was a Speedaire model 1Z6968. The ARs associated with 1FC017 and 1FC023 were model B-1103 Watts Airsets. The solenoids for valves 1FC017 and 1FC023, and 1HSVFC111 were replaced with SOVs with MOPDs equal to or greater than the maximum IA system pressure prior to the completion of PO-3. In addition, the Speedaire Model 1Z6968 AR was replaced with a Fisher Model 67 AR. To ensure the SOV installed upstream of 1FSVFC111 would not be exposed to pressures greater than its MOPD, a rupture disk, which will burst at a pressure less than the installed SOV MOPD, was installed upstream of 1FSVFC111 during RF-2.

During the course of preparing Field Alteration M-F051 to replace the low MOPD SOVs it was identified that the SOVs on the containment atmosphere monitoring system (CM) [IK] hydrogen/oxygen (H_2O_2) sampling panels [PL] were also subject to overpressurization since the MOPD of the SOVs was less than maximum IA system pressure. Upstream of the H_2O_2 panels was a Fisher 67 AR which had been evaluated and was found to provide a reasonable assurance of safety through RF-2; therefore the H_2O_2 panels were considered operable.

No automatic or manually initiated responses were necessary to place the plant in a safe and operable condition. No additional equipment or components were inoperable at the start of this event such that their inoperable condition contributed to this event.

CAUSE OF EVENT

The use of SOVs with MOPDs less than the maximum IA pressure was the result of various vendor errors (Fisher Controls Co., Anchor-Darling, Sentry, and Posi-Seal) and miscommunication between the vendors and the architect engineer (AE) (Sargent and Lundy Engineers). The vendors supplying the AOVs did not consider the

potential failure of the ARs in determining the MOPD of the associated SOVs, and the AE did not clearly specify the maximum air pressures to which the components could be subjected.

CORRECTIVE ACTIONS

To assist vendors in selecting AOVs and SOVs adequate for all applicable failure modes, the Nuclear Station Engineering Department (NSED) posted an Engineering Change Notice (ECN) against the procurement specifications for AOVs. This ECN emphasizes that the vendor, in performing the failure mode analysis of his equipment, shall evaluate for potential overpressurization of each component of the AOV assembly due to failure of vendor-provided ARs which are not seismically or environmentally qualified.

NSED revised the Mechanical Engineering Review Standard to include a review of AOVs and/or other components for impact on operability due to IA system overpressurization. Specific considerations are to include the MOPD of SOVs and actuator, transducer, and controller overpressurization.

During PO-3, IP replaced three of the four SOVs in the FC system for which the associated AR was not supplied by Fisher Controls. A Fisher Model 67 AR was installed upstream of the fourth SOV, 1FSVFC111, during PO-3. A rupture disk was installed upstream of 1FSVFC111 during RF-2.

IP nas implemented Field Alteration M-F051 which installed rupture disks between the non-safety ARs supplied by Fisher Controls Company and the SOVs associated with safety-related AOVs during RF-2. The rupture disks will burst at pressures less than the rated AOV pressure and less than the SOV MOPD eliminating the concern of AOV failure due to AOV component overpressurization.

A rupture disk was installed upstream of each of the H_2O_2 panels. Replacement of the H_2O_2 panel SOVs with high MOPD SOVs would adversely impact panel operability and therefore, in accordance with the schedule established by the EQ program, the SOVs were replaced with similar SOVs during RF-2.

Installation of rupture disks and/or high MOPD SOVs, also in accordance with Field Alteration M-F051, addresses the potential overpressurization of the remaining SOVs associated with safety-related AOVs. In cases where overpressurization concerns are alleviated solely by installation of a high MOPD SOV, the downstream AOV has a rated pressure greater than maximum IA pressure.

II. AOV OVERPRESSURIZATION

DESCRIPTION OF EVENT

During the course of preparing Field Alteration M-F051 to replace the low MOPD SOVs, the CPS architect engineer (Sargent and Lundy) recognized and identified to Illinois Power Company (IP) that the maximum pressures specified in the Fisher Controls Company Product Bulletins for Fisher Controls AOVs were less than the maximum IA system pressure.

