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U.S. NUCLEAR REGULATORY COMMISSION

Docket No. 50-335

LICENSEE: Florida Power & Light Company (FPC)

FACILITY: St. Lucie Unit 1

SUBJECT: MEETING SUMMARY - ST. LUCIE UNIT 1 STEAM GENERATOR TUBES

On November 9, 1981 we met with FPL and Combustion Engineering (CE) to discuss steam generator (SG) tube degradation revealed by inspections during the current refueling outage at St. Lucie Unit 1. A list of meeting attendees is attached as Enclosure 1.

Two CE SGs are in service at the plant. Primary coolant passes through U-tubes which serve as both a boundary and a heat transfer medium between the primary and secondary fluids. There are about 8500 tubes in each SG. Tubes in rows 1-18 (inner rows) have a single 180° U-bend. The remaining tubes have two 90° bends and a length of horizontal tube. As illustrated in Figure 1 the SG design includes a V (batwing) support structure.

The plant operated from April to September 1981 with a small (a few hundred ml per day) primary to secondary leak in the B SG. After the plant was shutdown for reload the leaking tube was identified, using Helium, to be in Row 10. FPL therefore conducted an inspection, using multifrequency eddy current testing, of the inner tube rows. These tubes had not been extensively tested during previous inspections.

The results of the testing thus far are as follows:

SG	Total Tubes Inspected	DEGRADED TUBES: Tubes Degraded < 20%	Tubes Degraded 20-40%	Tubes Degraded > 40%
A	2282	9	6	24
B	3228	17	4	42

- The majority of tubes tested are in Rows 1 through 22 and rows 66 through 74. (Rows 66-74 were inspected due to potentially similar secondary flow restrictions by batwing support.)

- All degraded tubes are in Rows 1-18 and all but a few are in Rows 8-12.

- The degradation is in the U-bend, at or near the apex of each degraded tube. The degradation is on the intrados of the U-bend and starts at the outside of the tube.

OFFICE							
SURNAME							
DATE							

FPL and CE could not specify the cause of this degradation. The plant's SG's have been operated since 1976. Support plate rim-cut was performed in 1979 to correct a tube denting problem identified in 1978. FPL stated that secondary water chemistry control has been good and that no main condenser tube leaks have occurred since titanium condenser tubes were installed in March 1979. FPL and CE do feel the cause is more likely chemical corrosion than a mechanical phenomenon. Radiography is being done for additional information.

FPL stated that the inspection results place both SG's in Category C-3 per Technical Specification 3.4.5. For Category C-3, the Technical Specifications require inspection of all tubes in each SG. FPL believes, however, that they have met the intent of the Technical Specifications by bounding the problem with respect to number and location of degraded tubes. Therefore, FPL does not plan to inspect additional tubes during the current outage.

FPL's planned actions are to plug all tubes with degradation $\geq$ 20% (TS requires plugging of tubes degraded $\geq$ 40%); have the plant on line by November 23, 1981; and, in about 6 months shut down for further SG tube inspection.

We agreed that the extent of tube degradation appears to have been identified; however, we stated that a Technical Specification change would be necessary to eliminate the requirement for further tube inspections this outage.

Original signed by:

Chris C. Nelson, Project Manager
Operating Reactors Branch #3
Division of Licensing

Enclosures:
1. List of Attendees
2. Figure 1 SG Design

cc w/enclosure:
See next page

OFFICE	ORB#3:DL						
SURNAME	CNelson/cab						
DATE	11/12/81						

MEETING SUMMARY DISTRIBUTION

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*Copies also sent to those people on service (cc) list for subject plant(s).

