

UNNRO REGION II
ATLANTA, GEORGIA

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March 10, 1982
L-82-86

Mr. James P. O'Reilly
Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

Re: St. Lucie Unit 1
Docket No. 50-335
I&E Bulletin 81-01
Surveillance of Mechanical Snubbers



Florida Power & light has completed testing the mechanical snubbers installed in St. Lucie Unit 1 which are on safety related systems. The information requested by Bulletin 81-01 concerning this testing is attached.

Very truly yours,

Robert E. Uhrig
Vice President
Advanced Systems and Technology

REU/JEM/ga

Attachment

cc: Harold F. Reis, Esquire

Director of Inspection & Enforcement
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

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ATTACHMENT

St. Lucie Unit 1
Docket No. 50-335
I&E Bulletin 81-01

Results of Snubber Inspection

1. Description of the visual examinations and tests performed.

The inspector visually inspected the linkage assembly, paying particular attention to the condition of the pins, cotter pins, bolt tightness and the anchoring bracket welds. To determine operability he unpins one end of the snubber and manually strokes it through its full travel, and records its extension.

2. Number of snubbers examined and tested.

85 snubbers, FPL tag numbers 115 through 198 and 202, installed on 2" and smaller nominal diameter piping were inspected. All snubbers were Pacific Scientific Mechanical Snubbers and consisted of 6 PSA-1's and 79 PSA-1/4's.

3. Numbers of failures identified.

A The inspection results are as follows:

- a. Fifty-five (55) snubbers were found to be in satisfactory condition.
- b. Fourteen (14) additional snubbers were also found to be in satisfactory condition. However the snubber extension was measured to be less than the minimum required by the FP&L current procedure. See Attachment B.
- c. Two (2) snubbers, FP&L tag Nos. 143 and 186 were found to have a broken internal rod. See Attachment A.
- d. Two (2) snubbers FP&L tag Nos. 122 and 166 were found to be "stiff", i.e., hard to operate. See Attachment A.
- e. Twelve (12) snubbers, FP&L tag Nos. 117, 120, 129, 135, 146, 147, 165, 170, 175, 180, 194, and 196 were found to be inoperable due to a locked-up condition. See Attachment A.

All snubbers listed in 3.A.c thru e were replaced by FP&L personnel with new units.

The review of the (14) snubbers noted in 3.A.b had shown that snubbers were initially installed with either the cold setting or the hot position setting being less than the minimum required by current FP&L procedures. A comparison of the recorded initial cold setting with the measured extension in the inspection report showed that almost all snubbers returned to the initial cold setting, and only in few cases the measured extension did not match the initial setting.

For the (14) snubbers in 3.A.b the magnitude and direction of the thermal movement was verified with the computer analysis. It was determined that in each case the direction of thermal growth is away from the close setting. Therefore, it is assumed that each snubber remained operational at all conditions.

It is assumed that the broken internal rod in the snubbers noted in 3.A.c was caused by rotation of the telescoping cylinder around its support cylinder to line up the end attachments.

One of the "stiff" snubbers noted in 3.A.d, tag No. 122 was found hard to operate because of rusted condition. The breakaway force exceeded the normal friction force for size PSA-1/2.

The other "stiff" snubber, tag No. 166 was also very tight. It could be moved by hand only with effort. The cause of stiffness has not been determined.

For the twelve snubbers noted in 3.A.e the cause of the lock-up was assumed to be as follows:

- a. (5) snubbers, tag Nos. 135, 165, 170, 175 and 180 were found to be painted over with an epoxy type paint, most likely during original construction.
- b. (1) snubber, tag No. 129 was found to be corroded due to steam impingement from an adjacent leaking valve.
- c. (2) snubbers located on the trestle, tag Nos. 194 and 196 were found to be corroded.
- d. (1) snubber, tag No. 147 was found to be corroded. It was installed inside insulation lagging.
- e. In (1) snubber, tag No. 117, the top of internal rod (an extension of the ball screw shaft) was found to be bent. In another snubber, tag No. 120, the shaft was found to be slightly bent causing eccentric turning and binding. In both cases the wear marks were visible. Such conditions are often caused by blows, falls, or forced alignment of end connections during installation.
- f. In (1) snubber, tag No. 146, the cause for the lock-up has not been determined.
- g. (11) snubbers were visually inspected by Ebasco personnel. Some of the snubbers were in plastic bags because of radiation contamination. Also, the installation of replacement snubbers on the let-down line inside the RAB was inspected. No unusual conditions were noted.

