

# Generating Station

## Field Trip Notes

Station Name	Elvira's Blum
Location/Address	
Date Constructed	2014
GF Attendees	ANUS, CLARKE
Company Attendees, Title	LISA ELLIOTT Brian Maxwell
Date/Time	6/23 8:00 AM
License Date(s)	

Generating Units							
Unit	Date in Service	MW (gross/net)	Fuel	Fuel Delivery	Fuel Disposal	Base/Int/Peak	Number of Starts
5	2014	1250	CAS	liquefied			

**Comments**

3.1 COMBINED CYCLE  
 S. KAMAS CTS, TOSHIBA GEAR TURBINE  
 CTS 1-2 CTS OFF FOR MAINT  
 HAS DATE ~ 6400

CTS, 272 MW  
 DUCT ~ 100 MW

Major Equipment (including year installed)						
Unit	Scrubber	SCR	Baghouse	Cooling Tower	Stacks	
1	-		-	-	-	

**Comments**

Gas Link Boiler From MANTIS, Compressor @ MANTIS  
 6.5 min Diesel Tank  
 (2-3 AM SUPPLY)

Duct - 1A.M

# Field Trip Notes

Site: RIVIERA

Date: 6/23

13<sup>th</sup> CI SENSORS 1/2016

HANDFUL OF VARIANTS DRADES

- A/A PERMANENT STATION

OLD SOIL PLANT

REMOVE MOST ASSIES  
OLD GRADE OF WASTE SOLIDUS  
SOME WASTE PILES

1947 ? 1980s  
1955  
1968  
1964

# Generating Station

## Field Trip Notes

Station Name	Uranium
Location/Address	
Date Constructed	
GF Attendees	
Company Attendees, Title	Craig Rickson
Date/Time	6/23 1:00 PM
License Date(s)	

### Generating Units

Unit	Date in Service	MW (gross/net)	Fuel	Fuel Delivery	Fuel Disposal	Base/Int/Peak	Number of Starts
1	1974	800	OL/GAS			Peak	
2	1974	800	"			Peak (New in Service)	
3	1993		GAS				
4	1993		GAS				
5	2004		GAS (part of 0-)				
SOLAR							

GE 7  
7  
7FA

### Comments

SA#4 2x1 C =  
 SA#83 was ORIGINAL FURNACE, ADDS 2 CTR & HASGS 2004  
 SOLAR TESTS UG  
 U#02 NEW TO BLIND OIL + GAS TO 800 MW  
 1.146 KWAS JUNE 21 500 ACRES

### Major Equipment (including year installed)

Unit	Scrubber	SCR	Baghouse	Cooling Tower	Stacks

### Comments

# Field Trip Notes

Site:

Date:

V1/V2 CAD DO MOUNT CYCLES

V1/V2

ADD ESPs 2012-2014  
TERRAINS DYSQUALI

V3/V4

MAY REARRE T. 04

REARRE LINES etc.  
WATER f DOR FRO CYCLING

V8

04  
REARRE T. 09

# Substation

## Field Trip Notes

Station Name	PLUMOSUS			
Location/Address	7 SIMONS CREEK HWY			
Date Constructed	1993			
GF Attendees				
Company Attendees, Title	BUD PFEIFFER			
Date/Time	6/27			
Type	<input type="checkbox"/> Transmission <input type="checkbox"/> Distribution <input checked="" type="checkbox"/> Both			
Line(s) in				
No.	From	Voltage	Notes	
1	RIDERS	138		
2	BRIDGE	230		
3				
4				
5				
Line(s) out				
No.	To	Voltage	Notes	
1	WINDMILL	138 kV		
2	HOBBS (2 LINES)	138 kV		
3	DISTRIBUTION	23 kV		
4				
5				
Transformers				
No.	Manufacturer	Voltage (in/out)	Vintage	Notes
1	ABB	230 → 138	1991	
2	PENNSYLVANIA	230 → 23	2006 / 2013	
Breakers				
No.	Type	Vintage	Notes	
3	GAS	230 kV		
4	SEE	138 kV	1990, 1 13 2005	
5	UNKNOWN			
Structures				
No.	Type	Vintage	Notes	
1	BRIDGE	1993		

