



# Enmax Calgary Energy Centre





## Calgary Energy Centre Overview

- State-of-the-art, highly-efficient, environmentally-responsible thermal generation facility
- Facility was built by Calpine and was their first investment in the Canadian power industry
- Construction began April 2001; entered commercial operations March 31, 2003



## Calgary Energy Centre Overview cont'd

- Ownership transferred to Calpine Power Income Fund, Managed by Calpine Power LP.
- Base-load generation of 250 mw, enough power to supply approximately a quarter of a million homes in Calgary area
- Ability to produce additional 50 mw of electricity during peak demand periods



## Kelson Canada Inc & NAES

- Plant was purchased by Kelson Canada Inc, a private corporation in February 2007.
- Kelson Canada Inc. is headquartered in Calgary, Alberta
- North American Energy Services (NAES) was retained to operate and maintain the facility.
- NAES is headquartered in Issaquah, Washington.
- NAES operates and maintains > 90 plants world wide
- All CEC employees were offered employment with NAES



# Enmax Tolling Agreement

- CEC entered into a 20 year Tolling agreement with Enmax Energy Services on January 01, 2007
- Enmax Energy Services is owned by the City of Calgary



# Facility Name

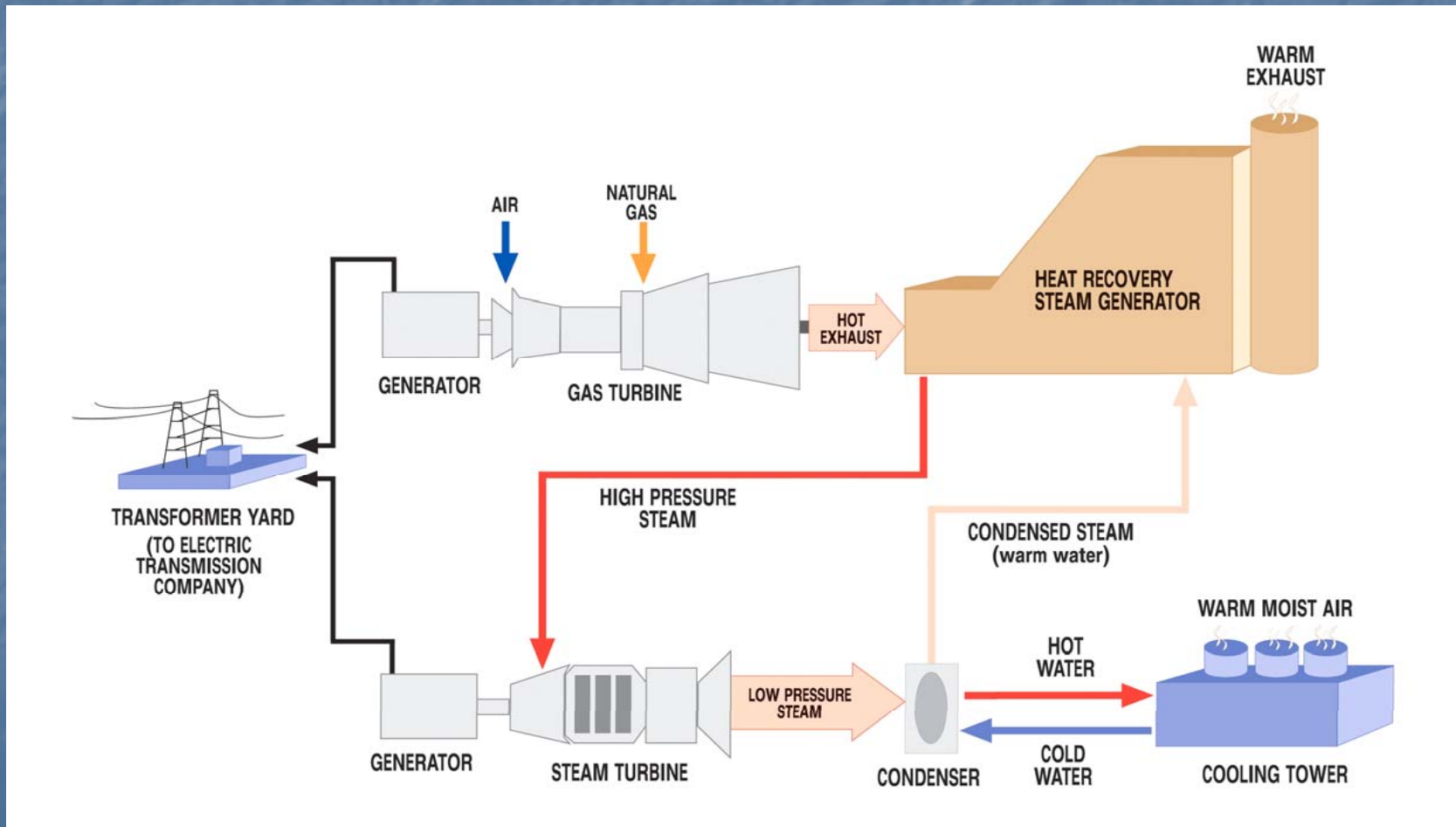
- The legal name of the facility is Calgary Energy Centre No. 2, Inc.
- The facility operating name is the Enmax Calgary Energy Centre