For the purpose of analysis the actual cold settings for the locked-up snubbers (FPL tag Nos. 135, 170, 175 and 180) were verified in the following manner: Actual measurement of cold setting and pin to pin dimensions of the snubber replacement installation was performed and verified by an FPL inspector on 11/14/81. Except for the snubber tag No. 135, the inspected cold settings of the replacement snubbers, before adjustments, are considered to represent the cold settings of the locked-up snubbers. As noted by the FPL inspector, the U-Bolt end attachment on snubber FPL tag No. 135 had to be rotated to get

the proper snubber setting. He also indicated the pipe did not "spring" when the locked-up snubber was removed, therefore, the cold setting of the locked-up snubber FPL tag No. 135 is considered to be the same as the lock-up position.

B STRESS ANALYSIS REVIEW RESULTS

All the piping systems on which the snubbers mentioned in 3.A.a through e were evaluated for the reported snubber condition.

The snubbers mentioned in 3.A.b and d have no impact on stress analysis.

The snubbers FPL tag Nos. 143 and 186 with a broken internal rod have no impact to the results of Stress Analyses except for the seismic analysis. Since no significant seismic event has been recorded at the site since the initial installation, the piping system (1-2"-B-1) was not adversely affected.

Combined thermal/displacement analyses considering the appropriate snubbers at the locked-up positions have been performed. The resulting stress ranges in the piping due to the locked-up snubbers, FPL tag Nos. 117, 120, 129, 146, 147, 194 and 196 are found to be well within the code allowable stress levels.

Investigation and analysis of RC-295, a 3/4 inch diameter line, that included locked-up snubbers, FPL tag Nos. 135, 170, 175 and 180 revealed some high stresses, (51, 778 psi max.) in the system. This stress level, however is still less than $3S_c$ or 56,400 psi, the code allowable stress limit for a single non-repeated movement and is therefore acceptable.

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT NO. 1

ATTACHMENT A

| SA CALC. NO. | SNUBBER SIZE | FP&L TAG.NO. | MARK NUMBER | LINE NO. | CALC. LOAD, LB | COLD SETTING | EXTENSION MEASNT, IN. | CONDITION | | REMARKS |
|-----------------|-----------------|-----------------|----------------|--------------|-------------------|-----------------|--------------------------|-----------|-----------|-----------------------|
| | | | | | | | | O.K. | LOCKED-UP | |
| 1 | 1/4 | 117 | RC-1-221A | 1-2-RC-142 | 262 | 1.86 | 2.25 | NO | YES | ROD SHAFT BENT AT TOP |
| | 1/4 | 120 | RC-1-192A | 1-2-RC-142 | 104 | 2.29 | 1.75 | NO | YES | BALL SCREW SHAFT BENT |
| | 1/4 | 129 | RC-1-124C | 1-2-RC-142 | 270 | 3.14 | 2.5 | NO | YES | CORRODED FROM STEAM |
| | 1/4 | 146 | RC-1-25C | 1-2-RC-142 | 62 | 1.74 | 1.5 | NO | YES | CAUSE NOT DETERMINED |
| 2189 | 1/4 | 135 | RC-220-105 | 1-3/4-RC-295 | 116 | 3.75 | 3.75 | NO | YES | PAINTED |
| | 1/4 | 170 | RC-220-112(T) | 1-3/4-RC-295 | 74 | 2.5 | 3.75 | NO | YES | PAINTED |
| | 1/4 | 175 | RC-220-112(B) | 1-3/4-RC-295 | 74 | 2.19 | 2.5 | NO | YES | PAINTED |
| | 1/4 | 180 | RC-220-114 | 1-3/4-RC-295 | 54 | 1.38 | 1.25 | NO | YES | PAINTED |
| 17 | 1/4 | 143 | B-2-H1 | 1-2-B-1 | 172 | 1.0 | 2.38 | NO | -- | INTER ROD BROKEN |
| | 1/4 | 147 | CH-141-36C | 1-2-CH-147 | 315 | 1.5 | 2.13 | NO | YES | RUSTED |
| 4004 | 1/4 | 165 | RC-221-148 | 1-3/4-RC-294 | 38 | 3.5 | 3.0 | NO | YES | PAINTED |
| 1594 | 1/4 | 166 | RC-164-11(Z) | 1-3/4-RC-227 | 50 | 1.5 | 2.38 | NO | -- | STIFF |
| | 1/4 | 194 | MSH-7B | | | 2.0 | 2.38 | NO | YES | RUSTED |
| | 1/4 | 196 | MSH-7A | | | 2.0 | 2.0 | NO | YES | RUSTED |
| EDS003 | 1/4 | 122 | CH-129-99 | 1-2-CH-128 | 232 | 1.5 | 1.5 | NO | -- | STIFF (RUSTED) |
| | 1/4 | 186 | B-1-H3A | 1-2-B-1 | 200 | 2.0 | 2.38 | NO | -- | INTER-ROD BROKEN |

FLORIDA POWER & LIGHT COMPANY
ST. LUCIE UNIT NO. 1

ATTACHMENT B.