Substation PLUMOSUS  
 SE - 421  
 GE 360  
 CAPITAL BARR → 2014

6 air REGULATORS

# Field Trip Notes

Site: PLUMSUS

Date: 6/27

SERVER DN → DGA SYC

MOE APT # 65V TRANSFORMER

CC-VT, CAE → 15 YEARS

DU.PAL PLUMSUS SHOWN LEFT

SPG 600000 MM HAVE SHOWN 1.6

# Substation

## Field Trip Notes

Station Name	LANDINGS			
Location/Address				
Date Constructed	2005			
GF Attendees				
Company Attendees, Title	BOB PFLUG			
Date/Time	6/24			
Type	<input type="checkbox"/> Transmission		<input checked="" type="checkbox"/> Distribution	
	<input type="checkbox"/> Both			
<b>Line(s) in</b>				
No.	From	Voltage	Notes	
1	PLUMASUS	13.8		
2	RIVONA	13.8		
3				
4				
5				
<b>Line(s) out</b>				
No.	To	Voltage	Notes	
1	DIST. ROAD (S.W.D)	13.8 kV		
2				
3				
4				
5				
<b>Transformers</b>				
No.	Manufacturer	Voltage (in/out)	Vintage	Notes
2	PA XFL	13.8 → 13.8	2005	
<b>Breakers</b>				
No.	Type	Vintage	Notes	
2	SFG 13.8 kV	2005		
7	VACC 13.8 kV	2005		
<b>Structures</b>				
No.	Type	Vintage	Notes	
1	PLOR	2005		

011 REGULARS

# Field Trip Notes

Site: POLE REPLACEMENT  
Beverly St  
W. Hill

Date: 6/24/2015

145 m/h WIND AREA  
→ LONG SWAYING 145 m/h

OLD CONCRETE (1973) 45 FT H-POLE  
(7 1/2 FT DEPTH)

NEW CONCRETE (11 1/2 - 13 FT) 55 FT H-POLE  
→ INCREASE USE W/

2 WORK TRUCKS + CRANE }  
FORWARD + 2 MACH CRANE } CONTRACTORS  
L 3-4 TRAFFIC CONTROL }  
POLE TRUCK

CON

→ TOP POLE, TRAFFIC TRANSFER

BLIND CRANE FALL OUT + REMOVE PILE

ENERGIZED → TOP CAUSE

Plan

GRADE AT STRUCTURE  
→ FAA PERMITS  
COUNTY PERMITS





6/24

Rick Huff  
Katie Martin

V/G CONDUIT

Direct Burial < 10%

- Proactive Replace (over 30-40 years old)

CONDUIT

PVC

Duct System

River Crossings may be Direct Burial

instead River Crossings MA 2005

CAUSES

- 1) END OF LIFE - DAMAGE
- 2) DIG-INS (CAN SPLIT 2-3 TIMES)
- 3) PROACTIVE REPLACE DIRECT BURIAL
- 4) RELOCATIONS (SOME RELOCATIONS)

ABANDON

DIG AT LAST END, CUT BELOW GROUND  
LAP

ALUMINUM

ALUMINUM COPPER, LEAD CAN BE SALVAGED

COPPER / ALUMINUM PRICES HAVE DECREASED

RAD WINDINGS - MAY NEED TO REMOVE  
- CAN BE COSTLY

Older CABLE - TROUBLE ISSUES

INTROD DIELECTRIC INSULATION

V/L CABLE MAY HAVE SHORTER LIFE

-> INSULATION, ETC. BUILT INTO CABLE

- CABLE FAILURE MORE COMMON / UNDERGROUND

- WATER, ETC. V/L

EXPECT THAT O/H MAY HAVE LONGER LIFE

365

CAUSES

- 1) CAPACITY
- 2) TOO MANY SPICES
- 3) RELOCATIONS
- 4) OLDM COPPER
- 5) PASSIVE SPARE WIRE REPLACEMENTS

- SPARE WIRE HAS RELIABILITY ISSUE

MOST NAC  
SOME ACSR

STANDARDS WIRE SIZES

1.0 }  
3.0 } STANDARDS  
568 }

MAY HAVE FUTURE NEEDS FOR CARRYING WEIGHTS

OF TRANSMISSION CABLE WITH UPGRADE POLES

CONDUCTOR UPGRADES OF LOAD TO POLE

REQUIREMENTS (LOADING)

COSTS

PERMITS, PREP-WORK (SITEWORK, ETC)

HAZARDING PROGRAM

- MAY HAVE HIGHER COSTS FOR HAZARDING

THAN 2018-2020  
(WAS INCREASING)

