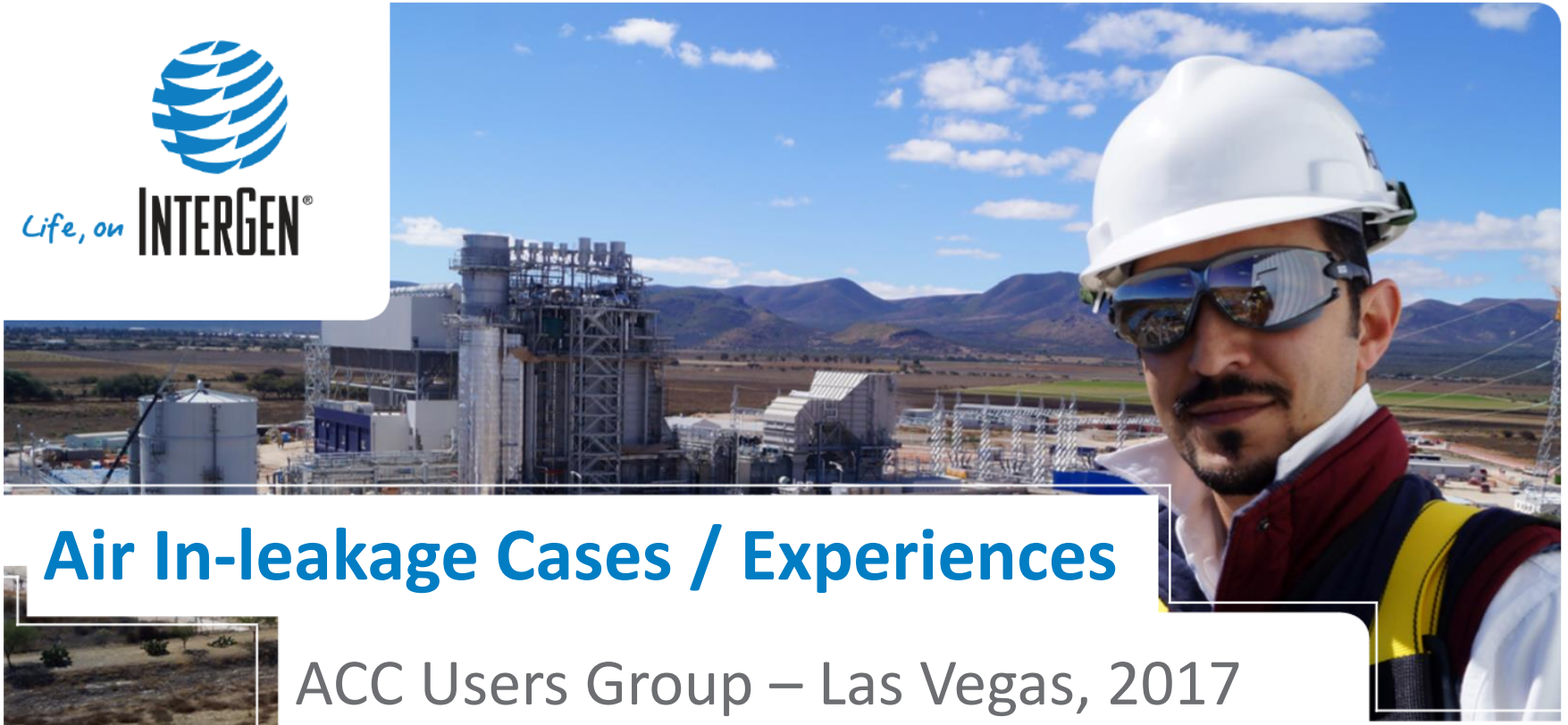
