SOUTHERN ILLINOIS UNIVERSITY CARBONDALE

SOUTHERN ILLINOIS UNIVERSITY CO-GEN

CIRCULATING FLUIDIZED-BED TECHNOLOGY

SOUTHERN ILLINOIS UNIVERSITY

Neil Saffelder: Plant Manager

SOUTHERN ILLINOIS UNIVERSITY CARBONDALE

BABCOCK & WILCOX CFB

- BUILT 1995-COMMISSIONED SPRING OF 1997
- 101,500 LB/HR STEAM FLOW
- ILLINOIS BITUMINOUS COAL
  - 3-3.5% SULFUR
  - 10-15% ASH
  - 11,000 BTU/LB
- $41.00/TON DELIVERED 2X0
- 59.50/TON DELIVERED STOKER

BABCOCK & WILCOX CFB

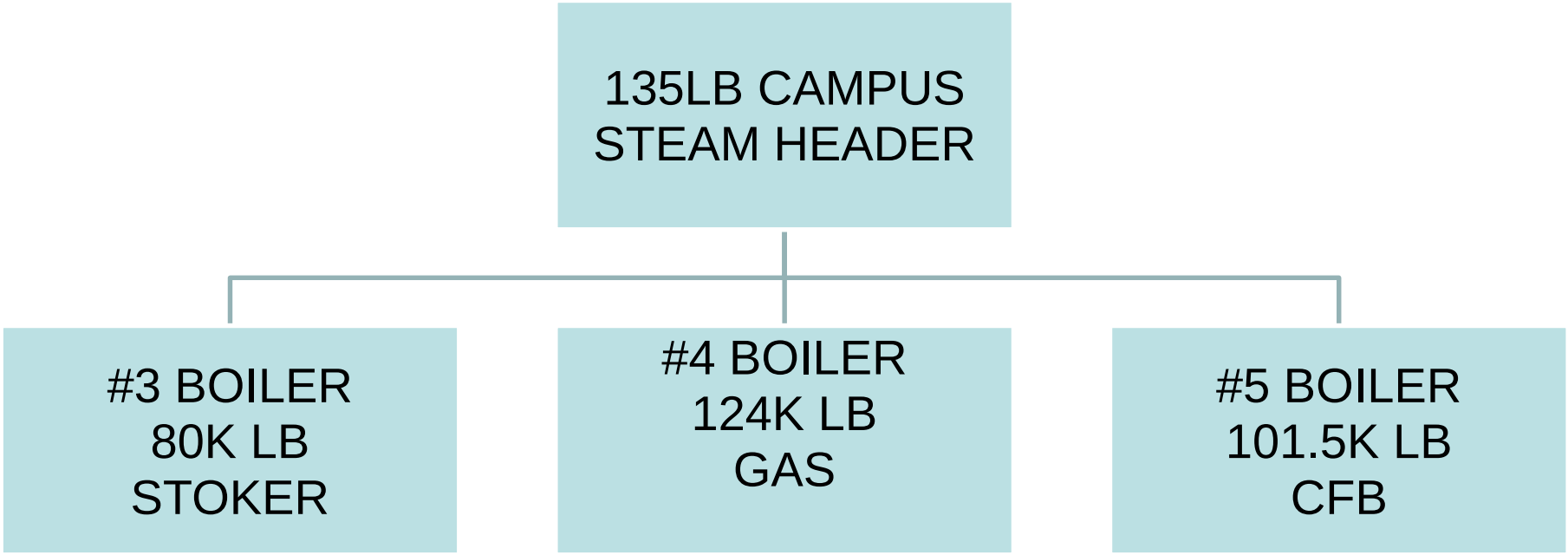
- R1 LIMESTONE $33.85/TON DELIVERED
- NO REFRACTORY PROBLEMS
- B & W SET MINIMUM 89% CALCIUM CARBONATE