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Doug Earlas
H. K. Williams
R. R. Mills
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Hugh Kennedy
Robert
K. N. Harris
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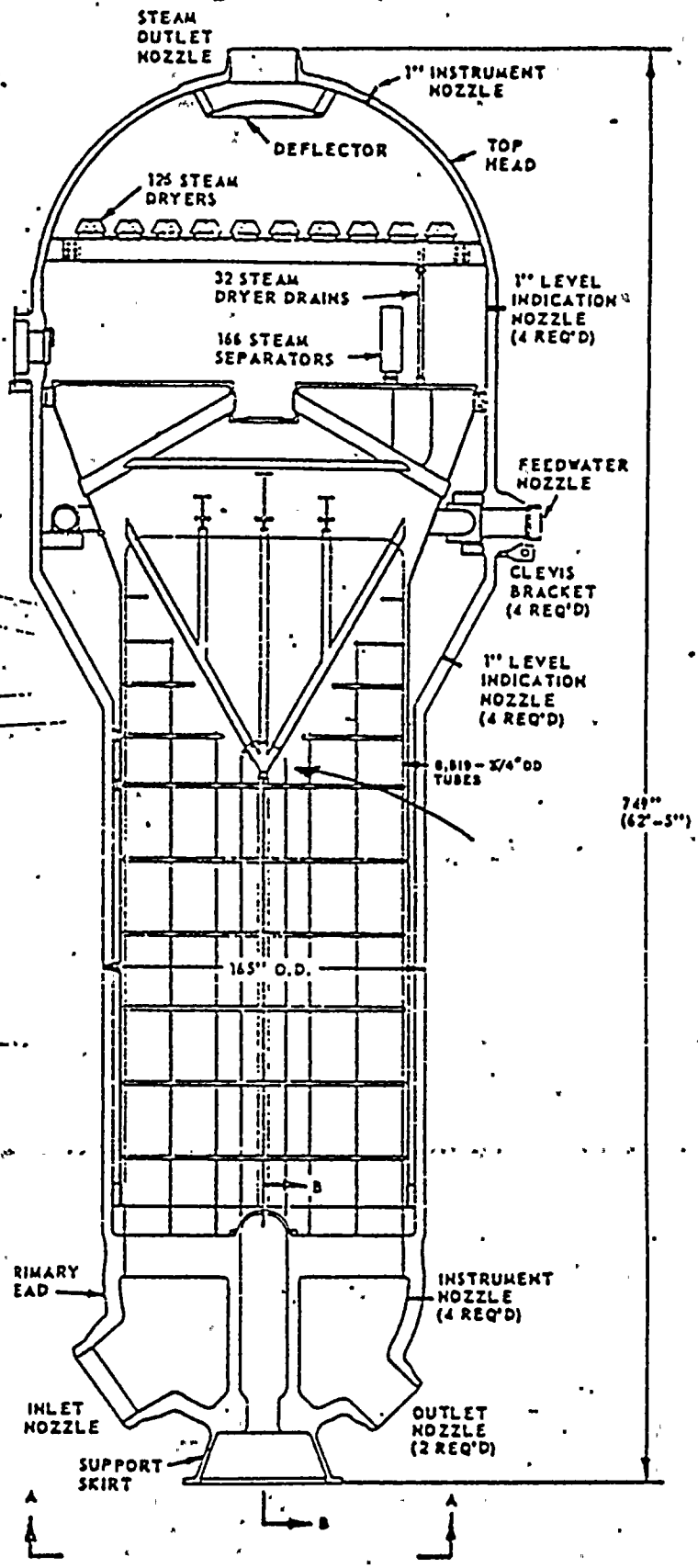
Enclosure #1

NOVEMBER 9, 1981 MEETING - ST. LUCIE UNIT 1

SG TUBE INSPECTION

NRC	CE	FPL
Chris Nelson	J. P. Lareau	Dave Evans
Conrad McCracken	F. L. Carpentino	Rich Kaminsky
Emmett Murphy	Dave Earles	Robert Frechetre
Keith Wichman	H. K. Williams	K. N. Harris
E. H. Girard	R. M. Rentler	R. J. Acosta
Alan R. Herdt	R. R. Mills	George Gotch
C. J. Cheng	H. Williams	John Sheetz
Louis Frank		
H. F. Conrad		
V. Nerses		
Wm. J. Collins		
Robert A. Clark		
Wm. V. Johnston		
P. R. Matthews		
V. Benaroya		
Stefan S. Pawlicki		

FIGURE 1


STEAM OUTLET NOZZLE
1" INSTRUMENT NOZZLE
DEFLECTOR
TOP HEAD
125 STEAM DRYERS
32 STEAM DRYER DRAINS
166 STEAM SEPARATORS
1" LEVEL INDICATION NOZZLE (4 REQ'D)
FEEDWATER NOZZLE
CLEVIS BRACKET (4 REQ'D)
1" LEVEL INDICATION NOZZLE (4 REQ'D)
0.819 - 3/4" OD TUBES
749" (62'-5")
165" O.D.
B
RIMARY EAD
INSTRUMENT NOZZLE (4 REQ'D)
INLET NOZZLE
OUTLET NOZZLE (2 REQ'D)
SUPPORT SKIRT
A
B
A