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Send copy to
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2) C. Berlinger

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406

P21 9/1094
Publicly Available

TECHNICAL ISSUE SUMMARY

TIS No: 91-15

Date: 9/11/91

ISSUE: SCRAM SOLENOID PILOT VALVE REBUILD KIT

PROBLEM: Automatic Switch Company (ASCO) replacement kits being used to refurbish control rod drive system hydraulic control unit (HCU) scram solenoid pilot valves (SSPV) were supplied with oversized core assembly needle hole diameters. This caused two control rods at Millstone 1 to not meet the maximum insertion time limit of 7 seconds for 90% insertion as required by technical specifications, and six other rods responded slowly.

EVALUATION: During the outage that preceded the scram timing test, approximately eighty (80) SSPVs associated with one bank of HCUs were rebuilt with ASCO replacement kits supplied by General Electric (GE). Investigation by Northeast Nuclear Energy Co. revealed that the dimension of the hole in the core assembly through which the nylon tip plunger protrudes was oversized (0.177 vice 0.156 inches), thereby causing the nylon tip to stick out too far, blocking the air port. This caused a decrease in air header vent off-flow, increasing rod insertion time. This condition apparently cannot result in a complete failure to insert-

Millstone Unit 1 used Pilot Head sub-assembly Kit part No. 204-139 (GE part No. 317A6168P001) to refurbish the scram solenoids. A similar event at Vermont Yankee resulted in issuance of GE service information letter (SIL) No. 441, advising return of all spare rebuild kits shipped prior to July 1986, for inspection. The SIL also stated that reinspection does not apply to rebuild kits shipped after July 1986. The kits most recently used at Millstone 1 were received in April 1987; thus, it appears that defective core assemblies were still being shipped after July 1986.

LICENSEE/NRC ACTION: The licensee has replaced the two bad solenoid valves, verified rod insertion times, and placed a hold on further use of the remaining eighty (80) rebuild kits located in their storage. Parts are being inspected for similar deficiencies. A notice on INPO network was made. An LER is being prepared, and reportability under 10 CFR 21 assessed. The NRR Events Branch, Vender Branch, and AEOD representatives are evaluating the issue.

CONTACTS: Doug Dempsey (203-447-3179) Russell Arrighi (FTS 346-5132)

REFERENCES: 9/9/91 Daily Report; SIL 441, 7/17/86 (attached); RICSIL 008, 6/27/86
VY Inspection Reports 86-10 and 86-21

[Signature] For
Chief, Reactor Projects Section 4A

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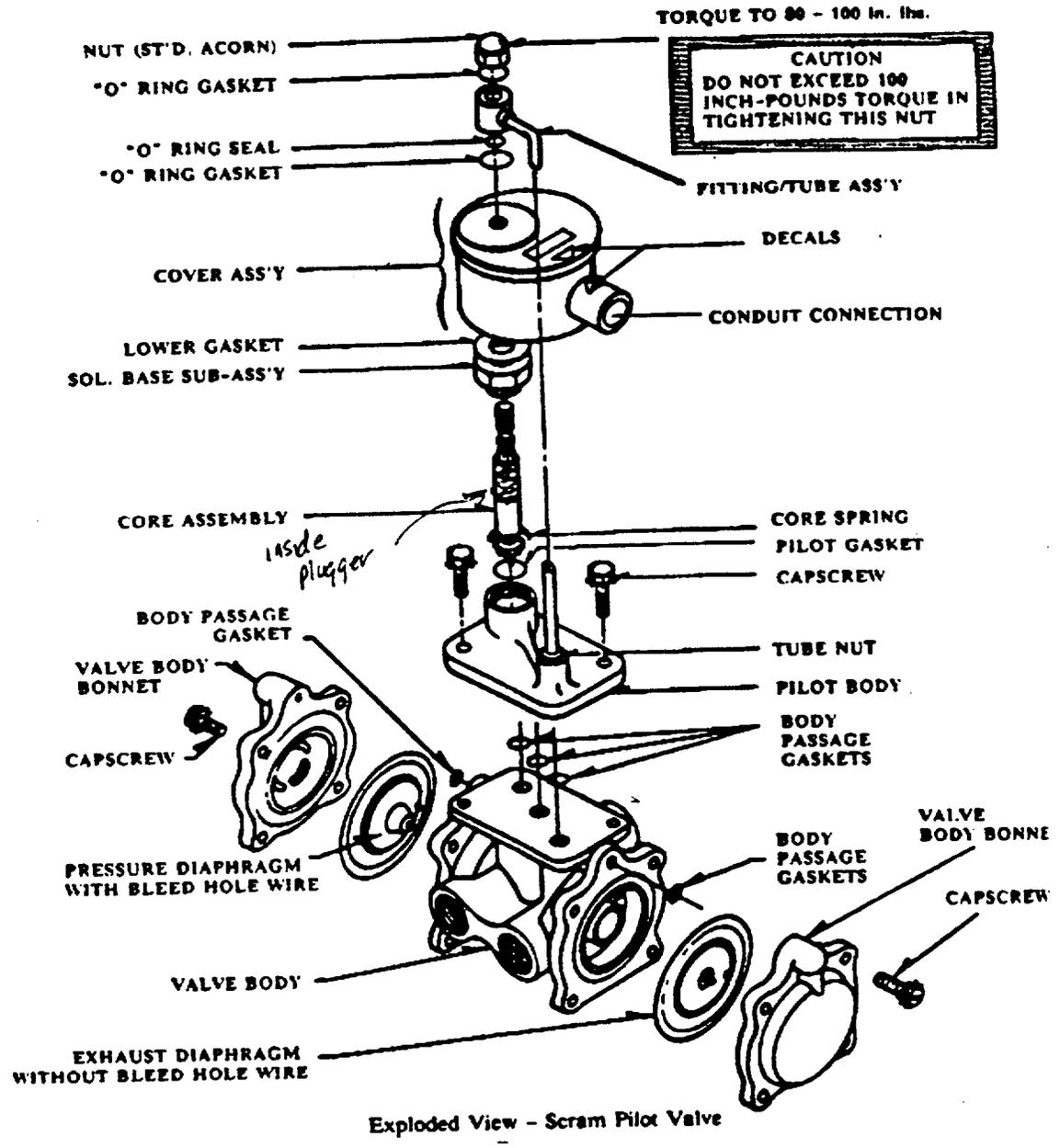
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G-EH-6-112