Lower SALVAGE

Lower Prices 2008-2009

LESS CORRU

HARDWARE

MORE WORK ON MAIN STREET

LESS LATERAL WORK

PERMITS, OTHER COSTS TEND TO ALIGN COSTS

## 364 Poles

### 1) POLE INSERTION

- EVERY 8 YEARS
- OVERLOADS
- DEFORMATION
- INSUFFICIENT DIMENSIONS

### 2) HARDENING

### 3) RESTORATION (CAN USE, FIRE, etc.) VOID PROTECT

### 4) RELOCATION

## LOADS

TELECOM ADD MORE STRENGTH

- HAVE UNUSED CABLES  
(PLACE HOLDERS)
- REPLACE POLES BEFORE FAILURE OCCURS  
(MAY CONTRIBUTE 50% WIND LOAD)

TOWER POLES → LARGER BILGEM TOWER

CONCRETE

HAD USE SPAN, NEW LADDER CONCRETE  
- COST, PRODUCTION QUANTITIES

DIMENSION

→ DAMAGE IN REBAR IS OPOS

POLE INSULATION

MAY DO C-TRUSS, ANTI-MICROBIAL  
REPAIR IF < 8 YEARS LIFE  
(CALCULATE, CONDITION)  
USING

TREATMENT

NO CEMENT  
CERAMIC

CONCRETE

REPAIR, CEMENT

CONCRETE

G-POES → WATER TANK CLASS 1 WOOD

H-POES → 4-5 TIMES STRONG  
( INCREASE IN USE DURING HARBORIAL )

HISTORICALLY CONCRETE MAY HAVE  
BUILT BROADLY MORE THAN  
12 PAGES

HISTORIC CONCRETE NOT BETTER AS  
MAY BE TO FAILURE AS:  
CAPACITY  
HOLDING

NEW CONSTRUCTION → U/C & O/C SIMILAR COST  
DUE TO HARBORIAL, ETC.



## COSTS

PERMITS, SAFETY, EQUIPMENT

→ DO WORK, CUT POLE

TELECOM TRANSFER,

REMOVE

→ NEW CLAMP FOR CONCRETE

DOT PERMIT TO MOVE POLES

## SALVAGE

USED TO BE ABLE RAISE,

SOME SALVAGE TO MOUNT

USE OF CONTRACTORS HAS INCREASED

(MAYBE 90%)

→ ONLY CHANGE NOT NUMBER

36%

$\sim 307. \quad \frac{1}{4}$   
 $\sim 707. \quad \frac{0}{4}$  } INCREASING  $\frac{1}{4}$

O/W HAS LOWER LIFE

-  $\frac{1}{4}$  - CORROSION  
FRACURE  
SPRINKLER  
CAR HILL

WINTER LOAD CAN CAUSE FAILURE

Failure

O/W COULD HAVE MINIMUM LIFE

MOVE TO AN SINKLESS FIN PADMONT'S

SINCE 1990s  $\rightarrow$  TOWER DESIGN TOLERANCES

Con

EXPECT CONSISTENT COSTS

CAN HAVE CLEANER IF OIL SPILLS

- MORE LAYS w/ PROTECTANT

329.1

REMOVAL COSTS

→ MAY BE CLOSE TO 50.50  
IN TERMS OF LABOR SPENT  
FOR REPLACEMENTS

REPLACEMENT UNIT COST ~ \$300 / hr.  
\$400

REASONS

- 1) PEOPLE CAN
- 2) INCREASE LOAD
- 3) UNDERSIZING
- 4) BOLLONE DEMOLITION )  
(eg. PUT IN HIGH RISE)

HOUSE REMOVAL → CONVERT TO 4/6

NEW DEVELOPMENTS → RETIRE SERVICES

EXPERIENCE SIMILAR LINES TO O/H CONDUCTION  
OR POWER O/H & U/G

## UNDERGROUND SERVICES

(RESIDENTIAL)

- 1) DAMAGE, TAPES, ETC.
- 2) FAULTS
- 3) CAPACITY

Now IN CONDUIT

373 SMALL LIGHTS

MOSE OWNED

OWNERS

UNOWNED

NO CURRENT LAWS FOR LED, etc.

