

TVA EMPLOYEE CONCERNS
SPECIAL PROGRAM

REPORT NUMBER: 301.05-SQM

REPORT TYPE: Sequoyah Nuclear Plant-Element

REVISION NUMBER: 3

TITLE: Questionable Design and Construction
Practices

REASON FOR REVISION:

Revised to incorporate SRP and TAS comments	Revision 1
Revised to incorporate evaluation findings subsequent to NRC review	Revision 2
Revised to incorporate SRP comments	Revision 3

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2/7/87
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SRP: *James R. Russell* 2-10-87
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MANAGER OF NUCLEAR POWER DATE
CONCURRENCE (FINAL REPORT ONLY)

*SRP Secretary's signature denotes SRP concurrences are in files.

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TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT
EMPLOYEE CONCERNS TASK GROUP
OPERATIONS
CEG

Subcategory: Mechanical Equipment Reliability/Design

Element: Questionable Design and Construction Practices

Report Number: 301.05-SQN Revision 3
MAS-86-002
RCM-85-001
I-86-233-SQN

Evaluator:	<u>Scott McComb/ Jon M. Richards</u> Scott McComb/ Jon M. Richards	<u>2/7/87</u> Date
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I. QUESTIONABLE DESIGN AND CONSTRUCTION PRACTICES AT SEQUOYAH NUCLEAR PLANT

This report specifically addresses three employee concerns about the design and construction practices at Sequoyah Nuclear Plant (SQN). All three of the concerns are specific to SQN. Two of these concerns were determined to be nuclear safety related by the NSRS.

II. SPECIFIC EVALUATION METHODOLOGY

Three specific concerns are evaluated in this report.

- MAS-86-002: "Improper mounting of limit switches on 2-FCV-30-15."
- RCM-85-001: "Failed check valve on B-CST allowed water on top of bladder. Bladder could get into ERCW suction."
- I-86-233-SQN: "An anonymous individual mailed in a potential safety hazard associated with the condensate demineralizer waste evaporator (CDWE) on elevation 706 of the Auxiliary Building at Sequoyah Nuclear Plant (SQN). The original stainless steel piping for pumping "Bottoms" from the CDWE was removed and replaced by a temporary rubber hose. Extensive modifications are being performed over the rubber hose. Welding hot chips have been observed falling on the rubber hose. Damage to or rupture in the hose would result in possible personnel exposure of a high amount."

Concerns MAS-86-002 and RCM-85-001 were expressed through the concerned individuals' supervisor. Concern I-86-233-SQN was mailed in to NSRS (Nuclear Safety Review Staff) by an anonymous individual.

The three concerns are specific in nature and will be addressed separately.

A review of previous evaluations conducted by SQN line organization and Nuclear Safety Review Staff (NSRS) was performed. Items reviewed are listed in the Reference Section of this report. Interviews with knowledgeable cognizant DNE and SQN personnel were performed, when needed, to address these concerns.

Due to the specific nature of these concerns, no review of regulatory requirements was performed.

III. FINDINGS

MAS-86-002:

1. A memorandum from B. M. Patterson to R. W. Olson dated March 7, 1986, "Sequoyah Nuclear Plant - Zone Switch Mountings," states that "During field verification and after cycling of zone switches following maintenance, a mounting problem of zone switches on butterfly valves with circular movement of the actuator was identified." The memorandum identifies the following zone switches:

1-ZS-30-7	1-A
1-ZS-30-14	1-A
1-ZS-30-16	1-B
2-ZS-30-14	1-A
2-ZS-30-15	1-B
2-ZS-30-16	1-B

The memorandum suggests straightening the zone switch on existing mounting so that the actuation level arm lever is tangent to the strike plate's circular plate (Reference 1).

2. A memorandum from R. W. Olson to B. M. Patterson on April 11, 1986, "Sequoyah Nuclear Plant - Zone Switch Mountings," says that, the zone switches referenced in the March 7, 1986 memorandum (S53 860124 910) were investigated, and it was found that a mounting problem existed on 2-ZS-30-15 and no problems were identified on the remaining five zone switches. The memorandum also stated that the problem with 2-ZS-30-15 was corrected by work request B-110369 (Reference 2).
3. A memorandum from M. A. Skarzinski to F. C. Mashburn dated April 28, 1986, "MAS-86-002," states that, "2-ZS-30-15 has been repaired, and concern MAS-86-002 is closed." The memorandum also states, "We will continue to evaluate these conditions as they are identified and will push Modifications for a resolution of the previously identified ZSs they claim require no fine tuning" (Reference 3).