July 29, 1986

Mr. W.D. Romberg
Millstone Plant Station Superintendent
Northeast Utility Service Company
P.O. Box 128
Waterford, CT 06385

SUBJECT; SIL NO.441, Category 1

Dear Mr. Romberg:

We have classified this SIL as Category #1 and believe that implementation of our recommendations at your earliest convenience will minimize undesirable impact on plant operation.

We would appreciate your feedback by updating and returning the "SIL Status Response" forms with in 30 days.

Please call me on (203) 238-6852 if you have any questions.

Very truly yours,



Robert C. Livingston
Services Project Manager
Nuclear Energy Business Operation

RCL/mkh

cc: E.A. DeBarba
E.J. Mroczak
D.J. Odland
J.P. Stetz

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NUCLEAR SYSTEMS & SERVICES OPERATIONS

SAN JOSE, CALIFORNIA

July 17, 1986
File Tab CSIL No. 441
Category 1CONTROL ROD DRIVE SCRAM ANOMALY

Six out of eighty-nine control rod drives (CRD) at a BWR/4 recently failed the single rod scram test during planned testing performed at vessel hydrostatic pressure. One of these CRDs failed to scram. The remaining five CRDs exhibited delays of 5 to 7 seconds before the start of rod motion was detected.

The purposes of this SIL are to discuss the causes of these scram anomalies and to recommend an inspection program to eliminate future occurrences of this type.

Please note that this SIL is a followup to RICSIL 008 issued by General Electric on June 27, 1986.

Discussion

The scram anomalies experienced at the BWR/4 in question were confined to "Dual-type" Automatic Switch Company (ASCO) scram solenoid pilot valves (SSPV). Each CRD Hydraulic Control Unit (HCU) contains two of these valves. ASCO "Dual-type" SSPVs have been supplied to all BWR/2s and 3s and to most BWR/4s and 5s.

SSPVs are de-energized during a scram initiation and allow depressurization of the air-operated scram valves so that the latter can complete their required scram function. The reported scram anomalies were attributed to mechanical discrepancies.

Examination of the twelve SSPVs in these six CRD HCUs revealed the following three distinct discrepancies:

1. Complete separation of the core spring from the core assembly occurred in one SSPV.
2. Abnormal extension of the Zytel (nylon) core assembly needle valve occurred in four SSPVs.
3. Incorrect assembly of the exhaust diaphragm was discovered in one SSPV.

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SIL No. 441
 Category 1

The failure of one CRD to scram was caused by the complete separation of the core spring from the core assembly. The other discrepancies produced the slow scram times observed in the other five CRDs.

Subsequent inspection of the remaining SSPVs revealed two other types of discrepancies. These were (1) out-of-round inside diameter of the solenoid base subassembly and (2) a deformed core spring. Although these two discrepancies did not cause abnormal scram performance in this case, they could have had an adverse effect on scram performance.