STEAM PLANT EXPANSION

- TOTAL EXPANSION “1995” = $35,000,000

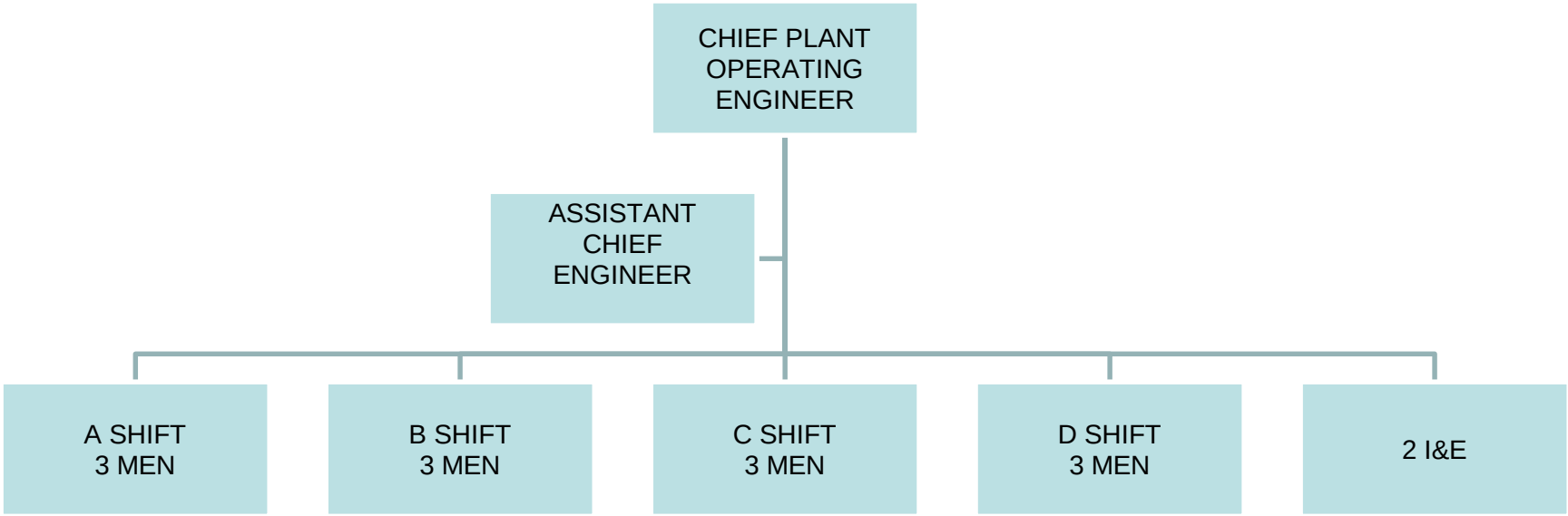
- COST OF CFB CONSTRUCTION = $18,000,000
- COST OF CFB = $6,000,000

STEAM DISTRIBUTION



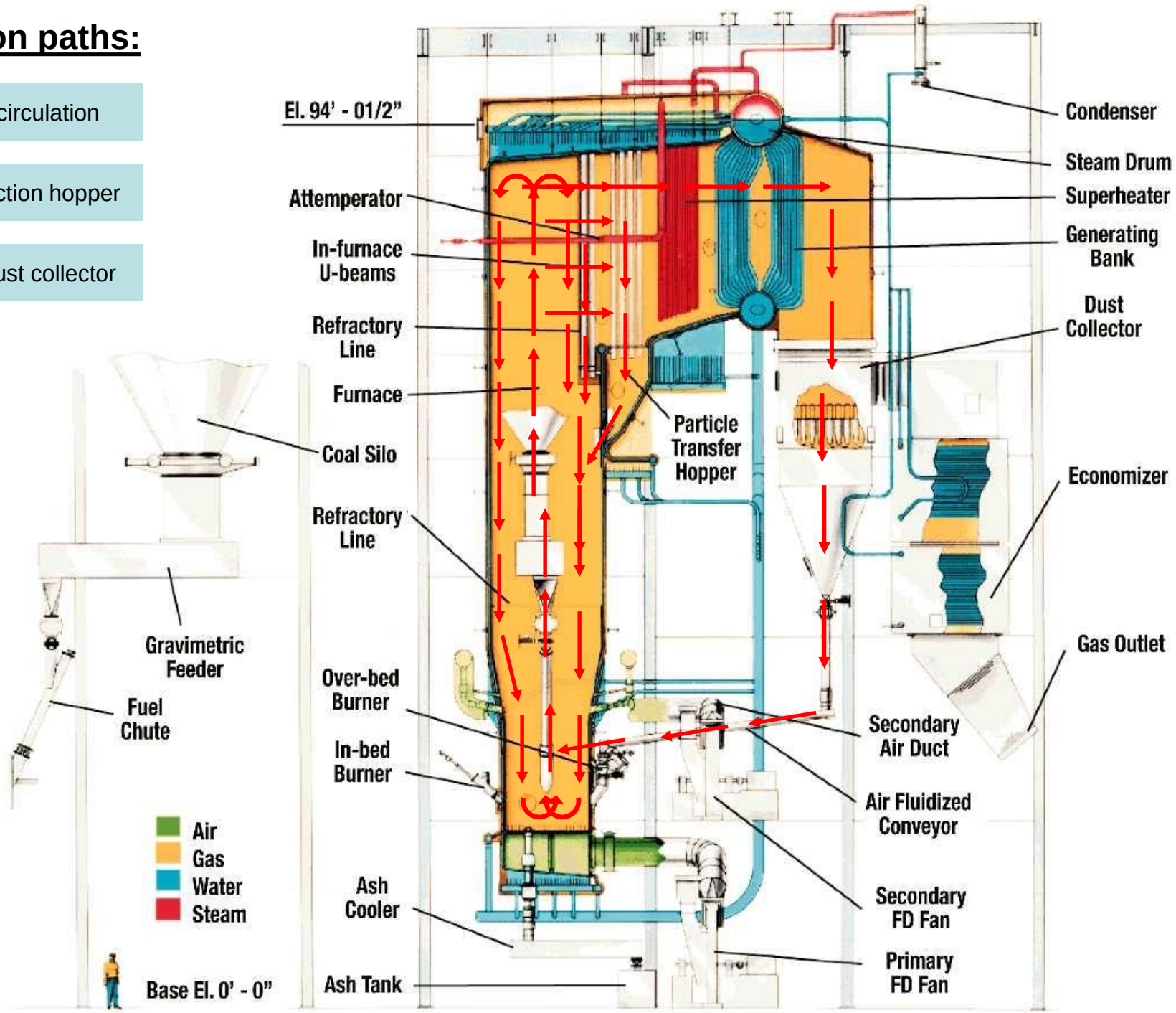
PLANT STAFFING

12 HR ROTATING SHIFTS



Circulation paths:

- in-furnace circulation
- particle collection hopper
- multiclone dust collector



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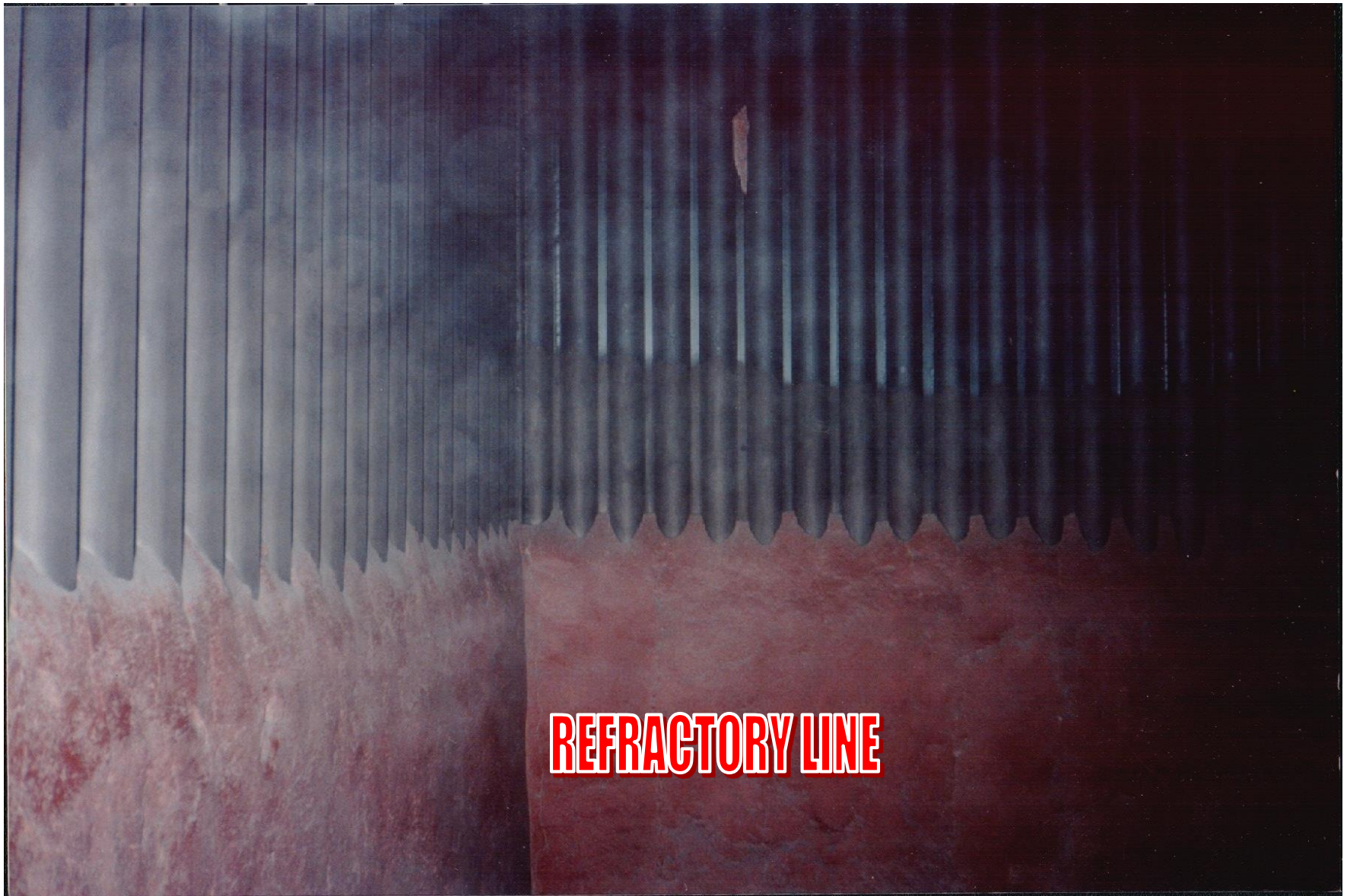
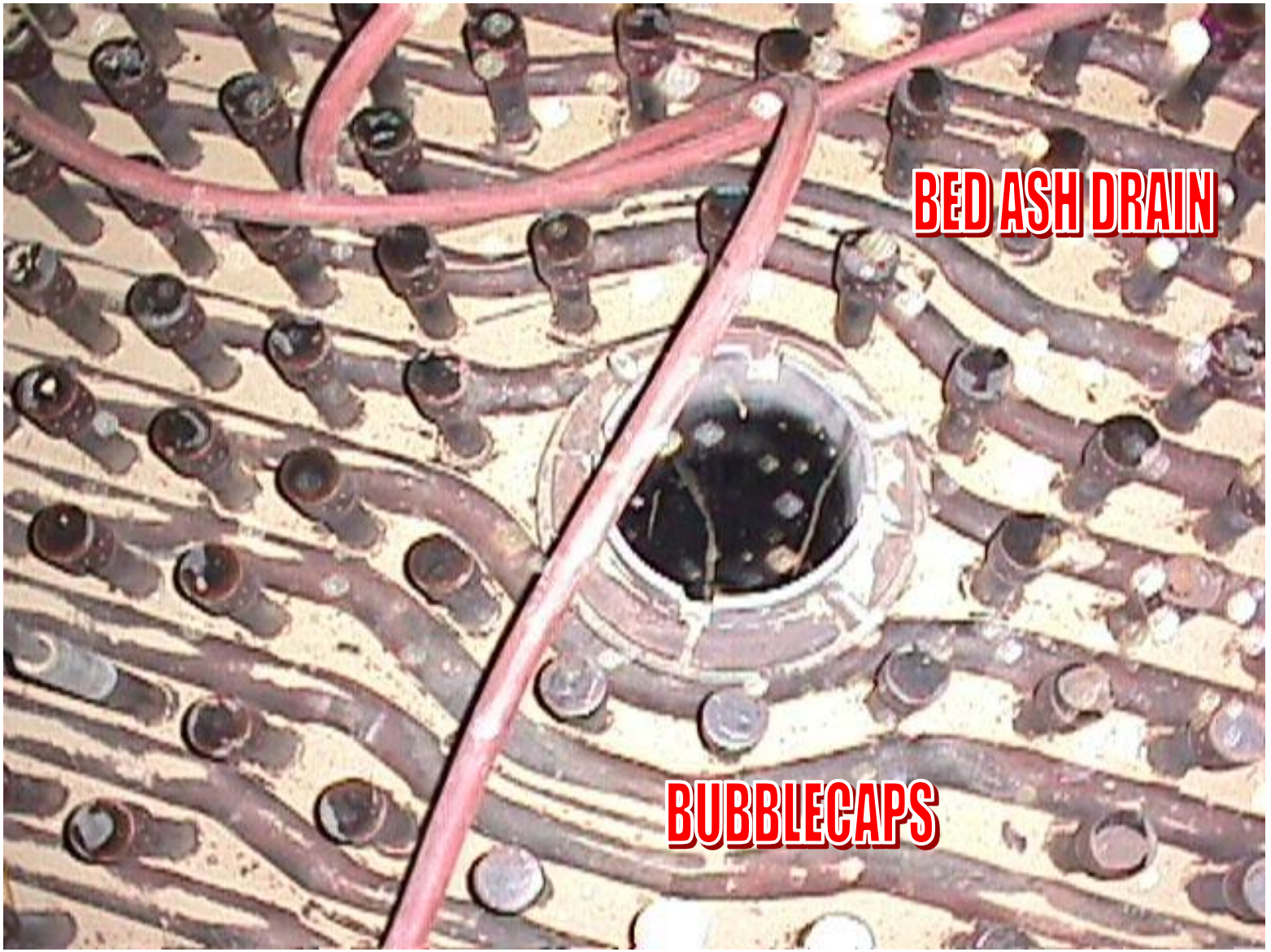
