

# ACC Chemistry Evaluation with 2 -Plants Located Ontario, Canada

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September 2011

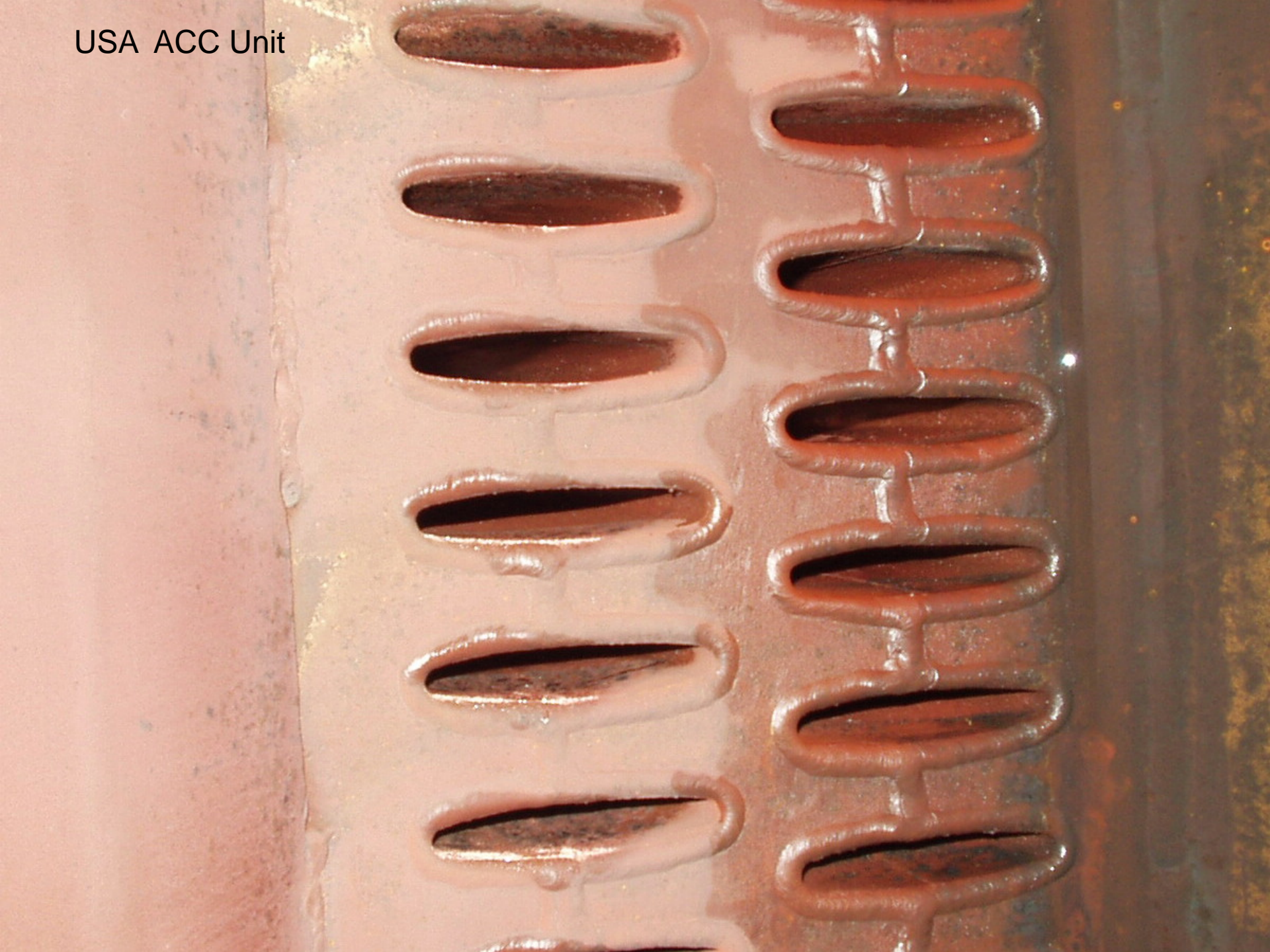
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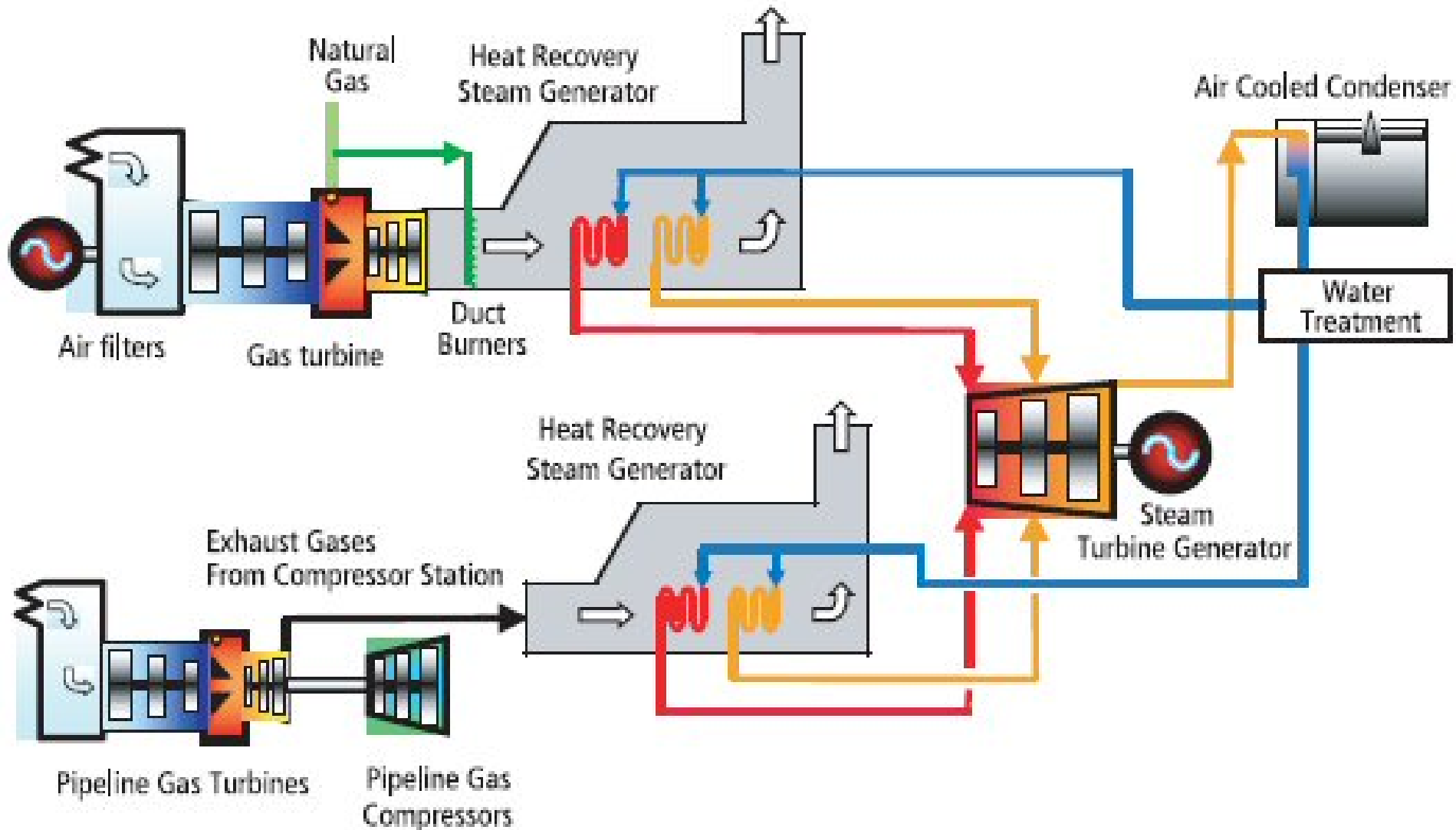
# EPCOR ACC units

- Two USA plant ACC units were inspected during early 2008 after ASME October 2007 ACC presentation with corrosion issues.
- Both plant ACC units were in excellent condition after 24 years service.
- Both ACC chemistry programs utilized various blends of neutralizing amines over this period that contains a component that would promote better pH protection for areas seeing early condensation.
- The Ontario plants on ammonia treatment had FAC noted during unit inspections.

USA ACC Unit



# North Bay, Ontario, Canada



# Chemistry-North Bay

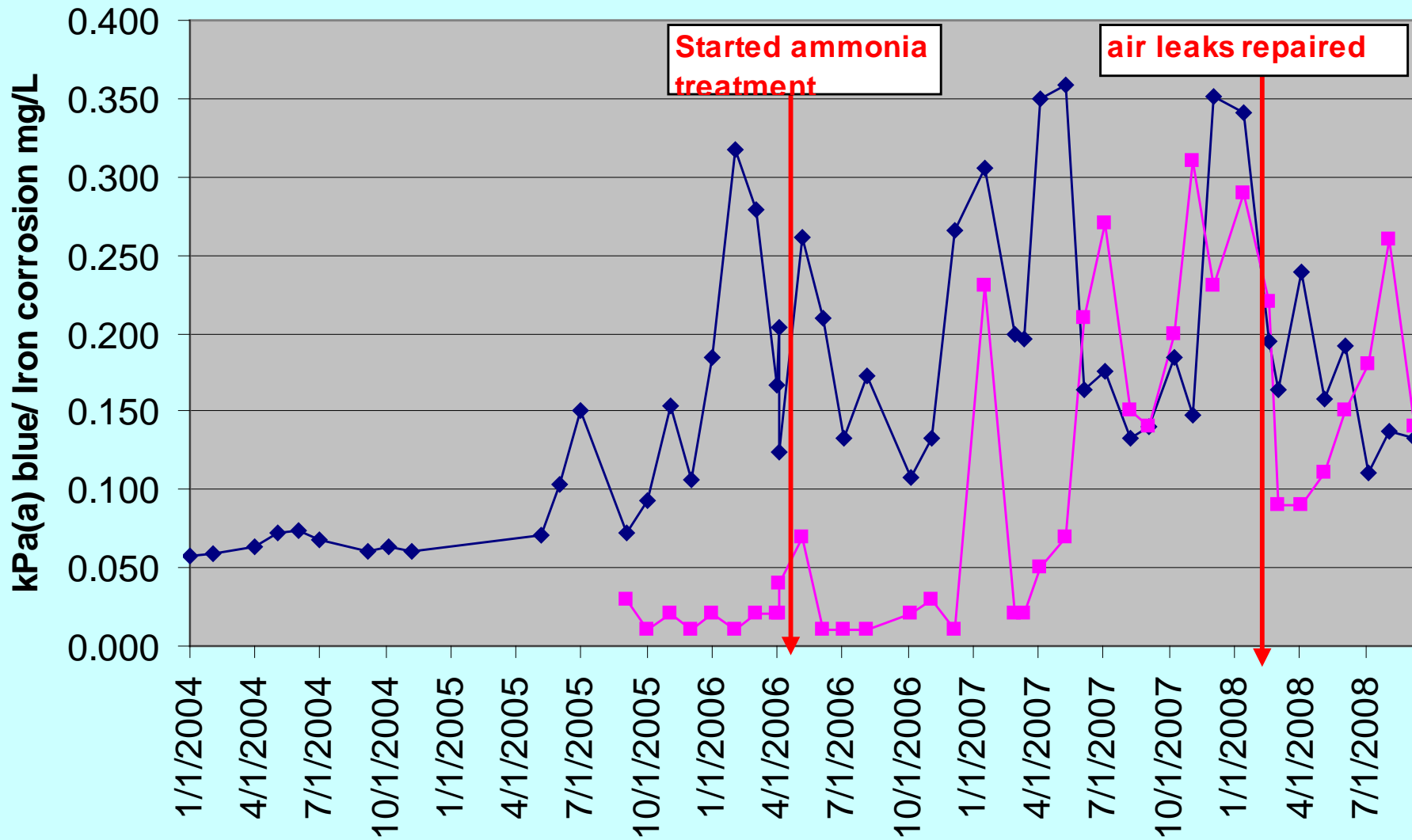
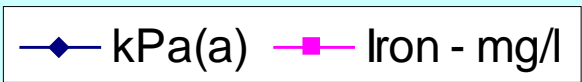
- Operating pressure 3,200-3,600 kPa (460-520 psi)
- Boiler make up: Well, softeners, RO and mix bed DI. Exhausted resin regenerated off site.
- Condensate polishers, resin replaced once every 50-60 days.
- On-line chemistry control <9.4 target 9.1-9.2
- Discharge wastewater pH 5.5-9.5, <10 ppm ammonia, <10 ppm iron
- MEA/Ammonia treatment ~20 months





For ~10 years the chemistry was hydrazine/morpholine then was changed during 2006 to ammonia treatment. Problem was not previously noted.

# Vacuum kPa(a) vs Iron Corrosion





# B&W filter iron test

Feed

Filtrate



**CHEMTRAC**

1.000 Line    0.00000  
0.00000    0.00000  
15.000    0.00000  
0.00000    0.00000

PWR    TX RX

**LaserTrac™**  
Particle Counter  
PC2400

MADE IN U.S.A. PATENTED    [www.chemtrac.com](http://www.chemtrac.com)

**CHEMTRAC**

0.00000

Flow  
Alarm  
Pip  
Alarm

**Particle Monitor**  
PM2500

MADE IN U.S.A. PATENTED    [www.chemtrac.com](http://www.chemtrac.com)



North Bay Power Plant  
Condensate Pump #1 Discharge Sample Line

Jan. 21, 2010 ~12:45 AM

Conditions:

~96 000 kg/h steam flow to condenser

~ -10 °C

~10.5 kPa backpressure

Plant at full load (Duct  
Burner On)

RB211 Speed ~ 6075 RPM

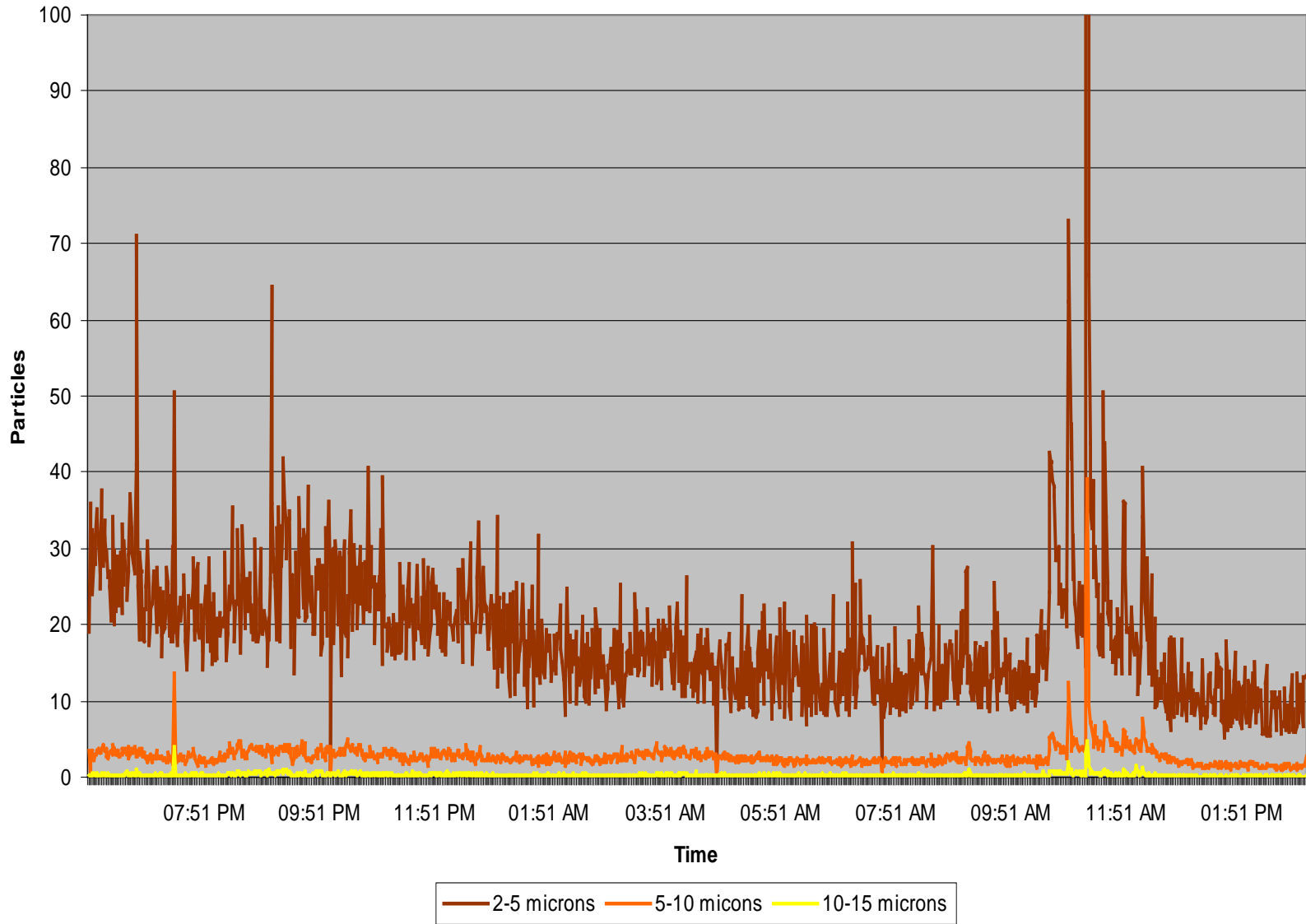
Milli. Test – 10-25 ppb

Iron Test – 0.03 mg/L

Backpressure and particle  
counts went up due to fan  
cycling to warm ACC.