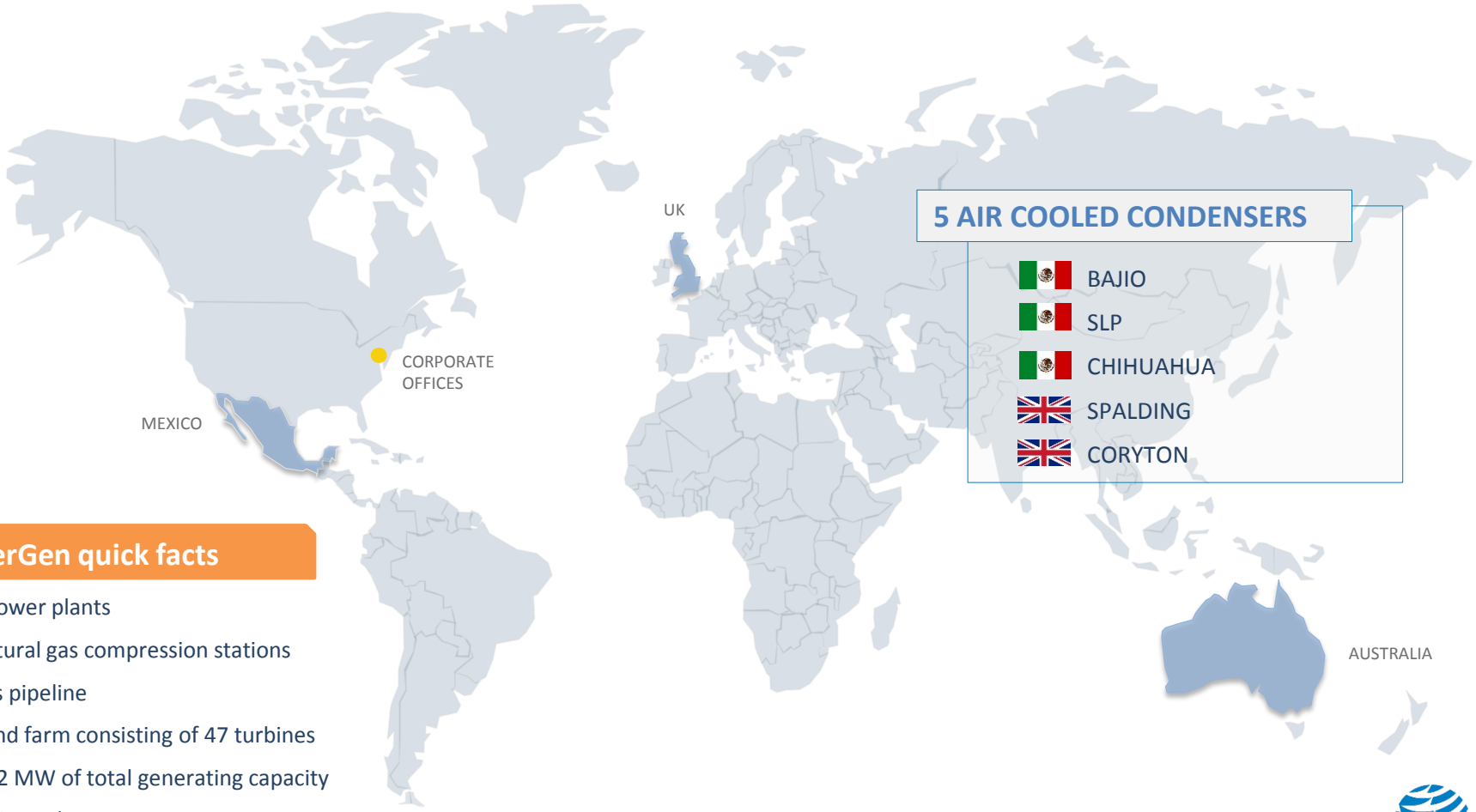