On May 11, 1990, Fisher Controls Company was contacted and confirmed that diaphragm casings, transducers, and positioners could fail when exposed to pressures exceeding the air pressures specified in the Fisher Product Bulletins. This could result in the inability of safety-related AOVs to reposition to their safety positions due to component (i.e., actuator, valve stem, etc.) damage. Sixty-two safety-related AOVs were identified to have a potential for overpressurization failure if their upstream ARs failed open.

Initial analysis of the failure modes of the AOVs included an evaluation of a loss of air, but overpressurization had not been considered. The overpressurization failure of the AOVs and the overpressurization of the low MOPD SOVs each results in the potential failure of the AOVs to reposition to their safety positions.

Upstream of each of the sixty-two safety-related AOVs is a Fisher Model 67 AR. The Fisher Model 67 ARs had been evaluated and were found to provide a reasonable assurance of safety through RF-2; therefore, the AOVs were considered operable.

No automatic or manually initiated responses were necessary to place the plant in a safe and operable condition. No additional equipment or components were inoperable at the start of this event such that their inoperable condition contributed to this event.

CAUSE OF EVENT

The installation of AOVs with components subject to overpressurization in active safety-related applications was the result of an error by Fisher Controls Company and miscommunication with Sargent and Lundy Engineers. Fisher Controls did not consider the potential failure of the ARs in supplying the AOVs. Sargent and Lundy design/procurement specifications included performance requirements. The specifications did not specifically discuss material specification requirements or the failure modes to be

considered in evaluating each component of the AOV assembly (that is, SOV, diaphragm, actuator, etc.), including the full-open failure of the ARs.

CORRECTIVE ACTIONS

To eliminate the concern of AOV failure due to SOV or AOV overpressurization, a rupture disk, which will burst at a pressure less than the rated AOV pressure and less than the SOV MOPD, was installed for all but two of the AOVs during RF-2. Since suitable rupture disks could not be obtained for all of the valves, four air regulators, associated with valves 0VC010A and B, were replaced during RF-2, with safety-related ARs, qualified to withstand a seismic event.

To resolve the concern regarding low MOPD SOVs, a rupture disk was installed during RF-2 upstream of the SOV and/or a high MOPD SOV will be installed. In cases where overpressurization concerns are alleviated solely by installation of a high MOPD SOV, the downstream AOV has a rated pressure greater than maximum IA pressure. In order to provide the highest confidence in the AOVs, SOVs not replaced during RF-2 will be replaced with high MOPD SOVs in accordance with the schedule established by the equipment qualification (EQ) program. Those SOVs not included in the EQ program will be replaced in accordance with the routine maintenance work request program as required.

To assist vendors in selecting AOVs and SOVs adequate for all applicable failure modes, the Nuclear Station Engineering Department (NSED) posted an Engineering Change Notice (ECN) against the procurement specifications for AOVs. This ECN emphasizes that the vendor, in performing the failure mode analysis of his equipment, shall evaluate each component of the AOV assembly for potential overpressurization due to failure of vendor-provided ARs which are not seismically or environmentally qualified.

NSED revised the Mechanical Engineering Review Standard to include a review of AOVs and/or other components for impact on operability due to IA system overpressurization. Specific considerations are to include the MOPD of SOVs and actuator, transducer, and controller overpressurization.

III. END-USE DEVICE OVERPRESSURIZATION

DESCRIPTION OF EVENT

A review of the IA system piping and instrumentation diagrams (P&IDs) was performed to determine if any safety-related end-use devices were subject to overpressurization. Three hundred safety-related end-use devices having twelve separate equipment identification numbers (EINs), were found to have a design pressure less than the maximum IA system pressure. Operability of the end-use devices was not impacted and therefore, the potential for overpressurization was determined to be not safety significant for all but two of the devices. The evaluation results are discussed below.