| SA CALC. NO. | SNUBBER SIZE | FP&L TAG NO. | MARK NUMBER | LINE NO. | CALC. LOAD, LB | COLD SETTING | EXTENSION MEASNT, IN. | CONDITION | | REMARKS |
|-----------------|-----------------|-----------------|----------------|---------------|-------------------|-----------------|--------------------------|-----------|-----------|---------------------|
| | | | | | | | | OK | LOCKED-UP | |
| EDS | 1/4 | 125 | CH-142-9 | 1-2-CH-147 | 53 | 3.34 | 3.5 | YES | -- | EXT. LESS THAN MIN. |
| 3900001- | 1/4 | 126 | CH-143-30C | 1-2-CH-147 | 21 | 0.5 | 0.5 | YES | -- | DO |
| 002 | 1/4 | 141 | CH-143-26C | 1-2-CH-147 | 259 | 0.5 | 0.5 | YES | -- | DO |
| | 1/4 | * 145 | CH-143-34C | 1-2-CH-147 | 44 | 0.5 | 0.25 | YES | -- | DO |
| 2299 | 1/4 | 163 | SI-69-58 | 1-2-SI-400 | 50 | 3.0 | 3.5 | YES | -- | DO |
| 1331 | 1/4 | 176 | MSI-2-H1 | 1-3/4-MSI-104 | 106 | 0.31 | 0.5 | YES | -- | DO |
| 1334 | 1/4 | * 178 | MSI-4-H1 | 1-3/4-MSI-102 | 108 | 0.5 | 0.25 | YES | -- | DO |
| 4004 | 1 | * 179 | RC-216-15 | 1-1-RC-105 | 394 | 3.13 | 3.75 | YES | -- | DO |
| 4001 | 1/4 | 181 | RC-215-9B | 1-3/4-RC-293 | 198 | 3.19 | 3.5 | YES | -- | DO |
| 1333 | 1/4 | 183 | MSI-3-H1 | 1-3/4-MSI-110 | 106 | 0.31 | 0.25 | YES | -- | DO |
| | 1/4 | 124 | CH-65-54C | 1-2-CH-103 | 358 | 1.42 | 3.13 | YES | -- | DO |
| 2189 | 1 | 182 | RC-219-6A | 1-3/4-RC-170 | 410 | 3.14 | 3.5 | YES | -- | DO |
| | 1/4 | 123 | RC-217-5(x) | 1-3/4-RC-291 | 126 | 0.75 | 0.75 | YES | -- | DO |
| | 1 | 148 | RC-1-124A | 1-2-RC-142 | 436 | 2.91 | 3.38 | YES | -- | DO |



INTER-OFFICE CORRESPONDENCE

| | | | |
|----------|--|-----------|--------------------|
| TO | R.E. Uhrig | LOCATION | General Office |
| | | DATE | MAR 10 1982 |
| FROM | J.W. Williams, Jr. | COPIES TO | D.K. James |
| | | | C.S. Kent |
| SUBJECT: | ST. LUCIE UNIT 1 | | H.N. Paduano/922SL |
| | I&E BULLETIN 80-01 | | H.S. Ruff |
| | <u>SURVEILLANCE OF MECHANICAL SNUBBERS</u> | | C.M. Wethy |
| | | | J. Yespica |
| | | | PRN-LI-82-48 |

The subject information is attached for your review and forwarding to the NRC. The information in the attachment to this report, except Item 1, was provided by EPP.

J.W. Williams, Jr.

JEM/mbd

Attachment



& date
1-82-86

Mr. James P. O'Reilly
Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
101 Marietta Street, Suite 3100
Atlanta Georgia 30303

Corrections

Dear Mr. O'Reilly:

Re: St. Lucie Unit 1
Docket No. 50-335
I&E Bulletin 80-01
Surveillance of Mechanical Snubbers

Florida Power & Light has completed testing the mechanical snubbers installed in St. Lucie Unit 1 which are on safety related systems. The information requested by Bulletin 80-01 concerning this testing is attached.

Very truly yours,

Robert E. Uhrig
Vice President
Advanced Systems and Technology

REU/JEM/mbd

Attachment

cc: Harold F. Reis, Esquire

*DIRECTOR OF INSPECTION & ENFORCEMENT
U.S. Nuc. REG. Comm.
WASH. DC 20555*



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Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

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Robert E. Uhrig
Vice President
Advanced Systems and Technology

REU/JEM/mbd

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cc: Harold F. Reis, Esquire

STATE OF FLORIDA)
)
COUNTY OF DADE)

That he is Vice President of Florida Power &
Light Company, the herein;

Robert E. Uhrig
Robert E. Uhrig

10 day of March, 1982

My commission expires: _____

My commission expires: