

A06/07/78

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)
DISTRIBUTION FOR INCOMING MATERIAL 50-335

REC: REID R W
NRC

ORG: UHRIG R E
FL PWR & LIGHT

DOC DATE: 06/01/78
DATE RCVD: 06/06/78

DOCTYPE: LETTER NOTARIZED: NO COPIES RECEIVED
SUBJECT: LTR 3 ENCL 3

RESPONSE TO NRC LTR DTD 03/01/78... FORWARDING APPLICANT'S OPERATING HISTORY OF THE STEAM GENERATORS AT SUBJECT FACILITY, AND ADVISING RESULTS OF THE FIRST UNIT 1 STEAM GENERATOR INSERVICE INSPEC CONDUCTED IN APRIL, IS SCHEDULED FOR SUBMITTAL BY 07/31/78.

PLANT NAME: ST LUCIE #1

REVIEWER INITIAL: XJM
DISTRIBUTOR INITIAL: *ne*

***** DISTRIBUTION OF THIS MATERIAL IS AS FOLLOWS *****

RESPONSES TO STEAM GENERATOR QUESTIONNAIRE
(DISTRIBUTION CODE A023)

FOR ACTION: BR CHIEF ORB#4 BC**W/7 ENCL

INTERNAL:	REG FILE**W/ENCL	NRC PDR**W/ENCL
	<u>I. & E**W/2 ENCL</u>	OELD**W/ENCL
	HANAUER**W/ENCL	AD FOR OPER TECH**W/ENCL
	ENGINEERING BR**W/ENCL	REACTOR SAFETY BR**W/ENCL
	PLANT SYSTEMS BR**W/ENCL	EEB**W/ENCL
	EFFLUENT TREAT SYS**W/ENCL	

EXTERNAL: LPDR'S
 FT PIERCE, FL**W/ENCL
 TIC**W/ENCL
 NSIC**W/ENCL
 RON GAMBLE**W/6 ENCL
 KEN HERRING**W/6 ENCL
 ACRS CAT B**W/16 ENCL

DISTRIBUTION: LTR 50 ENCL 50
SIZE: 1P+13P

CONTROL NBR: 781570332
MA 60

***** THE END *****



REGULATORY DOCKET FILE COPY.



June 1, 1978
L-78-193

US NRC
DISTRIBUTION SERVICES
BRANCH

1978 JUN 6 PM 12 19

RECEIVED DISTRIBUTION
SERVICES UNIT

Office of Nuclear Reactor Regulation
Attention: Mr. R. W. Reid, Chief
Operating Reactors Branch #4
Division of Operating Reactors
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Reid:

Re: St. Lucie Unit 1
Docket No. 50-335
Steam Generator Information

In accordance with our letter of March 1, 1978 (L-78-78), information on the operating history of the steam generators at St. Lucie Unit 1 is attached. A followup report, containing more detailed information on the results of the first Unit 1 steam generator inservice inspection conducted in April, is scheduled for submittal to your office by July 31, 1978.

Very truly yours,

Robert E. Uhrig
Vice President

REU/MAS/cpc

Attachment

cc: Mr. James P. O'Reilly, Region II
Harold F. Reis, Esquire

781570332

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ENCLOSURE 1
STEAM GENERATOR OPERATING
HISTORY QUESTIONNAIRE

NOTE: All percentages should be reported to four significant figures.

I. BASIC PLANT INFORMATION

Plant: St. Lucie Unit 1

Startup Date: 4-22-76 (Initial Criticality)

Utility: Florida Power & Light Company

Plant Location: Hutchinson Island, Saint Lucie County, Florida

Thermal Power Level: 2560 Mw

Nuclear Steam Supply System (NSSS) Supplier: Combustion Engineering

Number of Loops: Two

Steam Generator Supplier, Model No. and Type: Combustion Engineering; CE67508/
CE67509 Vertical U-tube

Number of Tubes Per Generator: 8485

Tube Size and Material: 3/4-inch OD, .048" Wall; Inconel composition Ni-Cr-Fe Alloy