Figure 2. Filtered Water (2-15 micron profiles)

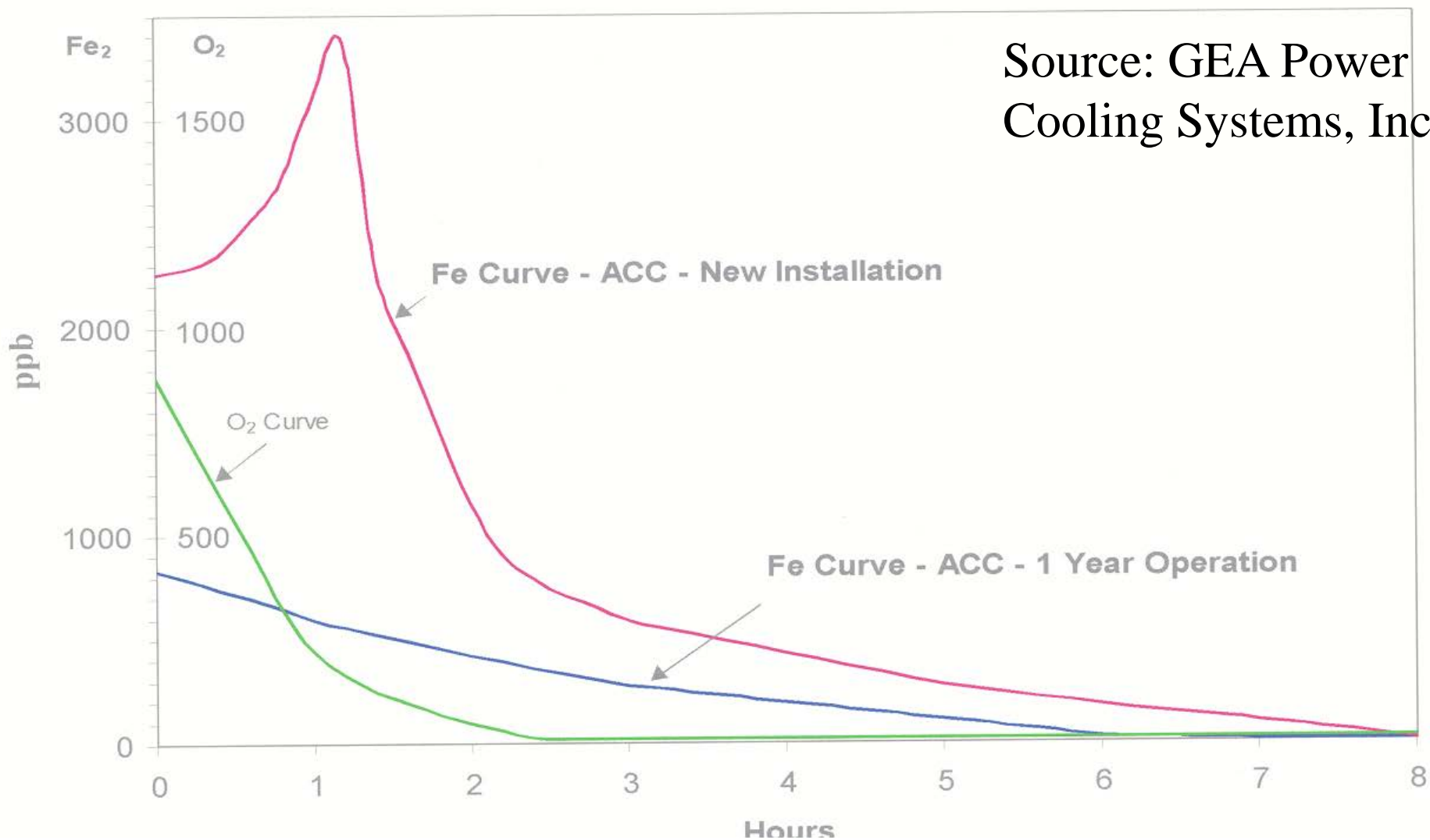


Spike due to Fan cycling on and off

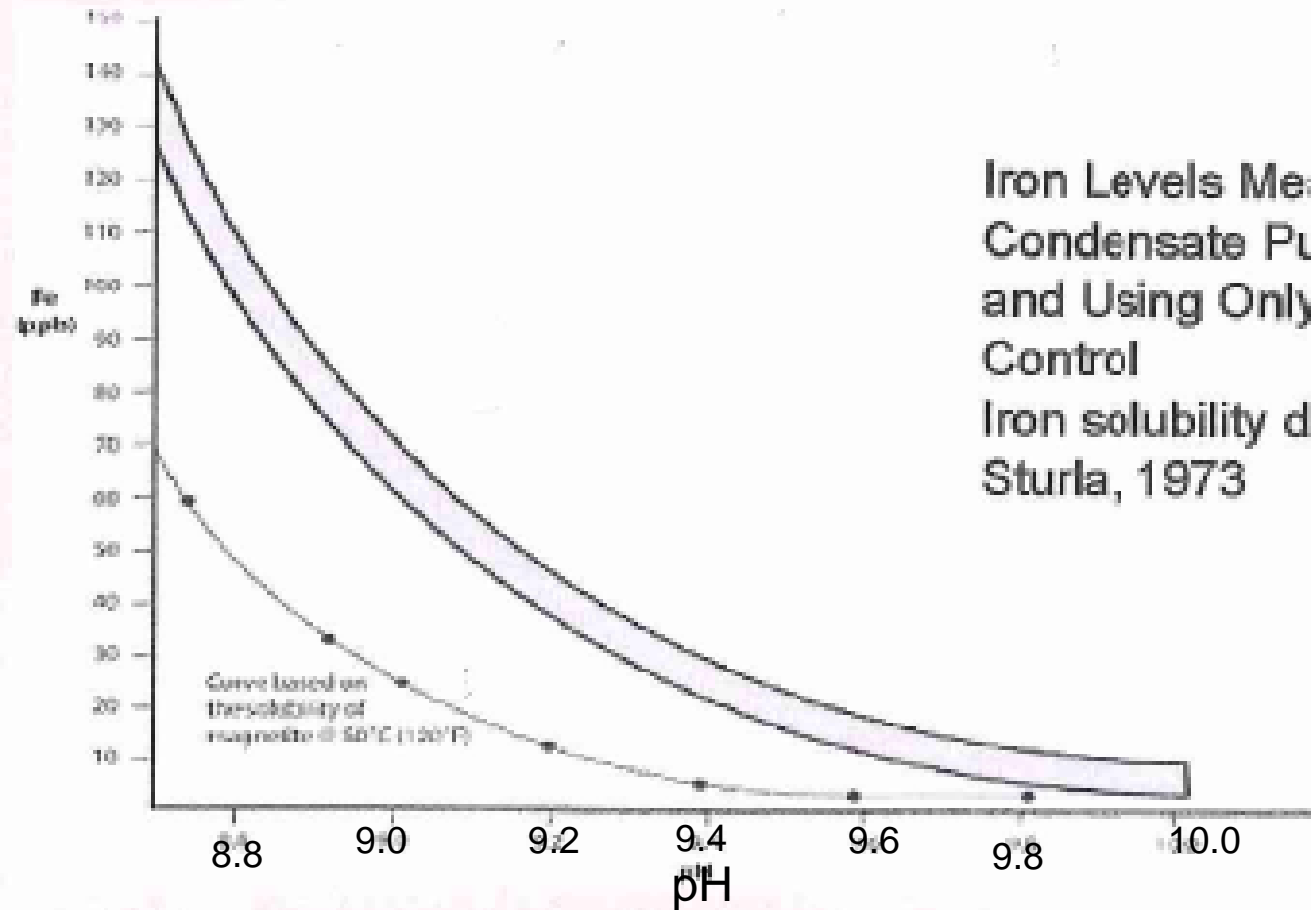




# Typical Iron & Oxygen Content ACC Condensate during Start-Up



# Dooley/Aspden pH Versus Iron Relationship





Armor-Flo®

FLUID  
AIR

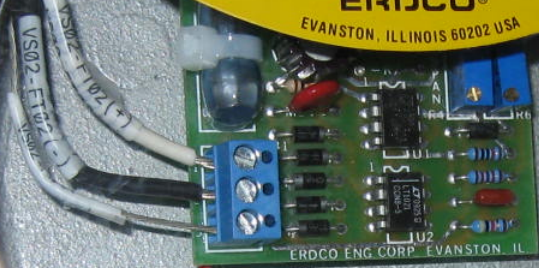
MODEL 3611-08T1-114 SERIAL 094034 TAG

PRESSURE 1.5 OP 200 MAX psig VISCOSITY