RCM-85-001: Informal telephone interview with a modification engineer at SQN revealed:

1. The CST check valve problem was the result of five styrofoam float valves at the top of the bladder decaying. These five styrofoam discs were supposed to seal off five holes in the top of the bladder when the water reaches the top of the bladder. These styrofoam discs shrank in size until they passed through the holes they were to seal against.

III. FINDINGS (continued)

2. The check valve problem was fixed by replacing the styrofoam discs with nonshrinkable plastic discs, under WP 11844 initiated by ECN L6515 and Category D, FCR 3317. No further problems with the check valves have been reported since this modification.
3. There was a concern with the liner being drawn into the auxiliary feedwater vacuum dragline. The cage around the suction inlet was enlarged to prevent this potential occurrence. This work was also initiated by ECN-L 6515.

I-86-233-SQN: Informal interview with a site services engineer, a radwaste shift engineer, and an HP supervisor, plus a review of SQN operating instructions, radiological instructions, and HP survey records, revealed the following:

1. The bottoms piping was replaced under ECN-6326 with a temporary drain line (hose) that runs from the Condensate Demineralizer Waste Evaporator (CDWE) to the FDCT (floor drain collector tank). The old piping routed the offgrade distillate to the floor drains. This resulted in the floor drain getting clogged because of boric acid precipitates. To ensure that this did not happen again, a temporary hose for offgrade distillate was routed directly to the floor drain collector tank. This 2-inch hose is about 400 feet long and drops about 80 feet from the CDWE to the FDCT.
2. The rubber hose that was installed on the above ECN can be used to transfer distillate, offgrade distillate, and evaporator bottoms to the FDCT. The offgrade distillate should not be highly radioactive. Under normal fluid flows the specific activity ranges between non-detectable up to 1.27×10^{-4} $\mu\text{Ci/ml}$. The average specific activity is 10^{-6} $\mu\text{Ci/ml}$. However, under what is referred to as, emergency operations, the bottoms are flushed through the temporary hose. When this is done, radioactive materials are expected to be flushed through the hose. When the bottoms need to be flushed, the radwaste shift engineer, according to Sequoyah Operating Instruction (SOI)-77.1B3, notifies HP prior to flushing, in order that the control of areas where the hose runs is locked and monitored by HP according to SQN Radiological Control Instruction (RCI)-13. No personnel access or work in the areas where the hose runs is allowed when these areas are locked and monitored. Since the temporary hose was installed in August, 1985, the bottoms have been flushed several times. In one particular example, reference 7, HP controls were adequately in place with surveys taken before, during, and after the flushing.

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3. A walkdown of the locations where the temporary hose was accessible indicated the following:

The hose comes out of the evaporator and goes directly to the floor, then to the Upper Head Injection (UHI) room. In the UHI room the hose runs 20 feet to 30 feet off the floor; out of the way of workers. In the Auxiliary Building Gas Treatment System (ABGTS) room, radiological control tags clearly mark the hose. Steps leading over the hose are present to protect the hose from personnel traffic. In the 690-foot pipe chase, the hose runs along the ceiling. No signs are on the hose, but the pipe chase is in a designated C-Zone.

4. The pressure in the hose is very low. In fact, the 80-foot drop between the CDWE system and the floor drain collector tank (FDCT) results in a vacuum on the line.
5. A review of ECN-6326 revealed that DCR 2152 would install permanent piping from the CDWE to the FDCT and that the temporary hose was installed under this ECN. This DCR has not yet been worked.

Conclusions

1. Concern MAS-86-002 on zone switch 2-ZS-30-15 was valid; the problem was corrected by work performed under work request B-110369. The zone switch was straightened on its existing mounting so that the actuation lever arm travel is tangent to the strike plate's circular path. Additional zone switches were checked and determined to be correctly mounted.
2. There was a problem with the check valves on the CST bladder. These valves have been replaced, and a larger inlet grate has been installed over the auxiliary feedwater vacuum dragline inlet in the CST. Concern RCM-85-001 was valid, but all repairs at SQN have been made.
3. Concern I-86-233-SQN is valid. There is a temporary rubber hose installed between the CDWE system and the FDCT. This hose carries offgrade distillate from CDWE to FDCT. This hose can also carry CDWE "bottoms." When bottoms are flushed, under what is referred to as, emergency operations, HP controls are in place to ensure there is no access of personnel in areas where the hose runs, per RCI-13. The hose is protected and well marked in areas where personnel traffic is expected to routinely occur. No procedures have been violated, therefore, no corrective actions are deemed necessary. Further, an ECN has been issued to replace the rubber hose with permanent piping.
4. Based on the findings presented above no outstanding nuclear safety-related issues were found.