1C11F126 and 1C11F127 are the hydraulic control unit scram inlet and outlet valves. Although there are only two EINs describing these valves, there are 145 each of 1C11F126 and 1C11F127. These valves are required to open to scram the control rods. They perform an active safety function, are normally closed, and their fail-safe position is open. General Electric Company (GE), the Nuclear Steam Supply System (NSSS) supplier for CPS, has evaluated these devices, which they supplied, and determined that although the design pressure is less than the maximum IA system pressure, the valves will perform their intended functions. The valves' ability to reposition will not be affected by short-term exposure to 110 psi. Administrative controls eliminate the possibility of long-term exposure.

Valves 1C11F180 and 1C11F181, the scram discharge volume outboard vent and drain valves, are required to close upon initiation of a scram signal. GE has determined that these valves, which they supplied, will still close and perform their intended safety function if overpressurized.

Two devices, 0VC022A and B, the Main Control Room Heating, Ventilating and Air Conditioning System (VC) [VI] makeup valves, serve an active safety function and are required to fail open. In the event of AR full-open failure the valves' actuators could potentially overpressurize, impacting the ability of 0VC022A and B to fail open. Failure of 0VC022A and B to open could result in inability to maintain adequate net positive suction head (NPSH) to the VC make-up water pumps. Upstream of each of the devices is a Fisher Model 67 AR which was evaluated and found to provide a reasonable assurance of safety through RF-2. These valves were supplied by the Fisher Controls Company.

OPR05S, the Standby Gas Treatment System (SGTS) [BH] exhaust high radiation monitor and OPR09S, the SGTS common stack high radiation monitor, are required to meet Regulatory Guide 1.97, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident" requirements. The IA system is used to purge the monitors. Purge supply pressure, by design, should not exceed 20 psi; therefore, maximum IA system pressure could potentially overpressurize the monitors, resulting in the inability to monitor releases. Upstream of each of the devices is a Fisher Model 67 AR which was evaluated and found to provide a reasonable assurance of safety through RF-2. These monitors were supplied by Eberline Instrument Corporation.

Two devices, 1B21A004P and R, were shown, by stress calculations and field testing, to be able to withstand the maximum IA system pressure to which they would be exposed. 1B21A004P and R are the non-Automatic Depressurization System (ADS) safety-relief valve accumulator tanks. They receive supply air from the ADS IA header, which has a potential maximum pressure of 200 psi. These accumulator tanks were supplied by Richmond Engineering.

GE verified the components subject to overpressurization in two devices, 1G33F041 and 1C41R001, do not affect the ability of the valves to perform their intended functions. 1G33F041 is the Reactor Water Cleanup System [CE] condenser [COND] blowdown valve. 1G33F041 has a passive safety function. 1C41R001 provides local level indication for the Standby Liquid Control System [BR] tank [TK]. These components were supplied by GE.

CAUSE OF EVENT

The installation of three of the end-use devices subject to overpressurization, 0VC022A and B and 1G33F041, was the result of an error by Fisher Controls Company and miscommunication with Sargent and Lundy Engineers. Fisher Controls did not consider the potential failure of the ARs in supplying the AOVs. Sargent and Lundy design/procurement specifications included performance requirements. The specifications did not specifically discuss material specification requirements or the failure modes to be considered in evaluating each component of the AOV assembly (that is, SOV, diaphragm, actuator, etc.), including the full-open failure of the ARs.

Failure of Sargent and Lundy to consider the failure of the ARs resulted in the potential for overpressurization of OPR05S and OPR09S.

The installation of two of the end-use devices, 1B21A004P and 1B21A004R, the accumulator tanks upstream of non-Automatic Depressurization System (ADS) safety relief valves 1B21F051C and D, was the result of an error by the Nuclear Station Engineering Department. A Field Change Request (FCR) to upgrade the accumulators to withstand pressure up to 200 psi for 1B21F051C and D was never processed. Prior to plant startup, when this omission occurred, FCRs were posted against drawings, but not incorporated into vendor manuals. Changes and improvements in the plant modification program preclude the possibility of omission of FCRs from vendor manuals and other design documents in the future.