TEMPERATURE 120 OP 185°F MAX 1.00 SG

ERDCO®

EVANSTON, ILLINOIS 60202 USA



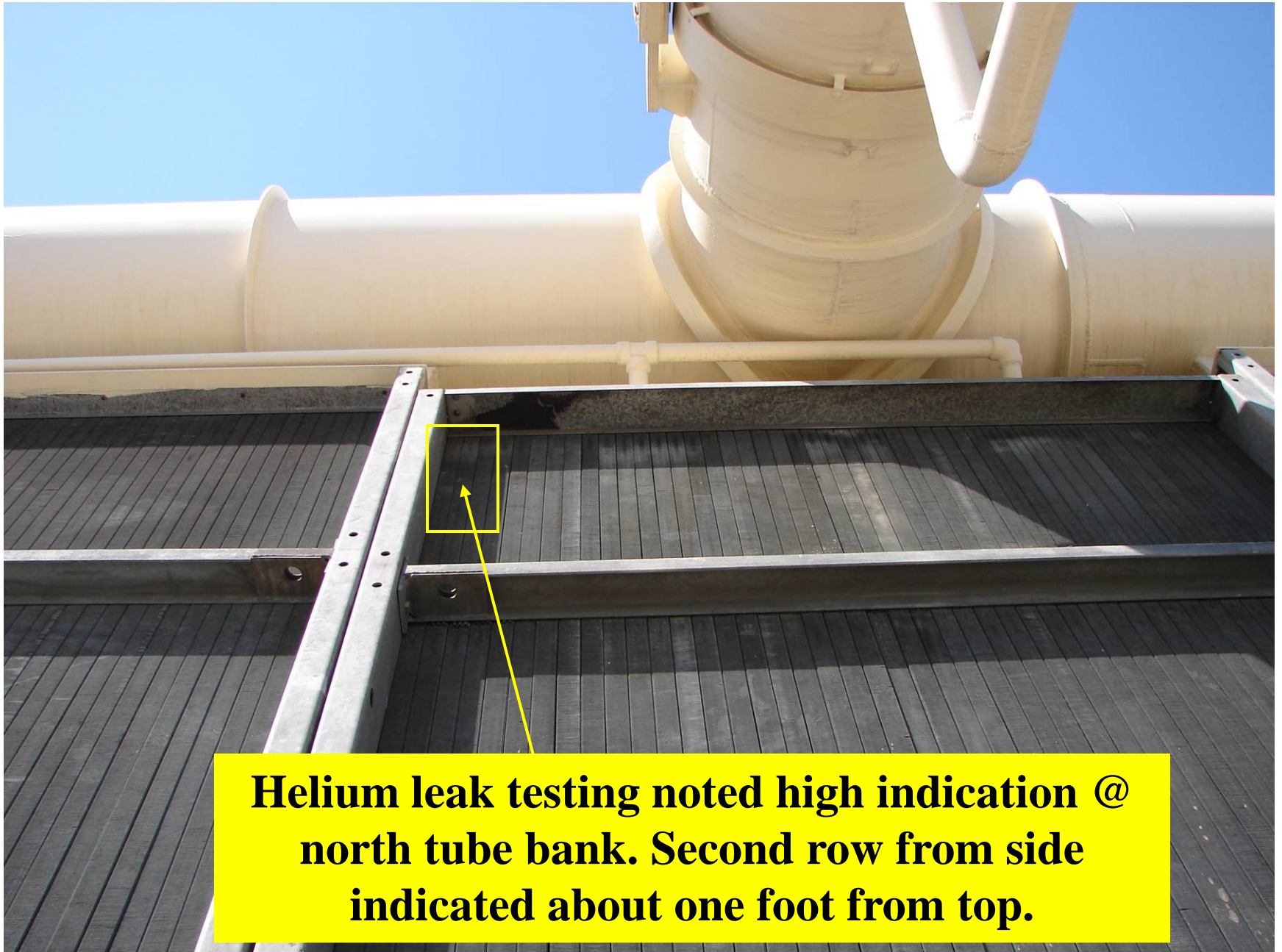
VS02-E1022  
VS02-E1021

ERDCO ENG CORP. EVANSTON, IL

19  
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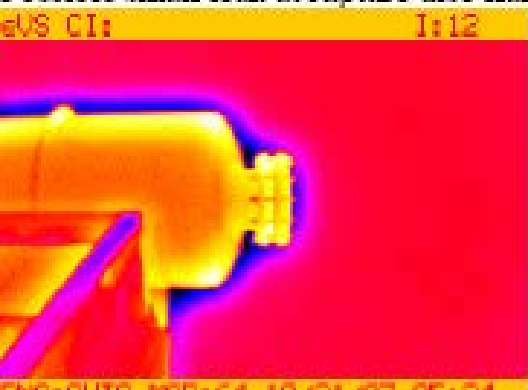




**Helium leak testing noted high indication @ north tube bank. Second row from side indicated about one foot from top.**



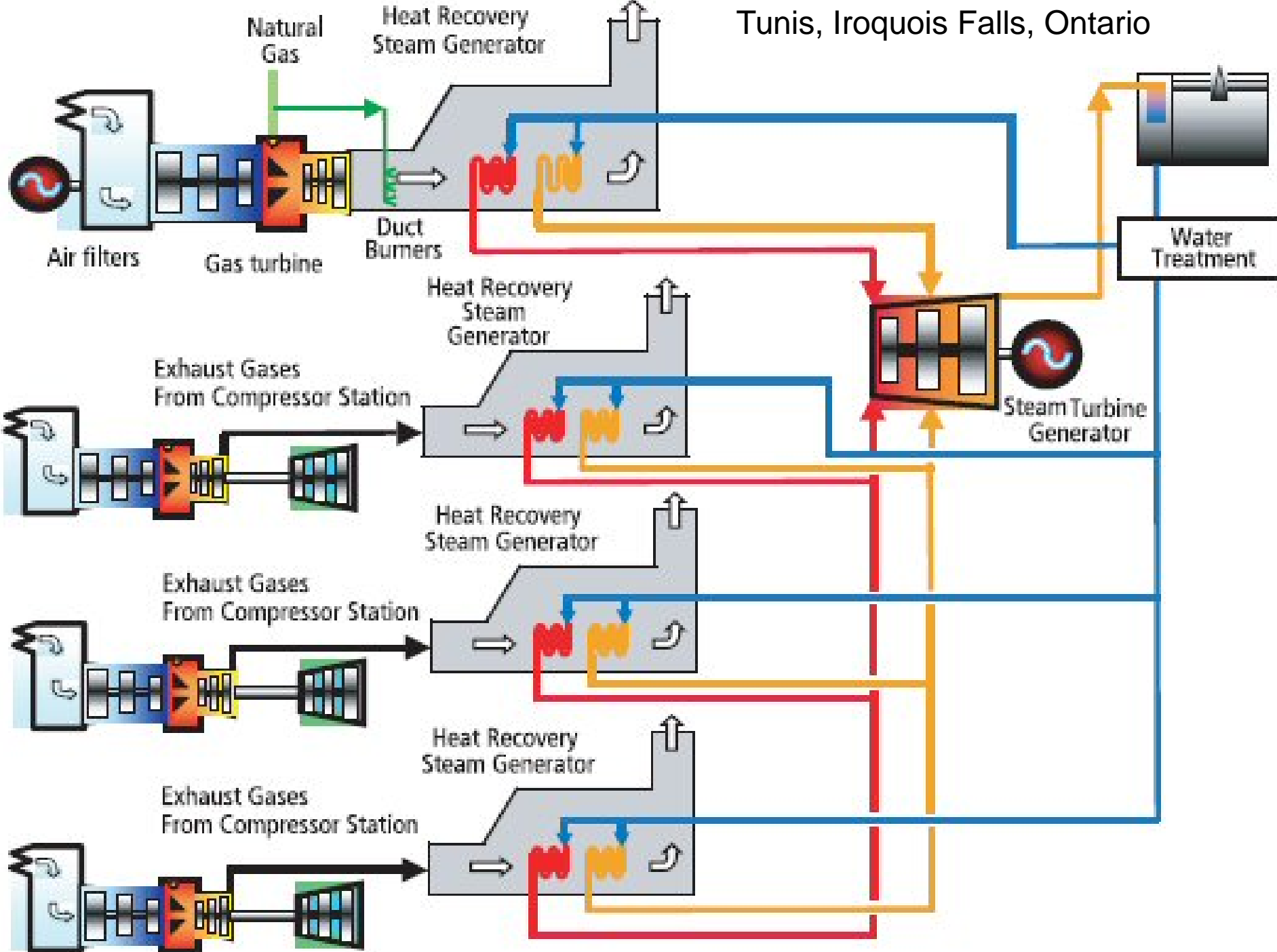
Possible small leak at rupture disc flange, Note the cooler stud and nut (color red)



# Chemistry-Tunis, Ontario, Canada

- Operating pressure 5,800 kPa (840 psi)
- Boiler make up: Well, RO and mix bed DI. Exhausted resin regenerated on site.
- Condensate polishers, resin regenerated on site.
- On-line chemistry control target 8.9
- Discharge wastewater pH 6.0-9.0, <10 ppm ammonia, <10 ppm iron; there have been some exceedances.
- MEA/Ammonia treatment after ~1 year.