II. STEAM GENERATOR OPERATING CONDITIONS

Normal Operation

Temperature: $T_c=541^\circ\text{F}$ $T_h=585^\circ\text{F}$

Flow Rate: 5.603×10^6 lb/hr Allowable Leakage Rate: 1.0 gpm

Primary Pressure: 2235 psig

Secondary Pressure: 800 psig

Accidents

Design Base LOCA Max. Delta-P: 985 psi reverse dp

Main Steam Line Break (MSLB) Max. Delta-P: 1850 psi

III. STEAM GENERATOR SUPPORT PLATE INFORMATION

Material: Carbon Steel

Design Type: Lower 8 - lattice/gridwork "egg crates"; upper 2 - drilled plates

Design Code: 1965 ASME Section III for Class A vessels (including Winter 1967 Addenda)

Dimensions: ~12.5' diameter, 1" thick

Flow Rate: 61×10^6 lb/hr

Tube Hole Dimensions: .765"

Flow Hole Dimensions: .250"

IV. STEAM GENERATOR BLOWDOWN INFORMATION

Frequency of Blowdown: Continuous

Normal Blowdown Rate: ~80 gpm

Blowdown Rate w/Condenser Leakage: ~125 gpm

Chemical Analysis Results (see attached sheet entitled
Steam Generator Blowdown Information)

Results	Parameter Control Limits

V. WATER CHEMISTRY INFORMATION (see attached sheet entitled
Water Chemistry Information)

Secondary Water

Type of Treatment and Effective Full Power (EFP) Months of Operation:

Typical Chemistry or Impurity Limits:

Feedwater

Typical Chemistry or Impurity Limits:

Condenser Cooling Water

Typical Chemistry or Impurity Limits:

Demineralizers - Type:

Cooling Tower (open cycle, closed cycle or none):

VI. TURBINE STOP VALVE TESTING (applicable to Babcock & Wilcox (B&W) S.G. only)

Frequency of Testing

Actual: N/A

Manufacturer Recommendation: N/A

Power Level At Which Testing Is Conducted

Actual: N/A

Manufacturer Recommendation: N/A

Testing Procedures (Stroke length, stroke rate, etc.)

Actual: N/A

Manufacturer Recommendation: N/A

VII. STEAM GENERATOR TUBE DEGRADATION HISTORY (Followup report due July 31, 1978)

(The following is to be repeated for each scheduled ISI)

Inservice Inspection (ISI) Date:

Number of EFP Days of Operation Since Last Inspection:

(The following is to be repeated for each steam generator)

Steam Generator Number:

Percentage of Tubes Inspected At This ISI:

Percentage of Tubes Inspected At This ISI That Had Been Inspected At
The Previous Scheduled ISI:

Percentage of Tubes Plugged Prior to This ISI:

Percentage of Tubes Plugged At This ISI:

Percentage of Tubes Plugged That Did Not Exceed Degradation Limits:

Percentage of Tubes Plugged As A Result of Exceedance of Degradation
Limits:

Sludge Layer Material Chemical Analysis Results:

Sludge Lancing (date):

Ave. Height of Sludge Before Lancing:

Ave. Height of Sludge After Lancing:

Replacement, Retubing or Other Remedial Action Considered: (Briefly
Specify Details)

Support Plate Hourglassing:

Support Plate Islanding:

Tube Metalurgical Exam Results:

(Followup report' due July 31, 1978)

Fretting or Vibration in U-Bend Area (not applicable to B&W S.G.) AS OF (4)

Percentage of Tubes Plugged.	Other Preventive Measures

Wastage/Cavitation Erosion AS OF (4)

Hot Leg: (Repeat this information for the cold leg on Combustion Engineering (C.E.) and Westinghouse (W) S.G.)

Area of Tube Bundle (1)	a	b	c	d	e
% of Tubes Affected by Wastage/Cavitation Erosion					
% of Tubes Plugged Due to Exceedance of Allowable Limit (2)					
% of Tubes Plugged That Did not Exceed Degradation Limit					
Location Above Tube Sheet (3)					
Max. Wastage/Cavitation Erosion Rate for Any Single Tube (Tube Circum. Ave) (Mills/Month)					
Max. Wastage/Cavitation Erosion in Any Single Unplugged Tube (Tube Circum. Ave) (Mills)					

Cracking AS OF (4)

Caustic Stress Corrosion Induced in C.E. and W S.G.