371

OUTDOOR LIGHTING

MOVING UP FOR A LIGHT PRIVATE

PROVISION

6/25

LIST EILAND

CSPs

SALVAGE

BASED ON RATIO OF OBLISHED HOURS  
TO TOTAL RUN HOURS

LIMITED TO THREE INTERVALS

REPLACEMENT COST CAPITALIZED VALUE  
REPLACING PARTS PLACED IN SERVICE

2011

04 PARTS MAINT. / SANFORD

UPGRADE (MAYBE SALVAGE)

Scanned

REPLACEMENT  
SCA ANALYSIS

DEC 2014

DOT 05

26 COMPRESSORS @ \$11 MIL.

+ LARSON \$338 MILLION

MOVED INTO SERVICE IN 2015

MARTIN 1-2

ESP IN 2014

MANAGE SPAN



SENEREN / SJRPP

10:00 AM

SCOTT BROWN

SENEREN

POLLUTION CONTROL

GEORGIA MULTI-POLLUTANT RULES

- BACHAUSE (2010)

- SCR

- FGD SCRUBBER

} 2012

~ \$450 MILLION ~ U4

HP TURBINE

2014 - BOLTON M.D. PLANT

COAL - POWAN RIVER BASIN

PLANNED EXPENDITURES (OUTAGES in EVEN YEARS)

2016 - CONDENSER RETROFIT (\$7-8 MILLION)

BY 2018 - PIPING REPLACEMENT FOR CONDENSER TUBES (\$11 MILLION)

LP TURBINE RETROFIT

(\$17-20 MILLION)

ASU IMPROVEMENT (CCR)

→ EIA RULE MOVE TO DAY (WAFU)

EFFLUENT GUIDELINES

SPEND \$60 MILLION BY 2022

UNLINED POND

NEEDS GROUNDWATER

OPERATED BY GA POWER

AGREEMENT IS AS OPERATIONAL AGENT

FPL MAKES DECISIONS ON UNIT SPECIFIC PROJECTS

COMMON PLANT -

OWNED BY BOARD (VHS FROM OWNERS)

GA POWER BUDGET

FPL OWNS 197 & IS AGENT

FOR JEA

STRPP

FPL OJNS 2007 OF U3&4  
+ PPA

2008-2010

→ SCR ON BOB UNITS

ORIGINAL BUILT w/ SCRUBBER  
IN 1987-1988

Still IN MASS COMPLIANCE

ASH LANDFILLS

SOME EFFLUENT EXPOSURE,  
COULD LEAD TO WATER TREATMENT

2015- HP TRABIDÉ

COAL FROM COLUMBIA (NOT - PAB)  
Coal - Sulfur

FUTURE REGULATORY PASSES SOME RISK  
50 YEAR OUTLOOK

START - ~~PA~~ LANDFILLS NOT LINDS  
GW MONITORING WELLS

CEN RULE - ~~WAS~~

SCHWAB - UNLINDS

CEN RULE KNOWS MAN LAND  
DAY-AS1 LANDFILL

6/26

CHARLES RIFE  
WALTER FOLEY  
WALTER DUNN

SOLAR

INVERTER ELECTRONICS ~ 10 YEARS, TRANSFORMER MAYBE LONGER  
PANEL DEGRADATION OVER TIME

COSTS / EFFICIENCY IMPROVEMENTS

COULD BE COMPATIBLE w/ CC BY 2020

NEW PLANTS, PV  
EFFECT SIMILAR OPERATIONS

LAUDMORAL PLANTS

SMILE CYCLE 7FA5

FAGE START

S PLANTS

Sim... P F MINS V3

more STARS & S-P'S

F MINS PLANTS

MANAGE GRAM

ESRS in 2000,

Turning Pt

SYNCHRONOUS CONDITION

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.63  $\Rightarrow$  it may have less value to GE

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CC

OTHER WORK

WASG WORK (USE BOILER WORK)

SCR

STEAM TURBINE MASON ( $\approx$  10 years)

GENERATORS  $\approx$  12 years

9/25

## SUBSTATIONS

500 kV  
230 kV  
138 kV  
115 kV  
69 kV 0.00  
23  
13.6 } TRANSMISSION  
DISTRIBUTION

## TRANSFORMERS

600 SUBSTATIONS (INCL DISTRIBUTION)

AM

560, 280 MVA

## CAUSES

- 1) FAILURE
- 2) PROLONGED SERVICE  
EOEL
- 3) CAPACITY / UPGRADES

DGA (SERVICES, BE KILMAN)

- REAL TIME ANALYSIS



QDA ASSETS

→ MORE QUANTITY, VARIOUS TOLERANCES

"BRUTE FORCE" ~~REPAIR~~ ENGINEERING

30-50 YEARS

BRANDS

INSTANT SFC TIME

PROGRAMS TO REMOVE OLD BRANDS

(PASSIVE EOL, ETC.)