The remaining five EINs were supplied to Illinois Power Company by GE, the NSSS supplier for CPS. GE specifications noted the maximum allowable IA pressure supplied to the EINs. To meet these requirements an AR was installed upstream of the EINs. The possibility of full-open failure of the ARs was not recognized nor evaluated by Sargent and Lundy in establishing the IA/NSSS interface.

CORRECTIVE ACTIONS

NSED revised the Mechanical Engineering Review Standard to include a review of AOVs and/or other components for impact on operability due to IA system overpressurization. Specific considerations are to include the MOPD of SOVs and actuator, transducer, and controller overpressurization.

A review and evaluation of the IA system piping and instrumentation diagrams (P&IDs) was completed. An additional 300 safety-related end-use devices, identified by twelve EINs, were identified and determined to be potentially subject to overpressurization.

Upstream of four of the end-use devices was a Fisher 67 AR which has been replaced with a safety-related regulator qualified to withstand a seismic event in accordance with Field Alteration M-F077. (The four ARs associated with two of the AOVs, 0VC010A and B, originally included in the scope of Field Alteration M-F051 have also been replaced since a suitable rupture disk was not obtainable).

A change has been made to the vendor manuals for four end-use devices, 1C11F126, 1C11F127, 1C11F180, and 1C11F181. The vendor manuals now reflect the actual pressure the equipment is able to withstand.

Two end-use devices, 1G33F041 and 1C41R001, will perform their safety function as-is.

Accumulator tanks 1B21A004P and R were shown, by stress calculations and field testing, to be able to withstand the maximum IA system pressure to which they would be exposed. The design drawings for those devices have been revised to reflect the upgraded pressures. The pressure noted on the accumulator tanks' name plates, which are located in the drywell, will be upgraded in accordance with modification MSF034 prior to the completion of the third refueling outage (RF-3).

ANALYSIS OF EVENT

The failure of an AR, which may result in the failure of safety-related AOVs and end-use devices to reposition to their safety positions, alone could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident. This event therefore is reportable in accordance with 10CFR50.73(a)(2)(v). A listing of the AOVs subject to overpressurization is included in Attachment 1.

Assessment of the safety consequences and implications of the potential failure of the AOVs to reposition to their safety positions as a result of AR failure, whether due to overpressurization of low MOPD SOVs or AOV components, indicates that this event is nuclear safety significant due to the potential inability to mitigate the consequences of an accident. Sixty-six of the seventy-three safety-related SOVs with low MOPDs were evaluated and were determined to provide reasonable assurance that they would support the function of their associated AOVs through RF-2. Two of the seventy-three have been previously tested, with satisfactory results, to a pressure greater than maximum IA system pressure. One SOV was determined to serve a passive function; therefore no action was required. The remaining four SOVs (1FSVFC111, 1HSVFC111, and the SOVs for 1FC017 and 1FC023) may have overpressurized upon failure of the AR. This could have resulted in the loss of FC system operability under certain conditions; however, the Shutdown Service Water system (SX) [BI] would have been available to supply makeup water to the FC spent fuel storage pools.

Upstream of the sixty-two safety-related AOVs identified as being subject to overpressurization are ARs which were evaluated and determined to provide a reasonable assurance that they would support operation of the AOVs through RF-2. Corrective actions to ensure operability following the completion of RF-2 are included in the CORRECTIVE ACTIONS section of this report.

Ten of the twelve additional safety-related end-use devices identified were determined to have no safety significance and to have no operability impacts.

The remaining two, 0VC022A and 0VC022B, were determined to have no operability impact but to be potentially safety significant. Upstream of these components is a Fisher 67 AR which was evaluated and was determined to provide a reasonable assurance that it would support the function of 0VC022A and B through RF-2. Overpressurization of these valves could impact the capability to maintain adequate net positive suction head pressure to the VC pumps which would render VC inoperable. The VC system is designed to maintain a habitable environment compatible with prolonged service life of safety-related components in the control room under all station operating conditions.