Flow Induced Vibration Caused in B&W S.G.

(Followup report due July 31, 1978)

- 5 -

Cracking (Con't)

Hot Leg: (Repeat this information for the cold leg on C.E. and W S.G.)

Area of Tube Bundle (1)	a	b	c	d	e
% of Tubes Affected By Cracking					
% of Tubes Plugged Due to Cracking					
% of Tubes Plugged That Did Not Exceed Degradation Limit					
Location Above (3) Tube Sheet					
Rate of Leakage From Leaking Cracks (gpm)					

Denting (Not applicable to B&W S.G.) AS OF (4)

Hot Leg: (Repeat this information for the cold leg on C.E. and W S.G.)

Area of Tube Bundle (1)	a	b	c	d	e
% of Tubes Affected by Denting					
% of Tubes Plugged Due to Exceedance of Allowable Limit (2)					
% of Tubes Plugged That Did Not Exceed Degradation Limit					
Rate of Leakage From Leaking Dents (gpm)					
Max. Denting Rate for Any Single Tube (Tube Circum. Ave) (Mills/Month)					
Max. Denting in Any Single Unplugged Tube (Tube Circum. Ave) (Mills)					



Handwritten text, possibly a signature or name, located at the top center of the page.

TABLE KEY

NOTE: All percentages refer to the percent of the tubes within a given area of the tube bundle.

(1)

Area of the Tube Bundle	No. of Tubes Within the Area
a. Periphery of Bundle (wi/20 rows for B&W; wi/10 rows for C.E. and <u>W</u>)	
b. Patch Plate (wi/4 rows)	
c. Missing Tube Lane (B&W only) (wi/5 rows)	
c. Flow Slot Areas (C.E. and <u>W</u> only) wi/10 rows)	
d. Wedge Regions (C.E. and <u>W</u> only) (wi/8 rows)	
e. Interior of Bundle (remainder of tubes)	

(2)

Allowable Limit for Wastage/Cavitation Erosion:

Allowable Limit For Denting:

(3)

1. Specifies area between the tube sheet and the first support plate

2. Specifies in the following locations: (list the additional locations)

Wastage/Cavitation Erosion:

Cracking:

(4)

Specify the date of the inspection for which results have been tabulated.

VIII. SIGNIFICANT STEAM GENERATOR ABNORMAL OPERATIONAL EVENTS

DATE	SUMMARY
	(Include event description; unscheduled ISI results, if performed; and subsequent remedial actions) None

IX. CONDENSER INFORMATION (see attached sheet entitled Condenser Information)

Condenser Material	Tube Date	Leakage Rate (gpm)	Detectable Limit	Detection Method
Aluminum Brass			.001 gpm	Cation Conductivity
----- 70/30 Copper- Nickel				----- Chloride Analysis

(Air Removal Section)

X. RADIATION EXPOSURE HISTORY WITH RESPECT TO STEAM GENERATORS

Date	Exam Dosage (Man-Rem)	Repair Dosage (Man-Rem)	Comments
3/78-4/78	12.455	None	None

XI. DEGRADATION HISTORY FOR EACH TYPE OF DEGRADATION EXPERIENCED FOR TEN REPRESENTATIVE, UNPLUGGED TUBES FOR WHICH THE RESULTS OF TWO OR MORE ISI'S ARE AVAILABLE

If the results for ten tubes are not available, specify this information for all those tubes for which results are available.

(repeat the following information for each tube and degradation type)

Steam Generator No:

Tube Identification:

Type of Degradation: (specify denting, wastage, cavitation erosion, caustic stress corrosion cracking, or flow induced vibration cracking)