30-40 YEARS

DISTRIBUTION - DESIGNING SOT. LEAD

2nd → Stimulus Monitor

Smart Grid

- MICROPROCESSOR BOARD
- BACKUP SECOND

PLANNING SO-SO MICROPROCESSOR PARTS

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CRASH SOLUTIONS

ZIVIERA / CUNY

AFRANKS

BROOKHURST

FAILURE - DIAGNOSIS

- OIL LOW

SERVER ON HAVE PREVIOUS 1 FAN FAILURE

METERS

DENNIS REYNOLDS

CARRIE

SEAN

4.8 MINIMAL METERS

6,500 OPT-OUTS  
(TARIFF FEE OPT-OUTS)

MASS DEPLOYMENTS 2009 (4.5 MINIMAL)

2013 - 2014 COMMERCIAL / INDUSTRIAL

POWER - BROWARD - STIC LEBANON MOUNTAIN  
- NEW REPLACE

SMART METERS

GE 1210 } USE SILVER SPINDLE  
LANSBORN 1a

SILVER SPINDLE MESH NETWORK  
ACCESS PTS, MOUNTAINS

Pilot Mirrors (2007-2008)

Reasons why not working

→ No contact solution

MFR RECOMMENDATION

→ Still same REASONABLE

Should accommodate DG

Home Network  
Switch

} INSTALLED EVEN THOUGH  
NOT USED IN-DAILY

RENTS, ETC. INCLUDED IN MFR ACCOUNT

Cost of Removal

MAY BE AT 50-50

5 YEAR WARRANTY in Service Manual



FPL COMBINED CYCLE

MATT JOMEYCH  
HOWARD FERGUSON

7FA → HIGHLY TURN TIMES  
WERE SHORTER THAN OEM  
RECOMMENDATIONS

TIME PERIOD

MARCH 3/4 → 1990S

MID - 2000S → HIGHER THAN  
NORMAL REPLACEMENTS

CONSIDER EXCLUDING

EARLY 2000S POINTS  
(COMPRESSION ISSUES 2005-2006)  
TURBINE DISC FAILURES

ISSUES 2006 2007  
→ MAJOR POINTS

CONSIDER 2007 - 2014 PROGRAMS

1/1/2000 - 1/1/2010 → ACTIVITY TO  
REPLACE

dot 04 / dot 05 → DESIGNED TO  
MITIGATE ISSUES FROM 2000s

GE 7FA.03 7FA.04

CI → 12,000 24,000 (MOVE TO 32,000)

→ OVERHAUL COMBUSTION

.03 → WORKS REPLACE BLADES  
(HOT GAS PANS)

.04 → OVERHAUL HOT GAS PANS

@ 32,000

→ PUSH TURBINE TO 32K AS WELL

100% OF BLADES, NOZZLES REPLACE  
TRANSITION PIECES

MITSUBISHI

24,000 FOR TURBINE INTERNAL  
COMBUSTION INSPECTION

SIEMENS

12,000 COMBUSTION  
27,000 HOT GAS PUMP

LAJORDALE (OLD SIEMENS/WESTINGHOUSE)

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d.104 / d.105

→ then increase efficiency  
Siemens

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CYCLE IN PLANTS NOW  
EXCEPT CANNONAL & RIVIERA



## LIFE SPAN

IN 2009

→ CORROSION ISSUES

BLADES, ETC.

→ MITIGATE CORROSION

2015

MITIGATE CORROSION

DEM → DESIGN LIFE 30 YEARS

(25 w/ CYCLING, OVER FREQUENCIES)

FPL - CC & CS?

6/18/2015

"UNAVAILABILITY FUTURE"

→ INCREASES AS PLANTS AGE

- PUNAM

LAUDONVILLE

MARTIN 3-4

TRENDS IN CAPITAL SPENDING

INCREASE, UPTURN IN SLOPE

NUM YEAR 30

1992 - PUNAM HASG REPLACEMENT

→ CTS ON #6 OIL  $\bar{F}$

15% TWO YEARS

→ COLLAPSE

CAP @

→ \$1.1 MIL PER YEAR 7 15% 25 YEARS

\$7.1 MIL PER YEAR LAST 10 YEARS