IV. ROOT CAUSES

The results of this evaluation have determined these concerns to be specific and isolated problems. The original design may be a potential root cause for all three concerns.

V. GENERIC APPLICABILITY

Since WBN and SQN's are similiar plants, these three concerns need to be evaluated at WBN. Also, the zone switch problem and CST bladder problem need to be evaluated for applicability to Browns Ferry and Bellefonte Nuclear Plants.

VI. REFERENCES

1. Memorandum from B. M. Patterson to R. W. Olson dated March 1986, "Sequoyah Nuclear Plant - Zone Switch Mountings"
2. Memorandum from R. W. Olson to B. M. Patterson dated April 11, 1986, "Sequoyah Nuclear Plant - Zone Switch Mountings"
3. Memorandum from M. A. Skarzinski to F. C. Mashburn dated April 28, 1986, "MAS-86-002"
4. Sequoyah Operating Instruction - 77.1B3-unit 0, revision 46
5. Sequoyah Radiological Instruction, RCI-13, "Access Control of High Radiation Areas Where Radiation Intensity is Greater Than or Equal To 1000 mRem/hour"
6. Sequoyah Radiological Survey Number 2-86-2688, dated November 29, 1986
7. Sequoyah ECN-6326, dated April 29, 1985
8. ECTG Files for Concern Numbers MAS-86-002, RCM-85-001, and I-86-233-SQN.

VII. IMMEDIATE OR LONG-TERM CORRECTIVE ACTION

The zone (limit) switch mounting problem was an isolated case. The CST bladder check valve discs were replaced with an upgraded material so as to prevent recurrence of the of the problem. Therefore, no corrective action is required.

The concern involving CDWE bottoms needs no corrective action. Controls by HP are in place per RCI-13 to assure no personnel access to areas where bottoms piping runs.

REFERENCE - ECPS120J-ECPS121C
 FREQUENCY - REQUEST
 ONP - ISSS - RHM

TENNESSEE VALLEY AUTHORITY
 OFFICE OF NUCLEAR POWER
 EMPLOYEE CONCERN PROGRAM SYSTEM (ECPS)
 LIST OF EMPLOYEE CONCERN INFORMATION

PAGE - 181
 RUN TIME - 11:47:07
 RUN DATE - 10/21/86

CATEGORY: OP PLANT OPER. SUPPORT

SUBCATEGORY: 30105 QUESTIONABLE DESIGN/CONSTRUCTION PRACTICE

KEYWORD A
 KEYWORD B
 KEYWORD C
 KEYWORD D

CONCERN NUMBER	CAT	SUB CAT	S H PLT J LOC	GENERIC APPL B B S W F L Q B	QTC/NSRS INVESTIGATION REPORT	P S R	CONCERN DESCRIPTION
I-86-233-SQN	OP OP	30105 30804	S SQN	N N N N K-FORM		NS	AN ANONYMOUS INDIVIDUAL MAILED IN A POTENTIAL SAFETY HAZARD ASSOCIATED WITH THE CONDENSATE DEMINERALIZER WITH THE CONDENSATE DEMINERALIZER WAS THE EVAPORATOR (CDWE) ON EL 706 OF THE AUXILIARY BUILDING AT SQN. THE ORIGINAL STAINLESS STEEL PIPING FOR PUMPING "BOTTOMS" FROM THE CDWE WAS REMOVED AND REPLACED BY A TEMPORARY RUBBER HOSE. EXTENSIVE MODIFICATIONS ARE BEING PERFORMED OVER THE RUBBER HOSE. WELDING HOT CHIPS HAVE BEEN OBSERVED FALLING ON THE RUBBER HOSE. DAMAGE TO OR RUPTURE IN THE HOSE WOULD RESULT IN POSSIBLE PERSONNEL
MAS-86-002	OP	30105	N SQN	Y Y Y Y REPORT		NS	IMPROPER MOUNTING OF LIMIT SWITCHES ON 2-FCV-30-15
RCM-85-001	OP	30105	N SQN	N Y Y Y REPORT		SS	FAILED CHECK VALVE ON BCST ALLOWED WATER ON TOP BLADDER. BLADDER COULD GET INTO ERCW SUCTION.

3 CONCERNS FOR CATEGORY OP SUBCATEGORY 30105