Tunis, Iroquois Falls, Ontario





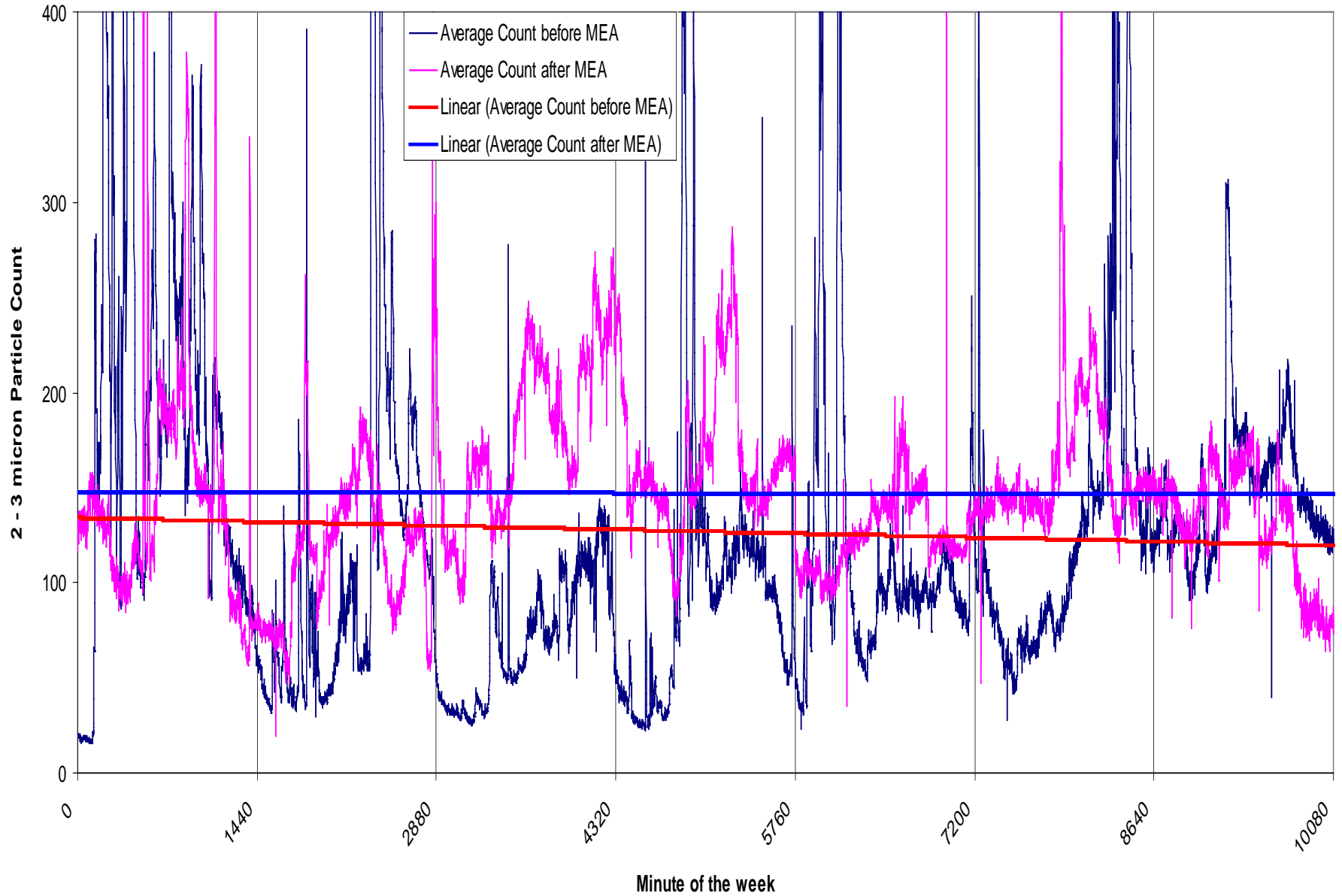
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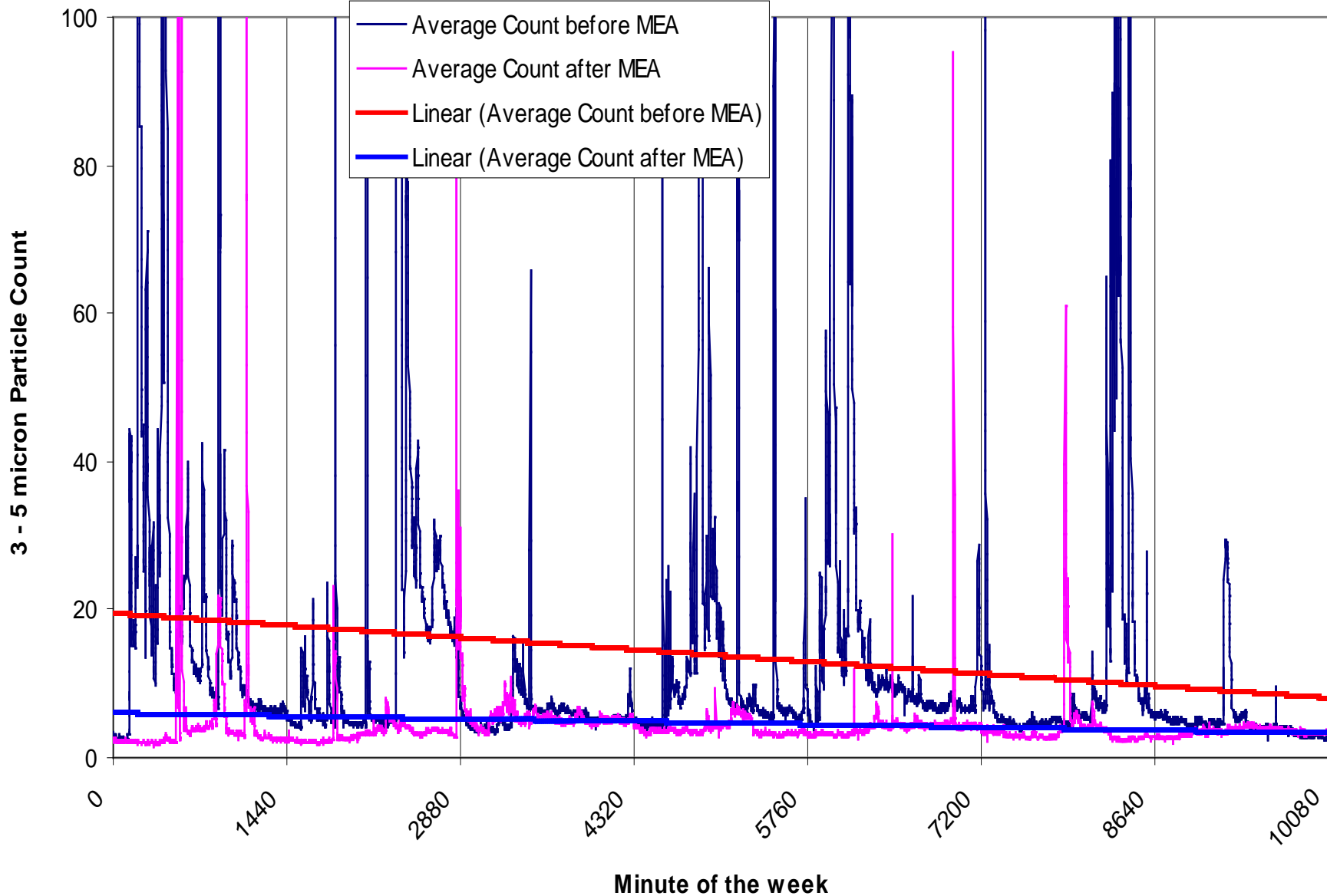