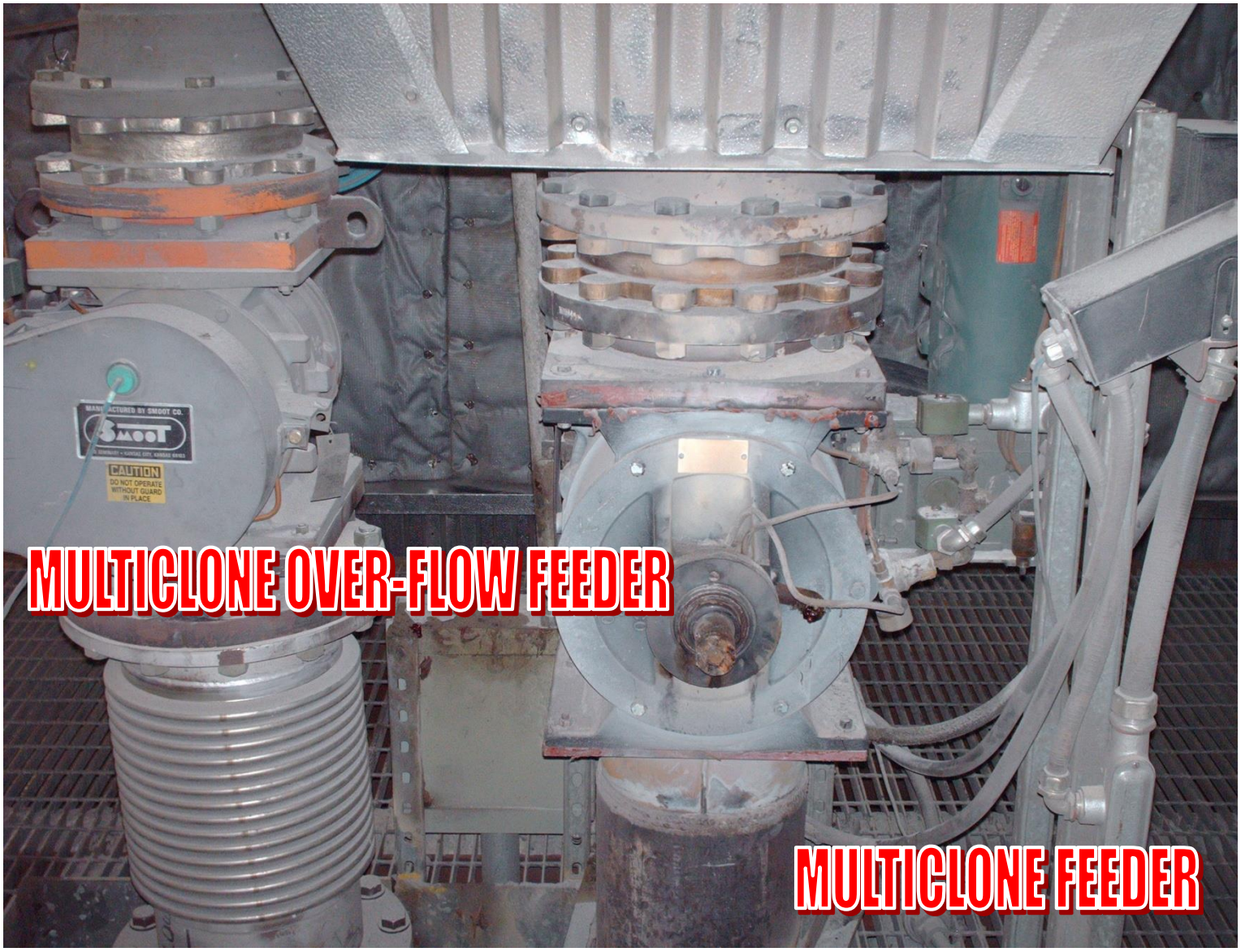