Prior to the single rod scram testing at the BWR/4 in question, all of the SSPVs were refurbished with ASCO Scram Pilot Head Assembly Replacement Kits No. 204-139 manufactured by ASCO and supplied by General Electric.

These "Dual-type" ASCO SSPVs have accumulated more than 100,000 reactor years of successful operating experience. The rebuild kits, which have been in use for more than twenty years, are identical for all "Dual-type" ASCO SSPVs currently in reactor operation. For example, approximately 21,000 rebuild kits have been delivered to BWRs since 1979. Based on their recommended shelf life and operational life limitations, which are defined in SIL 128 Revision 1, Supplement 1, Revision 1 (SIL 128 R1 S1 R1), many of the rebuild kits have been placed into service. Please note that SIL 128 R1 S1 R1 refers to ASCO Scram Pilot Head Assembly Replacement Kits No. 204-139 as GE Part No. 236X558-014.

The anomalies observed at the BWR/4 in question currently represent an extremely small percentage of the total rebuild kit population. Furthermore, among the SSPV discrepancies discovered at this BWR/4, only the core spring separation caused a failure to scram while the other discrepancies led to delayed scram initiation.

The planned single rod scram testing prior to plant startup following the SSPV refurbishment demonstrated that such testing is a prudent method of determining CRD HCU operability and of exposing such anomalies. However, in the event the pre-startup testing had not identified the scram anomalies, the small number and the random occurrences of these anomalies would not have prevented hot shutdown. Furthermore, all of the control rods with these SSPV anomalies would have been inserted during a plant scram by the existing scram air header dump system (that is, the backup scram valves).

Therefore, successful operation and extensive application of these SSPVs and rebuild kits together with the random, small number of occurrences of these discrepancies eliminate any potential safety impact if the discrepancies had gone undetected.

Recommended Action

General Electric recommends that BWR owners establish the following inspection program to eliminate occurrences of the discrepancies described in this SIL.

SII. No. 441
Category 1

- A. ASCO Scram Pilot Head Assembly Replacement Kits No. 204-139 Currently Installed in SSPVs

Plants currently operating with ASCO Scram Pilot Head Assembly Replacement Kits No. 204-139 installed in SSPVs should continue to utilize the Technical Specification surveillance test requirements to demonstrate acceptable SSPV performance. Close attention should be given to the CRD start of motion times or the first detectable position from rod position "48". If unusual delay times occur, refurbishment of the SSPV should be considered at the next planned outage.

- B. ASCO Scram Pilot Head Assembly Replacement Kits No. 204-139 Currently In Utility Inventory, But Not Installed In SSPVs

If your inventory contains ASCO Scram Pilot Head Assembly Replacement Kits No. 204-139 which were shipped to you prior to July 17, 1986, please contact your local General Electric Service Representative and arrange to return the kits to General Electric for reinspection. The reinspection will consist of checking the pertinent interfacing dimensions of the core spring, core assembly and solenoid base subassembly. The reinspection also will check for the proper core assembly needle hole diameter. This reinspection does not apply to ASCO Scram Pilot Head Assembly Replacement Kits No. 204-139 shipped to you after July 17, 1986.

General Electric recommends the following inspection and testing be performed during all future refurbishments of SSPVs.

- C. SSPV Inspection During Refurbishment At the Reactor Site

Determine that the first coil of the core spring is fully engaged (360°) into the core assembly groove during installation of the scram pilot head assembly replacement kits. Handle the core assembly carefully at all times to prevent separation of the core spring from the core assembly. Removal of the core spring is not recommended.

incorporate into future MPDOS

- D. SSPV Testing Following Refurbishment at Reactor Site

After refurbishment of the SSPVs, verify proper valve operation either by conducting scram valve time tests or performing single rod scram time testing.

Done

If you want additional information on this subject, please contact your local General Electric Service Representative.

Prepared by: N. J. Biglieri
E. Y. Gibo

Issued by:

B. H. Eldridge
B. H. Eldridge, Manager
Services Information and
Analysis

Product Reference:
CII: Control Rod Drive

Automatic Switch Co.

Manufacturers of
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Since 1888



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December 2, 1991

United States Nuclear Regulatory Commission
Washington DC 20555

ATTENTION: Mr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation

SUBJECT: Possible Incorrect Component Used In Certain ASCO Rebuild Kits

Dear Mr. Murley:

We enclose information relating to certain valve rebuild kits manufactured by Automatic Switch Company (ASCO).