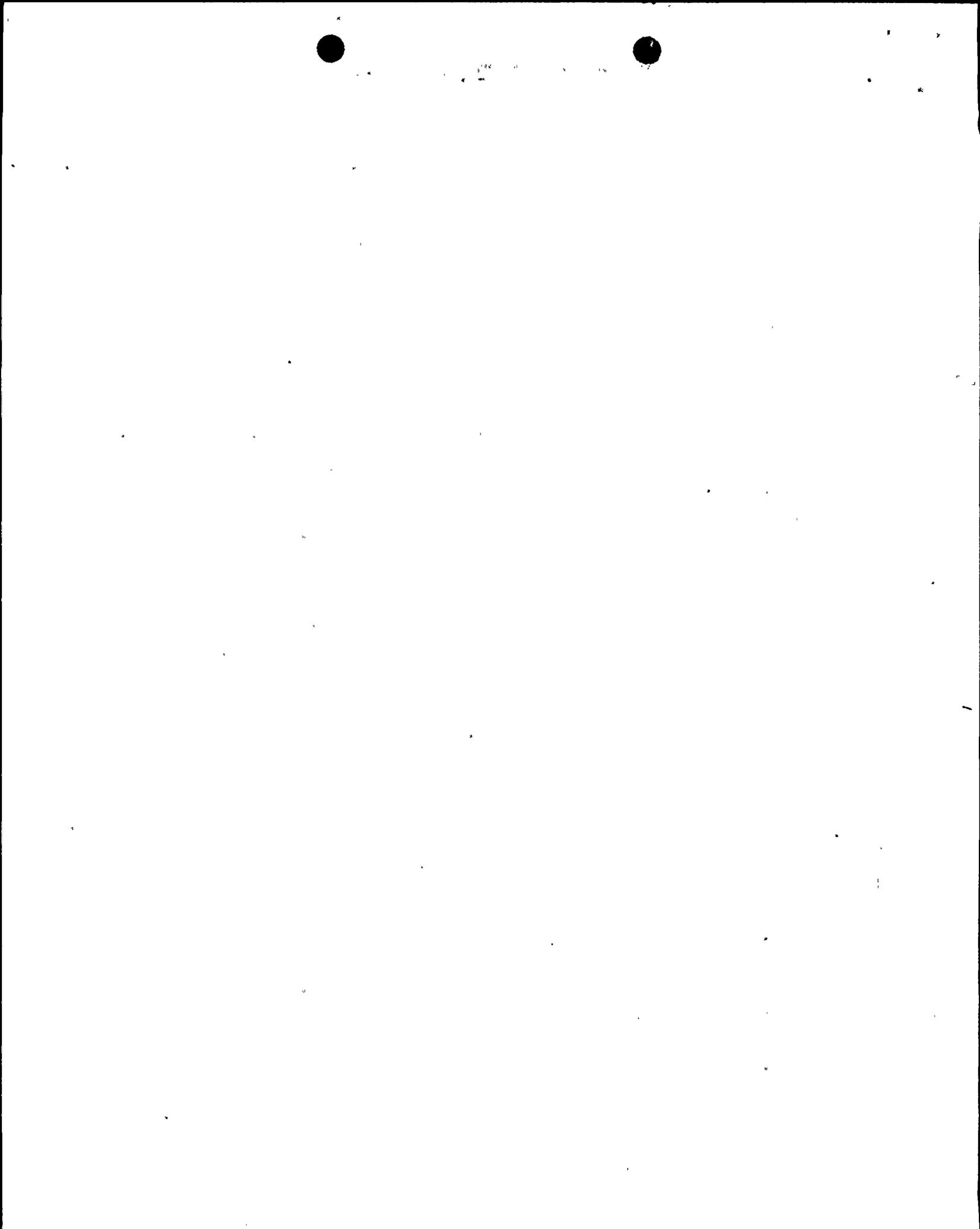
(repeat the following information chronologically for each ISI for which results are available)

ISI Date:

Amount of Degradation: (specify amount and units)

EFP Months of Operation Since Last ISI for Which Results are Given:

NOTE: Only 1 S/G ISI has been performed to date at St. Lucie Unit 1.



V. WATER CHEMISTRY INFORMATION

CONDENSATE

TYPE OF TREATMENT - DE-AERATED BY CONDENSER AIR REMOVAL SYSTEM.
- HYDRAZINE ADDED FOR DISSOLVED OXYGEN REMOVAL.