# CEC Employees

- Total of 20 Employees
- 5 Management
- 1 Full Time & 1 Part Time Admin
- 10 Operators (5 shifts of 2)
- 3 Maint Techs (1 Mech, 1 Elect, 1 Inst)

# CEC Combined-Cycle Process

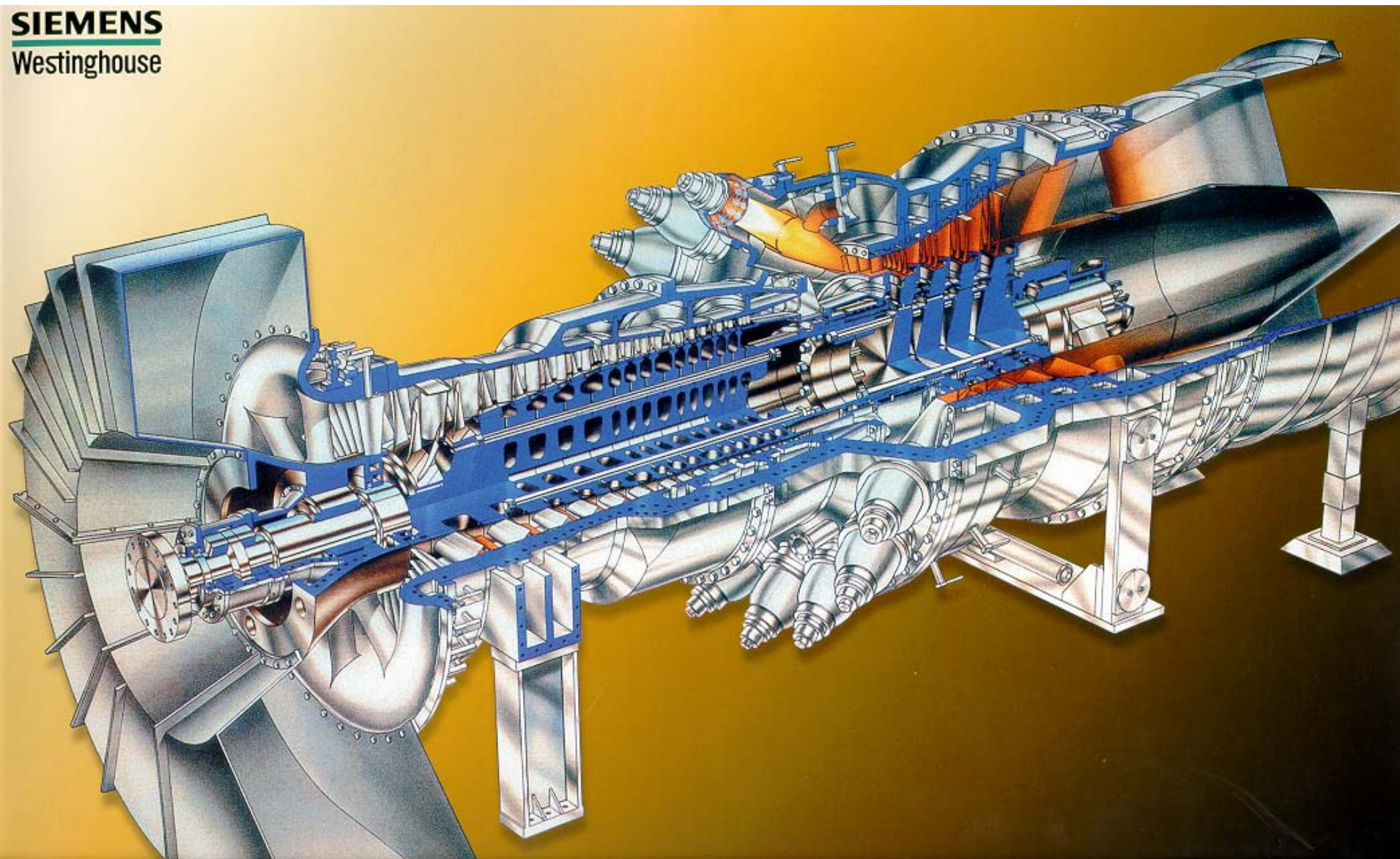




# Major Components of CEC

- Siemens Westinghouse 501 FD2 Gas Turbine Generator
- Nooter Eriksen 3 Pressure, Reheat, Duct Fired, Heat Recovery Steam Generator (HRSG)
- Fuji KN Steam Turbine, Reheat, Double Flow LP Exhaust, Sliding Pressure Operation
- Foster Wheeler Watertube Auxilliary Boiler
- Marley Cooling Tower – 7 Cell Cross-Draft
- US Filter Demineralized Water Plant

