Turbine Replacement

Issues

2400/6900 full arc

giving all margins / everything up to the edge + over

BOP

same flows + load as running SBOP/VWO
925 + an addition 3%

George Coss - Operators would never run there

lose all redundancy (same as 6750)

feeders + pulv

6 pulv operation → derate

rotating threads - issue (Oper always bitching)

pyrite capacity

pulv motors - marginal

pulv seal air fans

ID fan motors

PA fan motors - high speed

BFP vibr

BBFP

CP

CT / Cond

CWP

(control swing loss of feeders / heaters, upsets

Boiler absorbing more reheat

reheat dampers open

(pulls heat from main stm)

more SB / more fly ash erosion

add safety valves

lookup code / max limitations

→ gen transformer / isophase bus

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Issues:

93% 6750 $\boxed{\text{partial arc}}$ /2400

2% throttling 920 MW

running 6,600

max boiler design point

all systems

point - James truth they give 1% margin

Boiler: making temps

List out all issues

How fast run sports car down road

tilbaries speedometer / til redlines

how about tires / temp / oil press

are those limiting factors

OK so you run til 150 mph

where do you run 130 / 110 / 90

where are you comfortable / you are saying why can't I run 130

limiting I don't know how good

this does holding up

[illegible] discussed

[illegible] throughout

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REDO Equipment Guide sheets

new capacity

turbine rating 2400/VWO/6750
u1/VWO 930 //throttling 910
→ capabilities u2/VWO 960 // 910

load ratings/testing

safety valves

feeders

turbine check maximum capacity LP turb
check point/

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11/28/00

ALSTOM Turbine Replacement

Alan Holmes
Alan Hesketh
Bill Rudman

Brown Boveri) ABB
ASEA

Alstom HP impulse GE ABB LP (W) reaction

Measurements 30 to date in states

Inspection Nozzle full 100,000 hrs ~12yrs
Throttle partial 80,000

solid particle erosion
design: fewer thicker stages
1st 1st stages & nozzles 120° → 50

"optiflow"

thrust balancing
balance piston

Need 97 proposal / get copy partial cz?

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⇒ matchup GE penetrations
- vibration balance rings

balancing

need from Jim

references: retrofits 17 Impulse stations / + reaction Hugo

- Crystal River
- Sherburne
- → Miller 96
- Marshall
- Belews Creek 1120 MW
- Brunner Island
- Montour
- Rush Island

- Montilecello
- Morgantown 12 → GE
- G3

Pressure Drop 90% - diaphram thrusting

- penned roots
  1° rotation for interferance fit

η IP: single flow 95

HP: profile losses 85 → 94*

sec losses (endwalls) bowed nozzles GA20 R35

leakage (diaphragm gland)
tip leakage

full 8→ 11 stage miller 3 units

pentral circ 8→ 10 stage crystal river
wide 1st stage

testing Miller
(93) SPE copper deposits rough surface
93½% → 91½%
testing Crystal River

Intermountain 6 + 1 7 ~~75~~

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GE HP Turbine S2 11/9/00

(G.3 front end)

Bill Kuhen

40 installations

Dense Pack Steam Path Replacement

Bill Ray Atlanta

η_{HP} 94+ Advanced design steam path (ADSP)
tip seals, control vortex (advanced)
92½-95½ compound profiles (lean)

New Rotor / Casing
Full Arc Admission (base load)
SPE protection / coatings

↑ capacity
↑ η
maint
outage intervals

Dense Pack

Smallest diameter possible (↑η) steampath
axial space fixed
bucket height ↑ / thinner fore stages

replace # buckets + diaphrams / beefier

retractable packing (25 mils)

Single flow design
vernier teeth - spill strips

η 85-88 3% recoverable / unrecoverable

↓ CRH conditions need to pick up RH

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Perf Deterioration

~~New~~ N-1 N-2

A coupling - rabbit fit (supply rabbit ring
machine fit

~~Assembly~~
Alignment
tops on + tops off
Inlet snout rings

all new - thrust keys / gibbs / etc ...

Re-use control rotor

33 days
6-8 2-12 hr
solid rotor
10-12 yr outage cycle

IP
setback for SPE
open up

After market
nozzle box

Lead Time
6 7 week - 16 months
Inner shells - long lead
special casting

16 orders
9 complete
4 shipped
2 operating
14 thinking about

IP 93 to 95 gain in η not cost effective yet

Typical Deterioration ½ to 1% / year

~~Bu~~ Heat Duty in Boiler (zero input)
↓ Steam flow ↑ NUHR ↑ MW
Constant Flow Save
Over Press capability 1% flow = 1% MW

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