IP has determined that installation of SOVs with MOPDs less than the maximum IA system pressure meets the criteria of reportability in accordance with 10CFR21. As evidenced by the issuance of NRC Information Notice 88-24, the NRC has been adequately informed of the defect, and therefore in accordance with 10CFR21.21(b)(1), no additional notification is required.

IP has determined that the potential overpressurization of AOV components and safety-related end-use devices, which could result in the failure of AOVs and other devices to reposition to their required safety positions, and therefore result in the inability to mitigate the consequences of an accident, is reportable in accordance with 10CFR21. The 10CFR21 REPORT section of this report discusses these defects in detail.

ADDITIONAL INFORMATION

LER 87-066-00 discussed the failu[illegible] of junction boxes to meet environmental qualifications due [illegible] failure of a construction contractor (Baldwin Associates) to identify [illegible]he design requirements for drainage openings in the installation tr[illegible]s. Additionally, the requirement for the drainage openings was r[illegible]rly defined by Sargent and Lundy in the installation specification.

LER 88-017-01 discussed the inappro[illegible]riat[illegible]se of an Agastat Type GP relay in a low current application which resul[illegible]d in an oxide buildup, loss of control signal, and subsequent [illegible]eactor scram. The misapplication was the result of a design error by the General Electric Company.

LER 88-025-01 discussed a loss of feedwater heating system transient outside the design basis. The design basis was exceeded because the feedwater (FW) heating system failed to meet the appropriate design requirements. This was due to a lack of adequate communication between General Electric and Sargent and Lundy regarding the Nuclear Steam Supply System (NSSS) design requirements for the FW heating system.

LER 89-019-00 discussed the failure of electrical equipment to meet environmental qualification (EQ) requirements. One condition involved

the failure of solenoid valve leads to meet EQ requirements as a result of the failure of the vendor (NUTECH) to identify that Raychem heat shrink sleeve was required to meet EQ requirements.

The SOVs with less than adequate MOPDs were manufactured by Asco Valves, and supplied to CPS by various valve vendors.

The AOVs subject to component overpressurization were supplied by Fisher Controls Company. A listing of the valves and their model numbers is included in Attachment 1.

The air regulators determined to provide reasonable assurance of continued safe plant operation through RF-2 are Fisher Controls Model 67 air regulators.

The additional end-use devices subject to overpressurization were supplied by Reactor Controls, General Electric, Richmond Engineering, Fisher Controls Company, and Eberline. A listing of the end-use devices and their model numbers is included in Attachment 2.

For further information regarding this event, contact J. R. Langley, Director-Design and Analysis Engineering at (217) 935-8881, extension 3738.

10CFR21 REPORT No. 21-90-05

J. S. Perry, Vice President of Illinois Power Company (IP) was informed of this defect on August 24, 1990. NRC Region III management was verbally informed of this defect on August 24, 1990. IP is providing the following information in accordance with the requirements of 10CFR, Part 21.21(b)(3). The information has been updated to reflect the results of IP's further investigation into the potential overpressurization of safety-related end-use devices.

(i) J. S. Perry, Vice President of Illinois Power Company, Clinton Power Station, Post Office Box 678, Clinton, Illinois, 61727 is informing the Commission of the defect by means of this report.

(ii) The basic component involved in this defect was the failure to consider overpressurization of the AOV assembly. This was caused by the failure of the vendor (Fisher Controls Company) to consider the potential failure of the ARs in supplying the AOVs and miscommunications with the AE (Sargent and Lundy). The AE design/procurement specifications define performance requirements. These specifications did not specifically discuss material specification requirements or the failure modes to be considered in evaluating each component of the valve assembly, including the full-open failure of the ARs.

(iii) The supplier of the AOVs is Fisher Controls Company. The AE for Clinton Power Station is Sargent and Lundy Engineers.

(iv) A fail-open failure of the non-safety air regulator could overpressurize SOVs and AOV components resulting in SOV/AOV failure and result in the failure of safety-related AOVs to reposition to their safety positions. Failure of AOVs to achieve their safety positions could result in the inability to mitigate the consequences of an accident.