**SIEMENS**  
Westinghouse



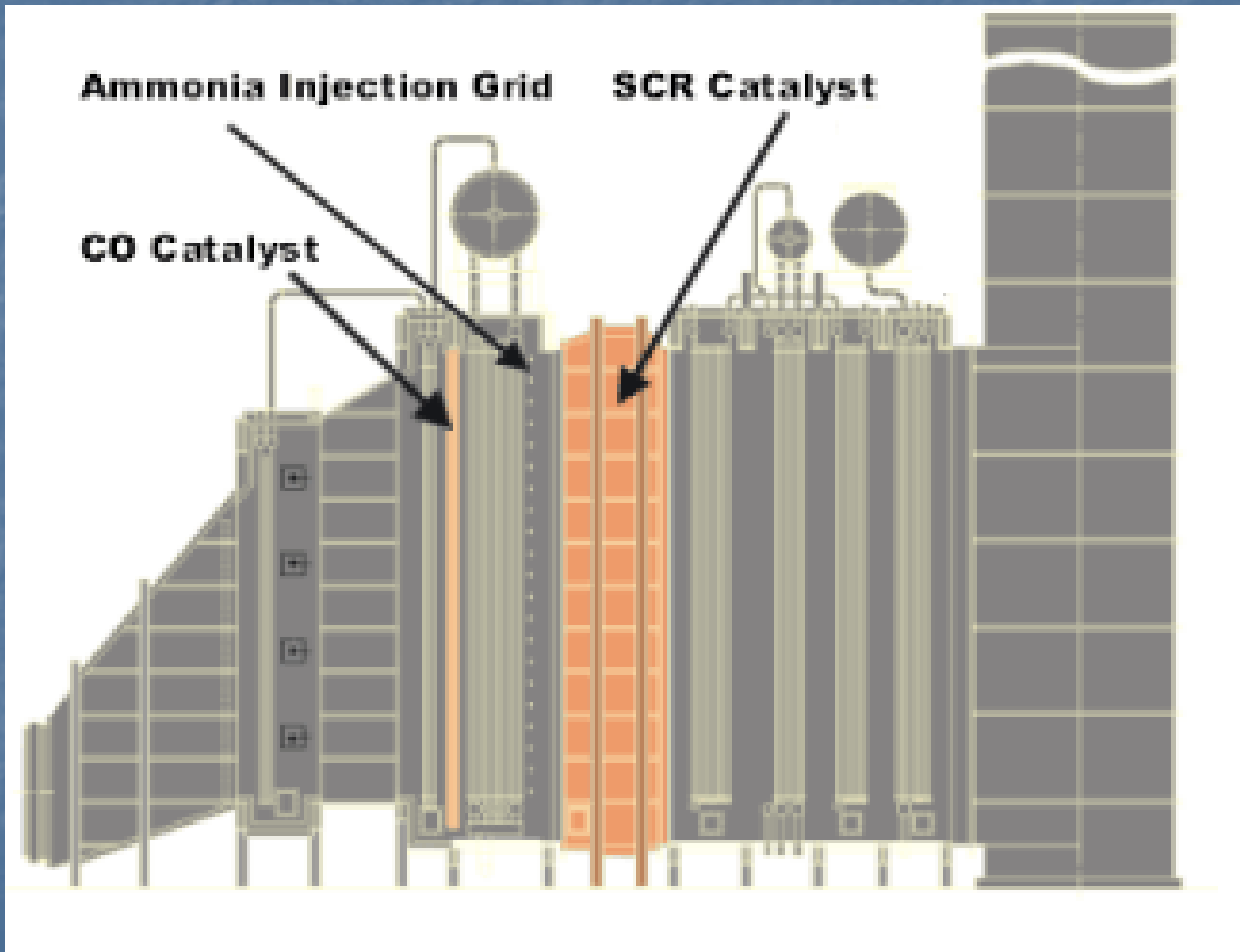
# W501FD2 COMBUSTION TURBINE



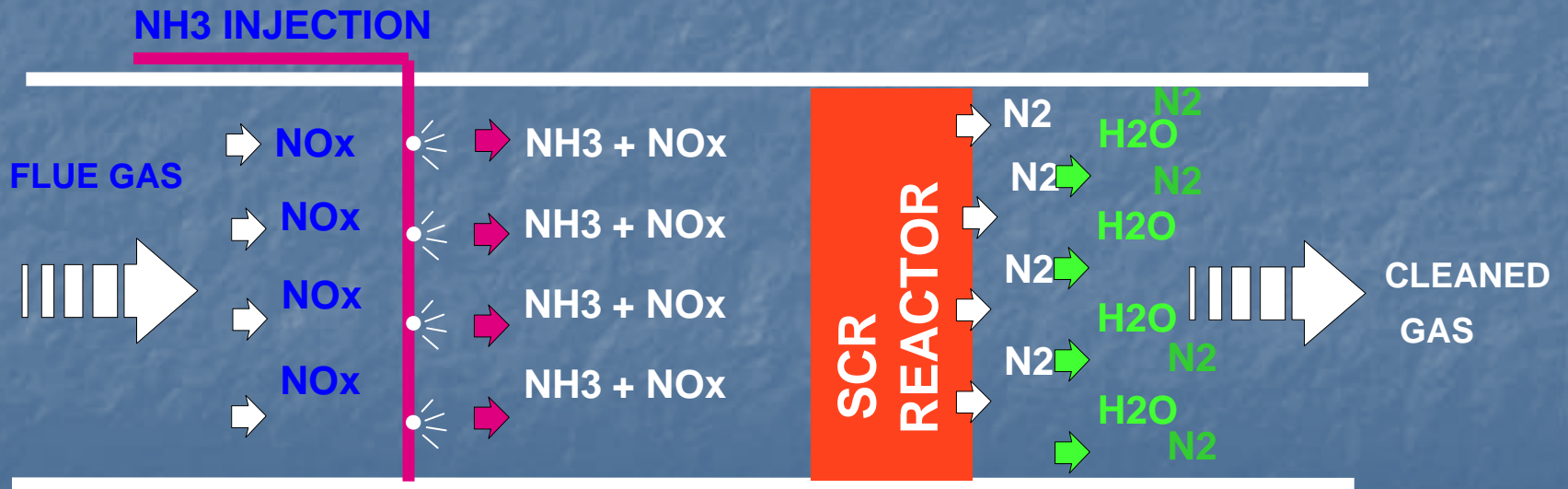
# Fuji Steam Turbine Generator



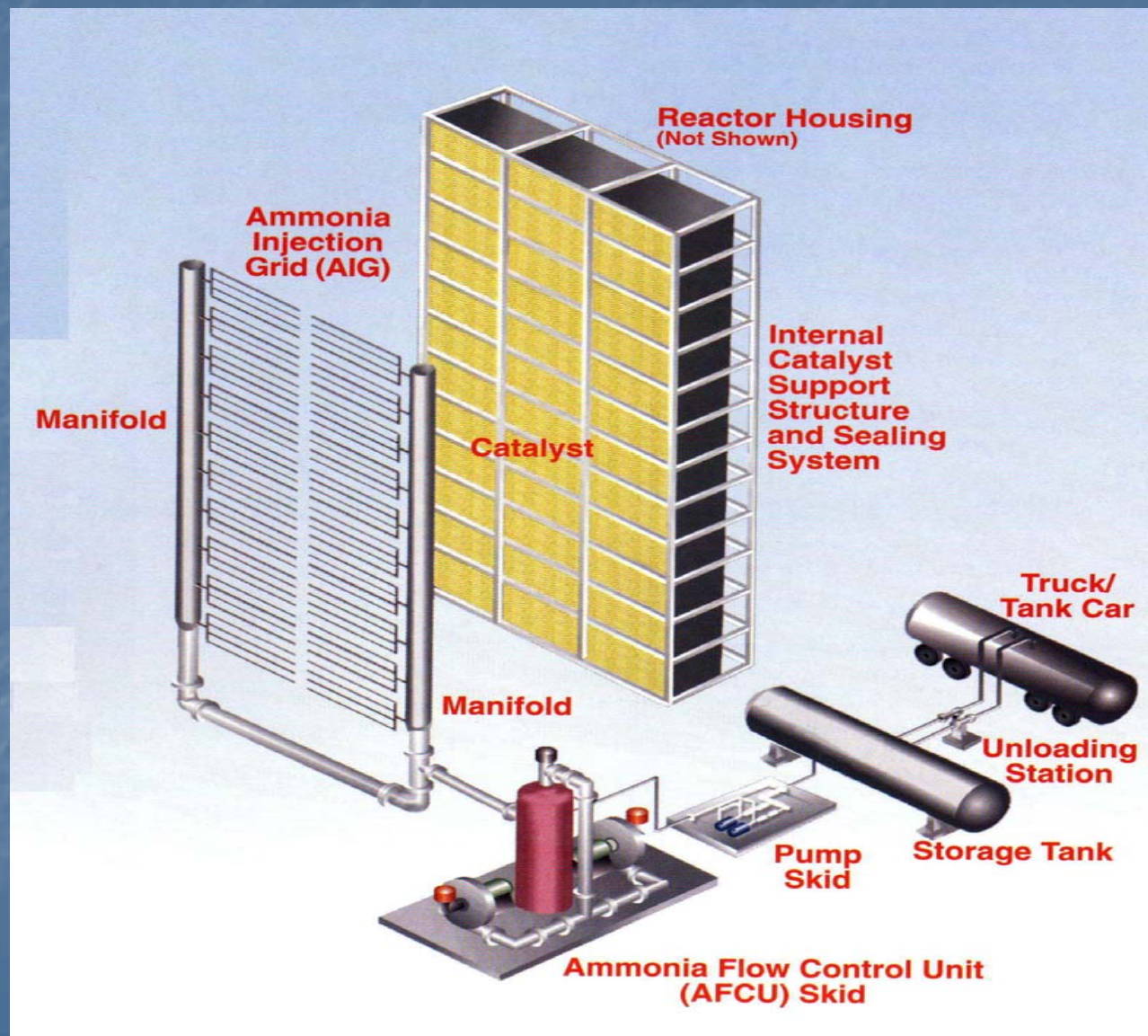
# Heat Recovery Steam Generator



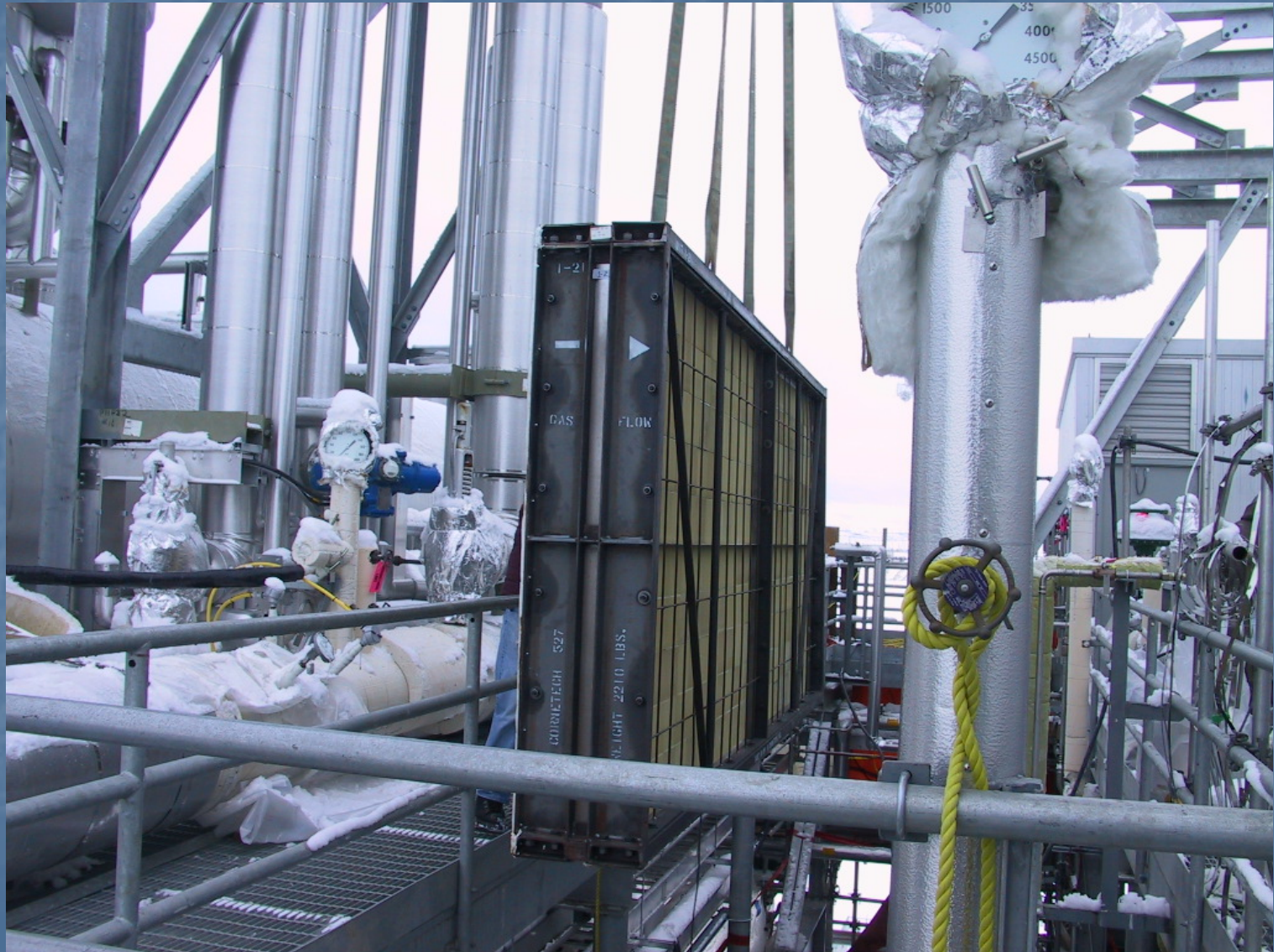
# SCR Basic Chemistry



# Selective Catalytic Reduction Module