Air In-leakage Cases / Experiences

ACC Users Group – Las Vegas, 2017

Air In-leakage Cases / Experiences

Company Overview



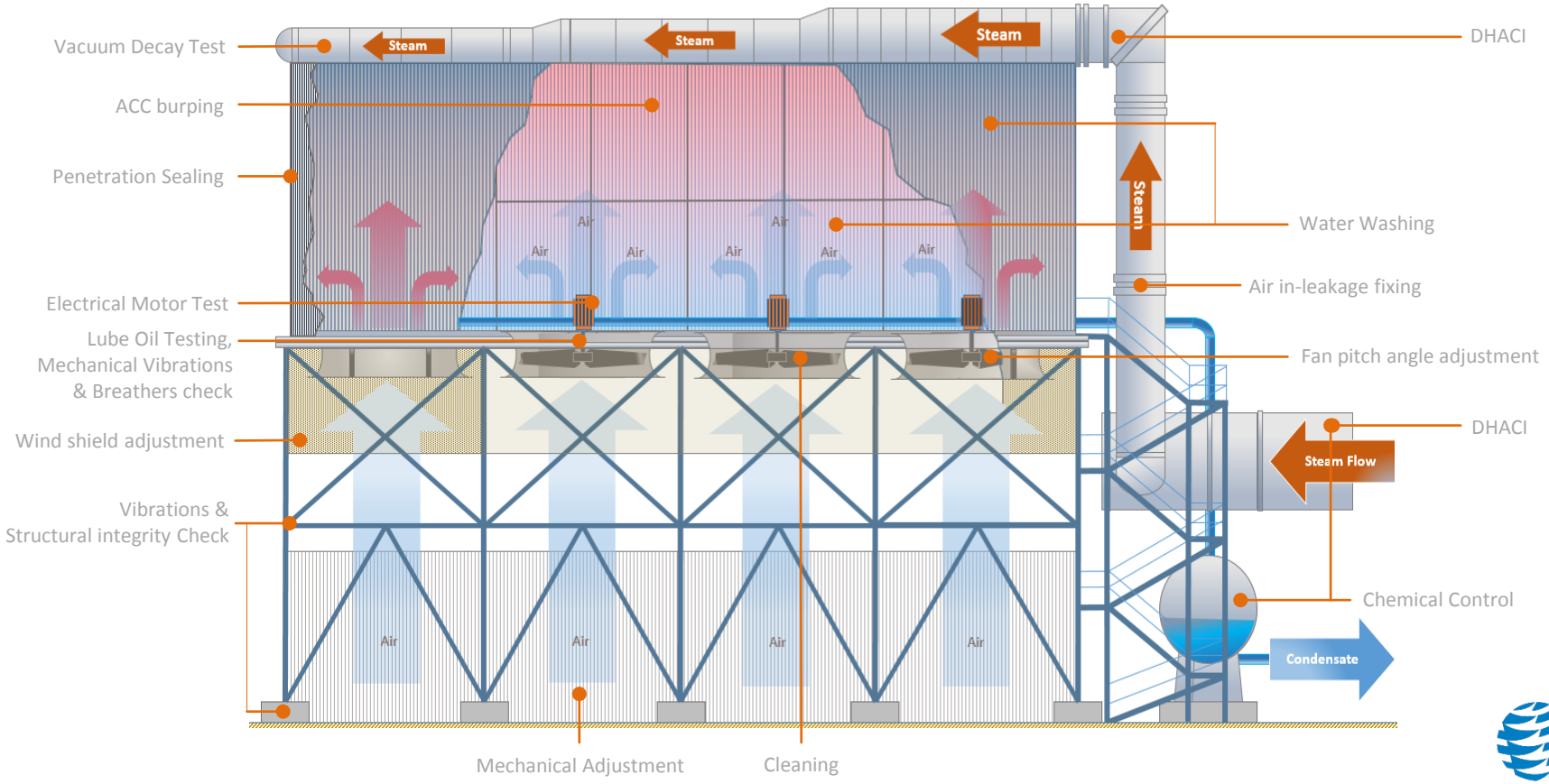
InterGen quick facts

- 12 power plants
- 3 natural gas compression stations
- 1 gas pipeline
- 1 wind farm consisting of 47 turbines
- 7,322 MW of total generating capacity
- > 600 employees

