

**(i) Name and address of the individual or individuals informing the Commission.**

Mr. Martin T. Kurr  
Quality Assurance Manager  
Fairbanks Morse  
701 White Avenue  
Beloit, WI 53511

**(ii) Identification of the facility, the activity, or the basic component supplied for such facility or such activity within the United States which fails to comply or contains a defect.**

**Facility:**

Prairie Island Nuclear Generating Plant (PINGP) returned an entire batch of 5 air start valves to Fairbanks Morse (FM). 2 of the 5 valves were identified as having a defect. No other facilities have been supplied with air start valves that have, nor are suspected to have, this same defect. The batch of 5 valves represent the entire population of product suspected to have this defect.

**Basic component which fails to comply or contains a defect:**

ASCO stainless steel solenoid actuated, normally open, valve used as a pilot valve to actuate the control air start valve on the Fairbanks Morse (FM) Emergency Diesel Generator (EDG). ASCO part number X300529797001HN, FM part number 11916969.

**(iii) Identification of the firm constructing the facility or supplying the basic component which fails to comply or contains a defect.**

Fairbanks Morse (FM)  
701 White Avenue  
Beloit, WI 53511

**(iv) Nature of the defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply.**

**Nature of defect:**

PINGP reported to Fairbanks Morse: "Prairie Island was conducting a planned replacement of both trains of air start solenoid valves to

an upgraded design that was all stainless steel. Post Maintenance Testing (PMT) was performed on the solenoid valves and the engine started as expected within 10 seconds. However, air leakage was observed after the run on the B-train of starting air SV-33645, D1 diesel generator air start solenoid valve B. Troubleshooting of the solenoid valve for SV-33645 revealed a potential internal manufacturing defect of the Normally Open (bottom) Stem. The (bottom) stem appears to be bent and (material at the tip of the cylindrical stem is missing, making it pointed instead of flat) which could potentially cause improper operation of the solenoid valve.”

The entire batch of 5 valves were returned to FM. FM confirmed the presence of the pointed tip on the bottom stem and then returned all 5 valves to the manufacturer, ASCO. ASCO reassembled the one valve and confirmed there was air leakage through the valve. The leakage path was from the air supply port to the exhaust port when the valve was in the de-energized normally open state. ASCO functionally tested the remaining 4 valves and found a second valve that also leaked.

In the presence of FM quality engineer, Dominic Dedolph, ASCO reworked and functional tested all 5 valves. During assembly of the 5 valves, each bottom stem was inspected for conformance. Stems were verified as being straight, not pointed on the end and traveled the specified distance within the valve assembly. 3 of 5 bottom stems were rejected and replaced with new conforming stems. Each of the 5 valves were completely assembled, actuated more than 10 times and then leak tested. All 5 reworked valves passed leak testing in both the energized and de-energized states.

Root Cause: The valve assembly process requires that valve travel is measured and set to be within a specified range. The range of travel is set by trimming the top and bottom valve stems. The trimming is performed using a customized benchtop milling machine. The assembler places the stem horizontally along its axis into a V block clamping fixture and secures it on the outside diameter, top of the V block with a vertical threaded rod. Since the same milling machine and fixturing is used across a wide range of valve sizes, with a wide range of valve stem lengths, the fixturing does not control the horizontal, axial positioning of the stem. Having too much of the stem tip protruding, sticking out, beyond the end of the

V block clamping fixture, creates a long lever arm effect between the clamping point and the tip of the stem. As the end mill cuts the tip of the stem that is fixtured with too much stick out, the forces of the rotating end mill traversing across the tip of the stem causes the stem to bend. The assembler apparently noticed that the bottom stem was bent and attempted to correct the bent condition by removing material on the outside diameter of the pin using the deburring file, making the stem pointed at the tip. This created a loose fit between the outside diameter of the stem and the inside diameter of the plunger. During valve actuation, the loose fit caused the plunger to bind / become axially misalign and not seat properly; causing the leak observed by the customer and verified by ASCO functional testing.

**Safety hazard which could be created by such defect:**

The D1 Emergency Diesel Generator (EDG) is the A train of backup emergency power for Unit 1 at Prairie Island Nuclear Generating Plant (PINGP). The air start system consists of two trains of starting air each capable of starting the diesel. Each train of starting air consists of a control valve and solenoid valve. The solenoid valve is a normally de-energized, normally open, valve that energizes upon a valid start signal to change position, closes and bleeds air off the control valve to allow bulk starting air to the diesel. Therefore, in the standby condition the normally open solenoid valve ports air to the control valve to keep the control valve closed until the next start signal.

The functional defect is air leakage through the valve, from the air supply port to the exhaust port when the valve is in the de-energized normally open state. If the amount of air leakage exceeds the capacity of the air compressor (compressed air supply system) makeup air, a low start air pressure alarm will occur. If the alarm event continues and the amount of air leakage is large enough and / or the compressed air supply system becomes inoperable, the compressed air pressure will become too low and become an inadequate supply of compressed to air to start the EDG.

**(v) The date on which the information of such defect or failure to comply was obtained.**

On December 22, 2023, ASCO verbally reported to FM that the pointed end on the bottom stem was a deviation from specification, that occurred during ASCO manufacturing and was the cause of the valve malfunction, leakage. On December 28, 2023, FM received ASCO’s written confirmation of the valve deviation.

**(vi) In the case of a basic component which contains a defect or fails to comply, the number and location of all such components in use at, supplied for, or being supplied for one or more facilities or activities subject to the regulations in this part.**

**Facility:**

FM is not requesting the return of any additional ASCO air start valves. Since the defect is operator dependent, ASCO confirmed that the operator who produced the defective batch of 5 valves did not assemble any other batches of valves provided to FM. However, the following is the FM sales history for the past 15 years for the ASCO part number X300529797001HN, FM part number 11916969.

<b>Company</b>	<b>Purchase Order</b>	<b>FM Sales Order (SO)</b>	<b>SO Date</b>	<b>Facility</b>	<b>Quantity</b>
Xcel Energy	4000024495	40136464	11-APR-2022	PINGP	5
Constellation	10167610 REL00431	40134259	29-SEP-2021	Limerick	2
Constellation	663102	40120200	23-OCT-2018	Limerick	24

**(vii) The corrective action which has been, is being, or will be taken; the name of the individual or organization responsible for the action; and the length of time that has been or will be taken to complete the action.**

1. As a corrective action, ASCO has designed and implemented a new tool for the stem trimming operation. The operator uses the tool to position the stem within the V block. The tool limits the amount of stick out length beyond the end of the V block.
2. As a corrective action, FM will add valve stem trimmed shape (straight and cylindrical, not pointed) and valve travel distance as critical characteristics to the CGID plans for all ASCO solenoid valves that are used by FM in nuclear safety applications.

Source inspection (CGID method 3) will be conducted by FM quality during the manufacturing assembly process on the next production run to verify ASCO's implementation and effectiveness of corrective actions. Source inspection will be the preferred method for ongoing verification of stem shape and valve travel distance.

**(viii) Any advice related to the defect or failure to comply about the facility, activity, or basic component that has been, is being, or will be given to purchasers or licensees.**

FM will provide this Part 21 notification to PINGP and Limerick.