# SCR Catalyst Installation





# CEC Features Enhancing Air Quality Performance

- **Natural Gas-Fired:** comparatively low-emitting fuel compared to other fossil-fuels commonly combusted for electricity generation.
- **Combined-Cycle Technology:** Exhaust heat from natural gas turbine 'recycled' to power the steam cycle. Reduces fuel consumption, and thus emissions by 30-40% as compared to aging conventional gas-fired plants.
- **Low NOx Combustion Turbine:** Staged low-NOx combustors produce exhaust gas with a NOx content of about 25ppm at 15% O<sub>2</sub> (without SCR).
- **Selective Catalytic Performance (SCR):** Reduces nitrogen oxides in flue gas to pure nitrogen and water using a catalyst and ammonia.



## CEC Air Quality Performance

CO<sub>2</sub> – 353 kg/ MWhr

NO<sub>x</sub> – 0.1131 kg/ MWhr

SO<sub>x</sub> – 0.00118 kg/ MWhr

H<sub>2</sub>SO<sub>4</sub> – 0.00020 kg/ MWhr

PM<sub>10</sub> – 0.0417 kg/MWhr (Excl. H<sub>2</sub>SO<sub>4</sub>)

NH<sub>4</sub> – 0.0208 kg/MWhr (Slip)



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