Air In-leakage Cases / Experiences

General Maintenance Experiences

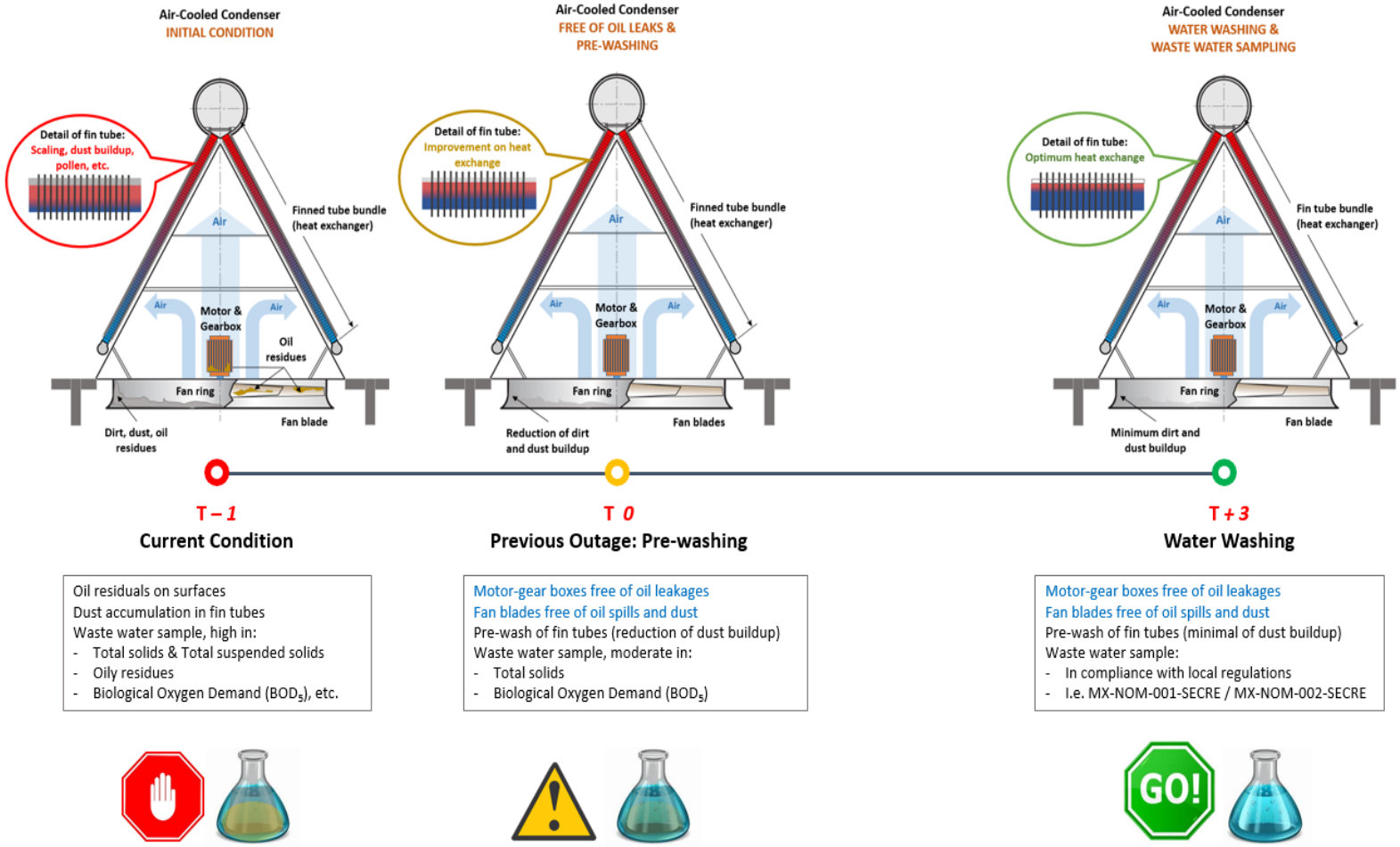
Although the Air Cooled Condensers (ACCs) are not complex equipment, their components require periodic maintenance in order to ensure their performance and contribution to the combined cycle efficiency.