INFURNACE U-BEAMS


BED ASH DRAIN
BUBBLECAPS


MULTICLONE OVER-FLOW FEEDER
MULTICLONE FEEDER


MULTICLONE SPARES


ASH COOLING SCREW


PLANT FEED BELT

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CONTROL ROOM

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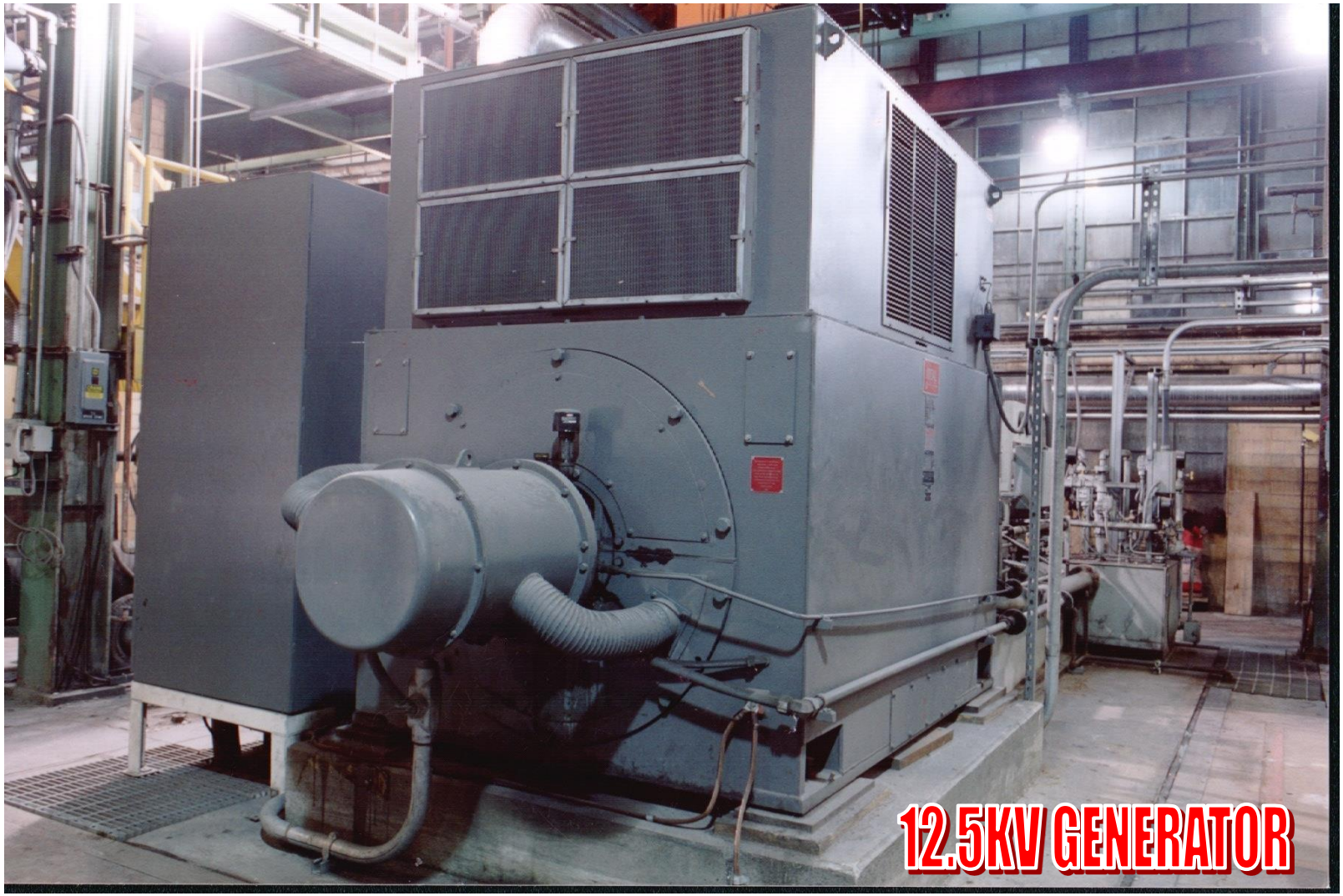

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EMISSIONS

- 30 DAY ROLLING AVG. FOR SO2
- EPA MINIMUM, 90% SO2 REDUCTION
- NORMALLY RUN 91-92% SULFUR REMOVAL
- CO AVG. 65PPM @ Full Load
- NOX AVG. RUNS .2LBS/MMBTU

AVAILABILITY

- 2004 95-96%
- 2005 98-99%
- 2006 95-96%
- 2007 95-96%
- 2008 92-93%
- 2009 97-98%
- 2010 98-99%
- 2011 98-99%
- 2012 98-99%

2013 98-99%
2014 98-99%
2015 98-99%
2016 98-99%

DESIRABLE TRAITS OF B&W CFB

- EXCELLENT TURNDOWN—ABLE TO TAKE 30-40K DROP IN STEAM LOAD AND STAY PRETTY STABLE WITH ASH IN BED READY TO COME BACK TO HIGHER LOAD.
- OPERATES 99% OF TIME IN AUTO
- HANDLES CAMPUS SWINGS
- LOW MAINTENANCE COSTS

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PV Array

- **Each panel (module) = 160 Watts**
- Made by BP Solar
- Characterized by OC voltage & SC current
- 2 sub-arrays consisting of 88 panels each
- **Total of 176 panels**
- Aluminum supporting framework
- Custom-built concrete piers
- Contains flyash from power plant as substitute for aggregate
- **Fixed tilt of 30°**
- Oriented to maximize total annual energy output
- ***Grid-connected* to SIUC electric distribution system**

- **Original design**: 8 parallel strings of 11 panels in series to form each subarray
- 1 (one) inverter of 30kW rated output

- After the May 8, 2009 storm:
- Replaced 11 damaged panels
- **New design:** 11 parallel strings of 8 panels in series to form each subarray
- **2 (two) inverters rated 14kW dedicated to each subarray**

- Control Building for electronic equipment, metering & data

FUTURE

- POSSIBLE GAS TURBINE ADDITION