(v) The potential defect was identified on May 14, 1990, during preparation of a field alteration to replace SOVs associated with active safety-related AOVs. On August 24, 1990, after additional review, IP determined that the defect is reportable in accordance with 10CFR21.21(b)(3).

(vi) A listing of safety-related AOVs in use at CPS which were identified as potentially subject to component overpressurization is included in Attachment 1.

(vii) Corrective actions for this matter are discussed in the CORRECTIVE ACTIONS section under the AOV OVERPRESSURIZATION heading of this LER. A review of the Instrument Air (IA) system piping and instrumentation diagrams (P&IDs) was completed and an additional twelve Equipment Identification Numbers (EINs) for safety-related end-use devices (AOVs, instruments, panels, etc.) subject to overpressurization were identified. The devices were identified as being potentially subject to overpressurization since their design pressures were less than the maximum IA system pressure to which they may be exposed. A listing of these twelve EINs is included in Attachment 2. The potential for overpressurization for two of the twelve EINs has been determined to be reportable in accordance with 10CFR21.21(b)(3). OVC022A and B were supplied by Fisher Controls Company. Items ii, iii and iv are applicable to these two additional components. The corrective actions being taken to address the potential overpressurization of these components are discussed in the CORRECTIVE ACTIONS section under the END-USE DEVICE OVERPRESSURIZATION heading of this LER.

(viii) Illinois Power recommends that other licensees evaluate their safety-related AOVs and other end-use devices to determine if the potential for overpressurization exists.

Attachment 1

All valves listed below were supplied by Fisher Controls Company. Unless otherwise noted the component model number is 206-832-3U

0RA026 0RA027	Respirator Air System Containment Isolation Valves
0RA028 0RA029	Respirator Air System Drywell Isolation Valves Model # 206-832-30
0VC010A 0VC010B	Control Room Heating, Ventilating, and Air Conditioning Automatic Flow Regulators, Model # 657-NS-ES
1B21F069	Main Steam Line Isolation to Main Condenser Bypass Valves
1B33F019 1B33F020	Reactor Recirculation Sample Line Flow Control Isolation Valves
1E12F301A 1E12F301B 1E12F301C	Pressure Equalizing Valves for Reactor Pressure Vessel Isolation Check Valves
1E21F340	Pressure Equalizing Valve for Testable Check Valve 1E21F006
1E22F304	Pressure Equalizing Valve for Testable Check Valve 1E22F005 Model # 667NS-DBQNS
1E51F004	Reactor Core Isolation Cooling (RCIC) Turbine Exhaust Drain Valve, Model # 206-381-U
1E51F005	Reactor Core Isolation Cooling (RCIC) Turbine Exhaust Drain Valve, Model # 206-382-U
1E51F316	Pressure Equalizing Valve for Testable Check Valve 1E51F316
1E51F025 1E51F026	RCIC Steam Supply Drain Isolation Valves, Model # 206-381-3U
1FC038	Fuel Pool Cooling and Cleanup (FC) Surge Tank Valve, Model # 667NS-ES
1FC004A 1FC004B	FC Filter Demineralizer Flow Control Valves, Model # 657NS-ED

1IA005
1IA006

Instrument Air Containment Isolation Valves,
Model # 206-382-30

1IA007
1IA008

Instrument Air Drywell Isolation Valves,

1RF019
1RF020

Containment, Auxiliary and Fuel Building Equipment
Drain Drywell Penetration Isolation Valves,
Model # 667NS-ES

1RE019
1RE020

Containment, Auxiliary and Fuel Building Equipment
Drain Drywell Penetration Isolation Valves,
Model # 667NS

1RF021
1RF022

Containment, Auxiliary and Fuel Building Equipment
Drain Containment Penetration Isolation Valves
Model # 667NS-ES

1RE021
1RE022

Containment, Auxiliary and Fuel Building Equipment
Drain Containment Penetration Isolation Valves
Model # 667NS