Air In-leakage Cases / Experiences

General Maintenance Experiences

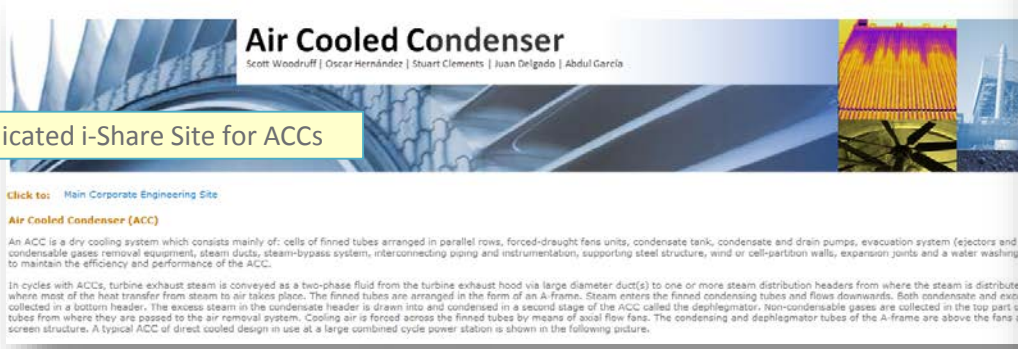
WATER WASHING



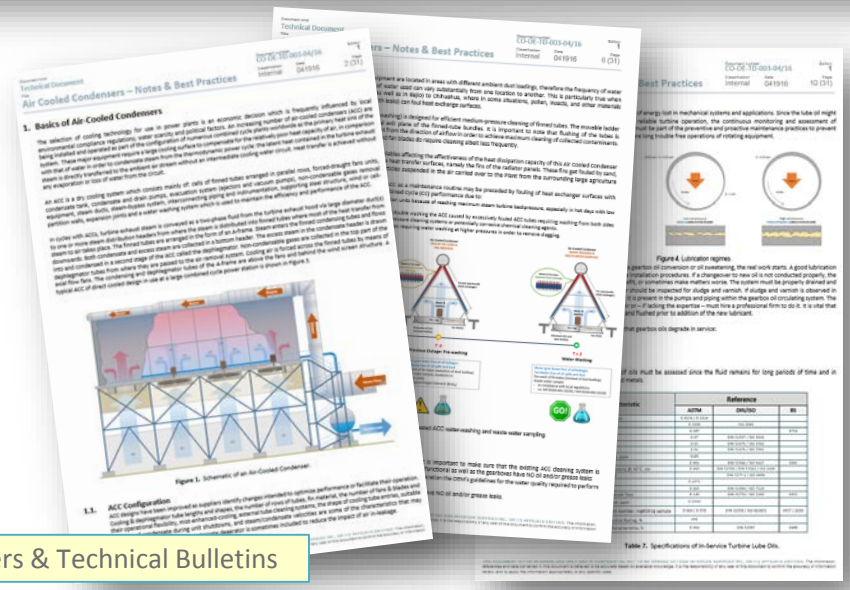
Air In-leakage Cases / Experiences

General Maintenance Experiences

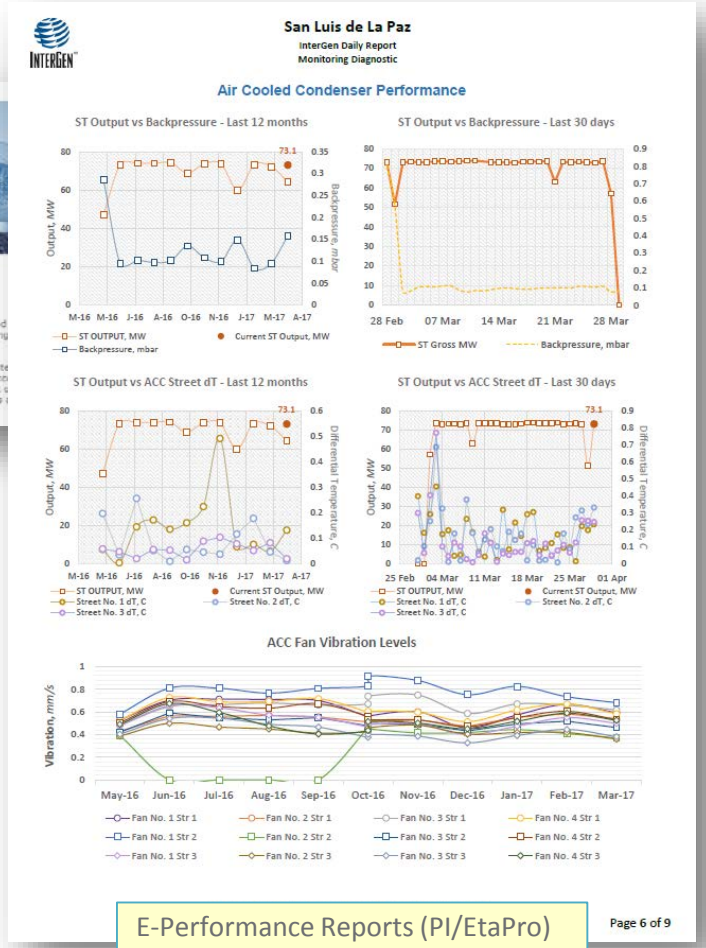
ENGINEERING RESOURCES



Dedicated i-Share Site for ACCs



White Papers & Technical Bulletins



E-Performance Reports (PI/EtaPro)

Air In-leakage Cases / Experiences

Air In-leakages

A common issue in Plants with an ACC – this condition will adversely affect plant efficiency, reliability & availability.

Key indicators of air in-leakage:

- ❑ Increase of backpressure