EFFECTIVE FULL POWER (EFP) MONTHS OF OPERATION - ~ 15

TYPICAL OPERATING CHEMISTRY - $\text{NH}_3 = .56$ PPM
(WITHOUT CONDENSER LEAKAGE) DISSOLVED $\text{O}_2 = 9.7$ PPB
 $\text{Cl}^- < .05$ PPM

CHEMISTRY RANGES - $\text{NH}_3 \leq 1$ PPM
(+ IMPURITY LIMITS) DISSOLVED $\text{O}_2 \leq 100$ PPB
 $\text{Cl}^- \leq .15$ PPM

FEEDWATER

TYPICAL OPERATING CHEMISTRY - pH - 8.87
CONDUCTIVITY - 5.82 μmhos
 $\text{Cl}^- < .05$ PPM
HYDRAZINE - 21.2 PPB
SUSPENDED SOLIDS - .022 PPM
 $\text{Fe} - 19.4$ PPB
 $\text{Cu} - < 10$ PPB

CHEMISTRY RANGES - pH - 8.8-9.2
(+ IMPURITY LIMITS) CONDUCTIVITY - VARIABLE
 $\text{Cl}^- \leq .15$ PPM
HYDRAZINE - 10-50 PPB
SUSPENDED SOLIDS - ≤ 1 PPM
 $\text{Fe} - \leq 10$ PPB
 $\text{Cu} - \leq 10$ PPB

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CONDENSER COOLING WATER (SEA WATER)

TYPICAL CHEMISTRY - CALCIUM - 400 PPM
MAGNESIUM - 1270 PPM
SODIUM - 10,600 PPM
IRON - .002 - .02 PPM
BICARBONATE - .41 PPM
CARBONATE - .41 PPM
SULFATE - 7.7 PPM
CHLORIDE - 19,000 PPM
FLUORIDE - 1.4 PPM
SILICON - .2 - 4.0 PPM
BORON - 4.6 PPM
CHLORINE - 0 PPM
SALINITY - 33-36 PPT
DISSOLVED OXYGEN - 5-7 PPM (3.2 PPM MIDSUMMER)
PHOSPHOROUS (AS PO_4^{\equiv}) - .05 - 10 PPM
NITROGEN (AS NO_3^-) - .002 - .0075 PPM
NITROGEN (AS NO_2^-) - 0 - .001 PPM
NITROGEN (AS NH_3) - 0 - .9 PPM

EFFLUENT LIMITS - FLOW = 1180 CFS (763.2 MGD)
pH = 6.0 - 9.0
TOTAL CHLORINE RESIDUAL - NOT TO EXCEED .1 PPM
INTAKE VELOCITY - NOT TO EXCEED 1.0 FPS
DISCHARGE TEMPERATURE - 43.9 C (111 F)

DEMINERALIZER TYPE - NONE

COOLING TOWER - NONE



The following information was obtained from the records of the
 Department of the Interior, Bureau of Land Management, on
 the subject of the above-captioned tract of land.
 The tract of land described in the above-captioned
 instrument is situated in the County of [redacted],
 State of [redacted]. The tract of land is
 bounded on the north by [redacted], on the
 east by [redacted], on the south by [redacted],
 and on the west by [redacted]. The tract of
 land is situated in the [redacted] Section,
 [redacted] Township, [redacted] Range,
 [redacted] Meridian, [redacted] State of [redacted].
 The tract of land is situated in the [redacted]

IX. CONDENSER INFORMATION

CONDENSER MATERIAL	TUBE LEAKAGE		DETECTABLE LIMIT (GPM)	DETECTION METHOD	
	DATE	RATE (GPM)			
ALUMINUM-BRASS.	4-1-77	.034	0.001	CATION* CONDUCTIVITY	
	4-29-77	.038			
	5-13-77	.046			
	5-17-77	.046			
	5-22-77	.072			
	70/30 COPPER-NICKEL IN AIR REMOVAL SECTION.	10-11-77			.064
		11-15-77			.046
		11-23-77			.038
		11-29-77			.042
		12-31-77			.047
	1-3-78	.026			
	1-5-78	.042			
	1-7-78	.064			
	1-24-78	.064			
	2-6-78	.038			
	3-13-78	.029			
	3-16-78	.040			
	3-18-78	.310	Y	Y	

* LEAKS VERIFIED BY CHLORIDE ANALYSIS.