1SA029
1SA030

Service Air Containment Isolation Valves

1SA031
1SA032

Service Air Drywell Isolation Valves

1SX010A
1SX010B
1SX010C

Shutdown Service Water Pump Room Cooler Outlet
Control Valves

1SX023A
1SX023B

Residual Heat Removal Heat Exchanger Room Cooler
Outlet Control Valves

1SX027A
1SX027B
1SX027C

Residual Heat Removal Pump Room Cooler Outlet
Control Valves

1SX029A
1SX029B
1SX029C

Residual Heat Removal Pump Seal Cooler Outlet Control
Valves

1SX033

Low Pressure Core Spray Pump Room Cooler Outlet
Control Valve

1SX037	Reactor Core Isolation Cooling Pump Room Coiling Coil Control Valve
1SX041A 1SX041B	High Pressure Core Spray Pump Room Cooler Outlet Control Valves
1SX181A 1SX181B	Standby Gas Treatment System Room Cooler Outlet Control Valves
1SX185A 1SX185B	Hydrogen Recombiner Room Cooler Outlet Control Valves
1SX189 1SX193A 1SX193B	Inverter Room Cooler Outlet Control Valves
1SX197 1SX209	Main Steam Isolation Valve Leakage Control Room Cooler Outlet Control Valves

Attachment 2

EIN	Component Description, Manufacturer, Model #
1C11F126	Hydraulic Control Unit (HCU) Scram Inlet Valves (145 total), Reactor Controls, Model #88
1C11F127	HCU Scram Outlet Valves (145 total), Reactor Controls, Model #88
1C11F180	Control Rod Drive (CRD) Outboard Scram Discharge Volume Vent Valve, General Electric Company, Model #A41AD84ABZ
1C11F181	CRD Outboard Scram Discharge Volume Drain Valve, General Electric Company, Model # A41AGD5ABZ.
1B21-A004P	Non-Automatic Depressurization System (ADS) Safety Relief Valve (SRV) Accumulator Tank for SRV 1B21F051C Richmonds Engineering Company, Model #77829
1B21-A004R	Non-ADS SRV Accumulator Tank for SRV 1B21F051D Richmonds Engineering Company, Model #77828
1G33-F041	Reactor Water Cleanup Condenser Blowdown Valve Fisher Controls Company, Model #667NS
1C41-R001	Standby Liquid Control Tank Level Indicator General Electric Company, Model #713BD
0VC022A	Control Room Heating, Ventilating, and Air Conditioning (HVAC) Make-Up Valve, Fisher Controls Company, Model #657NS-ES
0VC022B	Control Room Heating, Ventilating, and Air Conditioning (HVAC) Make-Up Valve, Fisher Controls Company, Fisher Controls Company, Model #667NS-ES
0PR05S	Standby Gas Treatment System (SGTS) Exhaust High Radiation Monitor, Eberline Instrument Corporation, Model #GSP-1
0PR09S	SGTS Common Stack High Radiation Monitor, Eberline Instrument Corporation, Model #GSP-1

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LICENSEE EVENT REPORT (LER) FAILURE CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8-31-88

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Clinton Power Station	0 5 0 0 0 4 6 1	9 0	0 0 4	0 2	2 1 0 OF 2 1 0

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
B	S E	I S V	F 1 3 0	N							
B	A D	I S V	F 1 3 0	N							
E	B O	I S V	F 1 3 0	N							
B	B M	F C V	F 1 3 0	N							
B	B G	P C V	F 1 3 0	N							
B	B N	V	F 1 3 0	N							
B	D A	I S V	F 1 3 0	N							
B	L D	I S V	F 1 3 0	N							
B	W K	I S V	F 1 3 0	N							
B	L F	I S V	F 1 3 0	N							
B	B I	F C V	F 1 3 0	N							
B	B O	F C V	F 1 3 0	N							
B	B N	F C V	F 1 3 0	N							
B	B J	F C V	F 1 3 0	N							
B	B H	F C V	F 1 3 0	N							
B	A A	I S V	R 1 4 0	N							
B	V I	F C V	G 0 8 0	N							
B	A A	T K	R 2 8 0	N							
B	B R	V	G 0 8 0	N							
B	B H	M O N	E 0 7 0	N							
B	C E	V	G 0 8 0	N							

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