- ❑ Increase of direct measurement of air in-leakage
- ❑ Increase of non-condensable gases
- ❑ Increase of plant heat rate
- ❑ Increase of corrosion rates
- ❑ Increased chemical dosage (oxygen scavengers, amines, etc.)
- ❑ Increase of chemical parameters, such as:
  - o Dissolved oxygen
  - o Cationic conductivity
  - o Carbon dioxide
  - o Iron
  - o Silica
  - o Sodium
  - o Total Organic Carbon
- ❑ Condensate temperatures decrease (more fans into service)
- ❑ Decrease of the hotwell temperature
- ❑ Loss of vacuum in the ACC
- ❑ Loss of heat transfer
- ❑ Failed decay test

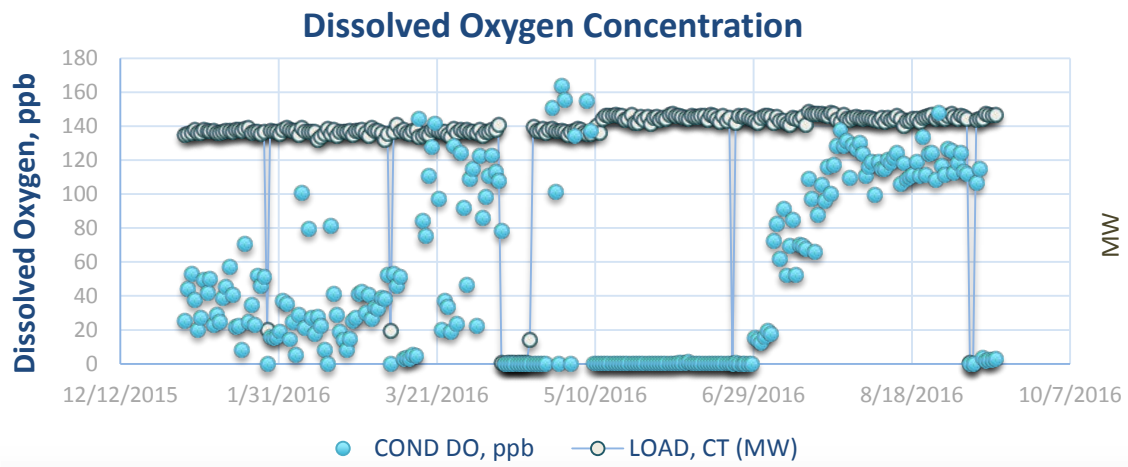
The primary sources of air in-leakage are:

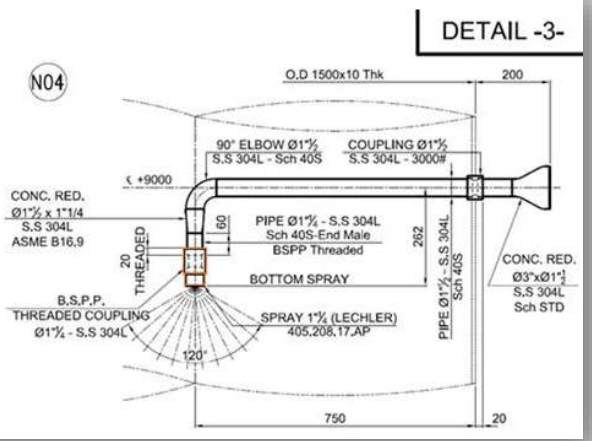
- ❑ Missing hardware (commissioning)
- ❑ Air-removal suction components
- ❑ Rupture disks
- ❑ Penetrations
- ❑ Welds
- ❑ Flanges, joints and coupling devices
- ❑ Turbine shaft seals
- ❑ Turbine instrumentation lines and test probe penetrations
- ❑ Turbine/condenser expansion joint
- ❑ Condenser instrumentation, sight glasses, etc.
- ❑ Condensate pump seals
- ❑ Drains that pass through the condenser
- ❑ Vacuum pumps
- ❑ Manways
- ❑ Atmospheric relief valves or vacuum breakers
- ❑ Low-pressure feedwater heaters, associated piping, bolt holes, valves and instruments

Air In-leakage Cases / Experiences

San Luis de La Paz, Mexico

COD: 2015 | 205 MW | Combined cycle natural gas-fired





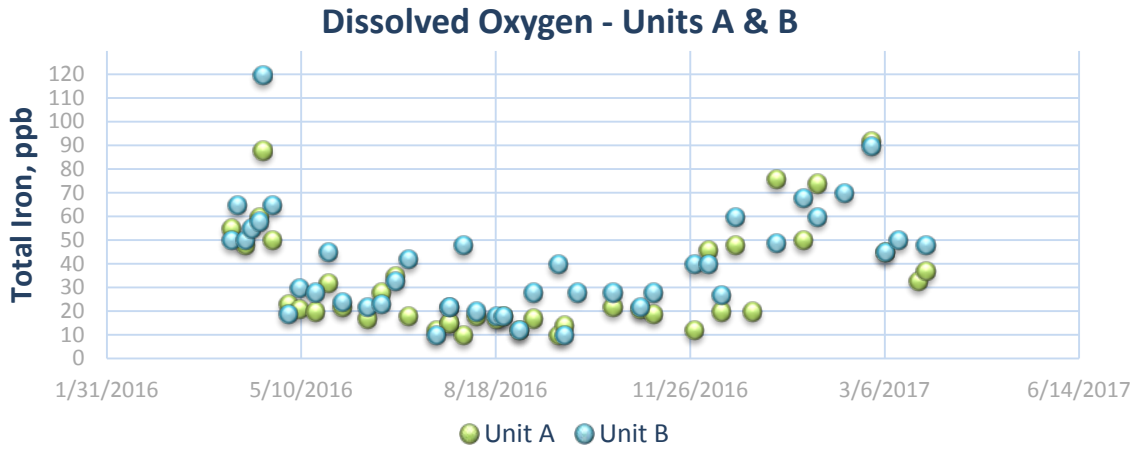
Success Story:

- ❑ Accurate On-Line Instrumentation
- ❑ Analysis tools available (PI/EtaPro)
- ❑ Continuous chemistry monitoring
- ❑ Teamwork commitment
- ❑ Air in-leakage identified and fixed
  - o Spray nozzle missing
- ❑ Lesson learned and shared
- ❑ O&M practices improved

Air In-leakage Cases / Experiences

Coryton, UK

COD: 2002 | 800 MW | Combined cycle natural gas-fired



Success Story:

- ❑ Accurate On-Line Instrumentation
- ❑ Analysis tools available (PI/EtaPro)
- ❑ Continuous chemistry monitoring
- ❑ Teamwork commitment
- ❑ Air in-leakage identified and fixed
  - o Potentially, a steam turbine gland seal out of position
- ❑ Lesson learned and shared
- ❑ O&M practices improved

Air In-leakage Cases / Experiences

Thanks!