As you will see from the enclosed material, there is the possibility that an incorrect component was inadvertently used in a portion of one lot of 300 rebuild kits manufactured in early 1987. ASCO was alerted to this potential problem upon examination of samples returned to us by General Electric Co. Use of the incorrect component to rebuild a valve may result in an increase in the valve's response time.

ASCO does not have adequate knowledge of the actual installation and operating conditions of the valves in which these kits are installed to determine whether their malfunction would create a "substantial safety hazard" as defined in 10CFR21.3 so that formal notification would be required by 10CFR21.21. We are likewise unable to conduct the evaluation necessary to make such a determination. Although ASCO is not obliged to submit formal notification pursuant to 10CFR21, we are reporting this information to you consistent with the provisions set forth at 10CFR21.21. We are taking immediate action to notify G.E. that the balance of their order (in addition to product provided to Millstone) is suspect, and to offer whatever assistance we can to locate, evaluate and replace, if necessary, affected product.

ASCO will certainly cooperate with any further investigation of the problem that may be required. Should you wish to discuss this further or obtain any additional information, please let us know.

Very truly yours,
AUTOMATIC SWITCH COMPANY

James P. Weaver
Vice President & General Manager
Valve Products Division

JPW/bg

enclosure

1. NAME AND ADDRESS OF INDIVIDUAL INFORMING THE COMMISSION:

Mr. James P. Weaver
Vice President & General Manager, Valve Products Division
Automatic Switch Company
50 Hanover Road
Florham Park, NJ 07932

2. IDENTIFICATION OF THE ITEMS SUPPLIED:

A Total of 300 Rebuild Kits, ASCO Part Number 204139, sold to General Electric Company in early 1987. These kits are used to rebuild ASCO Scram Pilot Valves.

3. NATURE OF THE FAILURE AND POTENTIAL SAFETY HAZARD:

In September 1991, General Electric reported to ASCO that ASCO Pilot Valves, Part Number HV90-405-2A, in service at the Millstone Nuclear Power Plant, exhibited slow response times during control testing. These valves had been rebuilt with kits purchased by General Electric and supplied to the Millstone Nuclear Power Plant against ASCO shop order 02020T. ASCO confirmed, from examination of parts returned, that the core assemblies supplied in some of these kits were incorrect, and that the incorrect core assembly, if installed in an ASCO HV90-405-2A valve could result in the slow response times reported by Millstone. In addition to the 150 kits supplied to the Millstone Plant, the G.E. order included an additional 150 kits, some of which were shipped to G.E. and some of which were drop-shipped per G.E. instructions.

We have had no reports of problems from any locations other than Millstone. However, in view of the fact that the components for all 300 kits were issued to our production floor at the same time, the possibility exists that kits from this particular order, supplied to locations other than Millstone may include the incorrect core assembly.

4. THE CORRECTIVE ACTION WHICH IS BEING TAKEN:

ASCO will notify General Electric of the potential problem with affected product in addition to that supplied to Millstone. We will make replacement product available to G.E., should that be required. ASCO will provide G.E. with whatever assistance possible in the location and evaluation of affected product.

Although we no longer supply rebuild kits, this core assembly is used in replacement pilot head assemblies supplied to G.E. All stock of this core assembly has been 100% re-inspected and found to be acceptable to print. In addition, ASCO's inspection sheet for this core assembly has been revised to require the inspector to record certain attributes 100% to preclude a recurrence of the problem.

Automatic Switch Co.

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December 2, 1991

General Electric
175 Curtner Avenue
San Jose, CA 95125

ATTN: Mike Mestressat

REF: P.O.#205-87C179, ASCO Pilot Kit #204-139
G.E. Part #317A616P001, ASCO Return #56364

Mike,

We have completed our investigation into the problems reported by Millstone with the kits referenced. ASCO Quality Assurance confirmed that an incorrect component (core assembly) was used in the manufacture of some of these kits. In keeping with the provisions of 10CFR21, the attached correspondence has been sent to the United States Nuclear Regulatory Commission. By copy of this letter, ASCO is notifying G.E. that slow response times could occur in HV90-405-2A valves that are rebuilt with these mis-manufactured kits from your Order #205-87C179.

ASCO will certainly cooperate with any further investigation required and assist to locate, evaluate, or replace any affected product. Please let me know how we can work together to resolve this problem.

Regards,
AUTOMATIC SWITCH COMPANY

A handwritten signature in black ink, appearing to read "Ken Thomas, Jr.", is written over the typed name and title.

Ken Thomas, Jr.
Sr. Service Engineer
Valve Service Dept.

KT/bg

enclosure