# Average 2 - 3 micron particle count

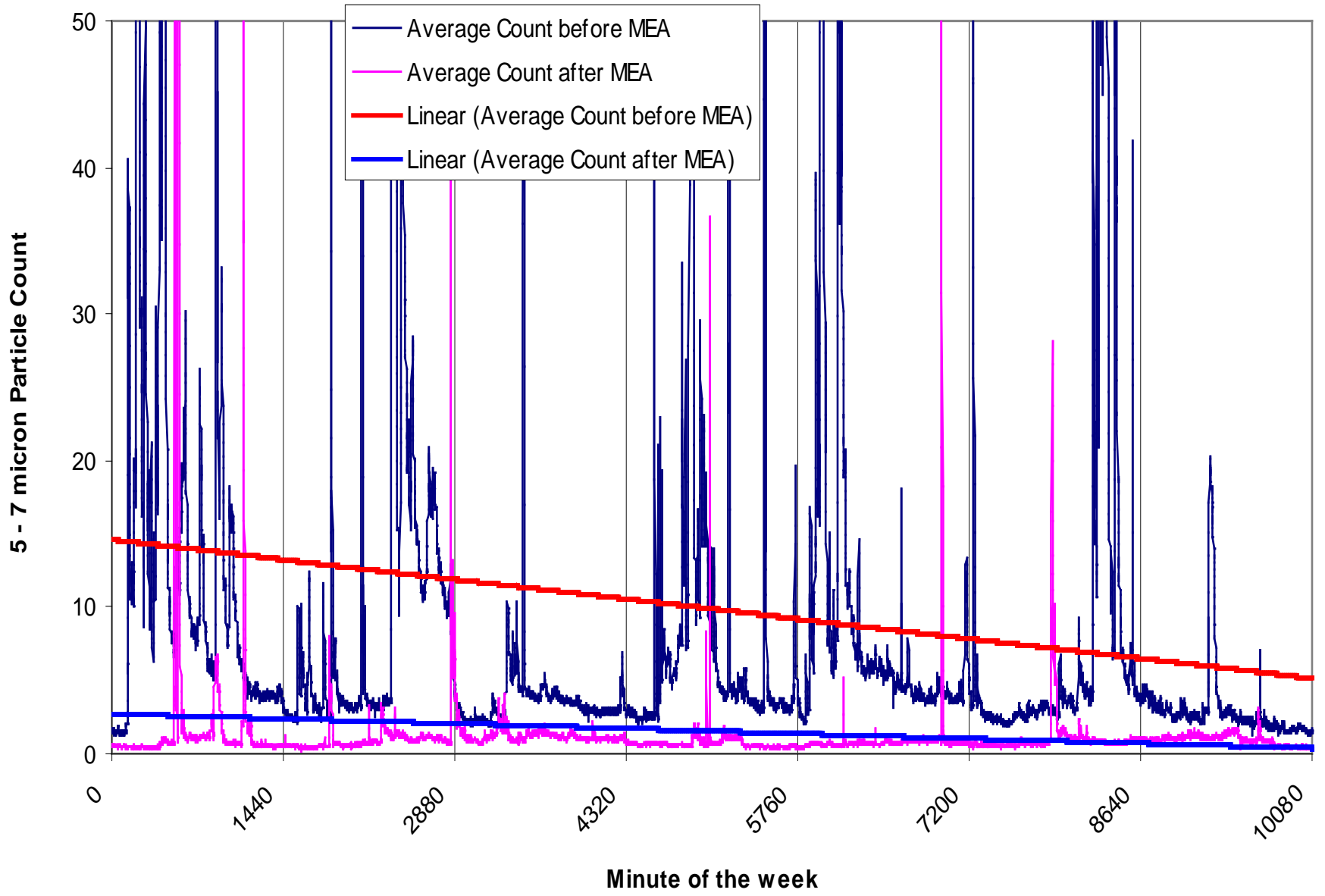


### Average 3 - 5 micron particle count

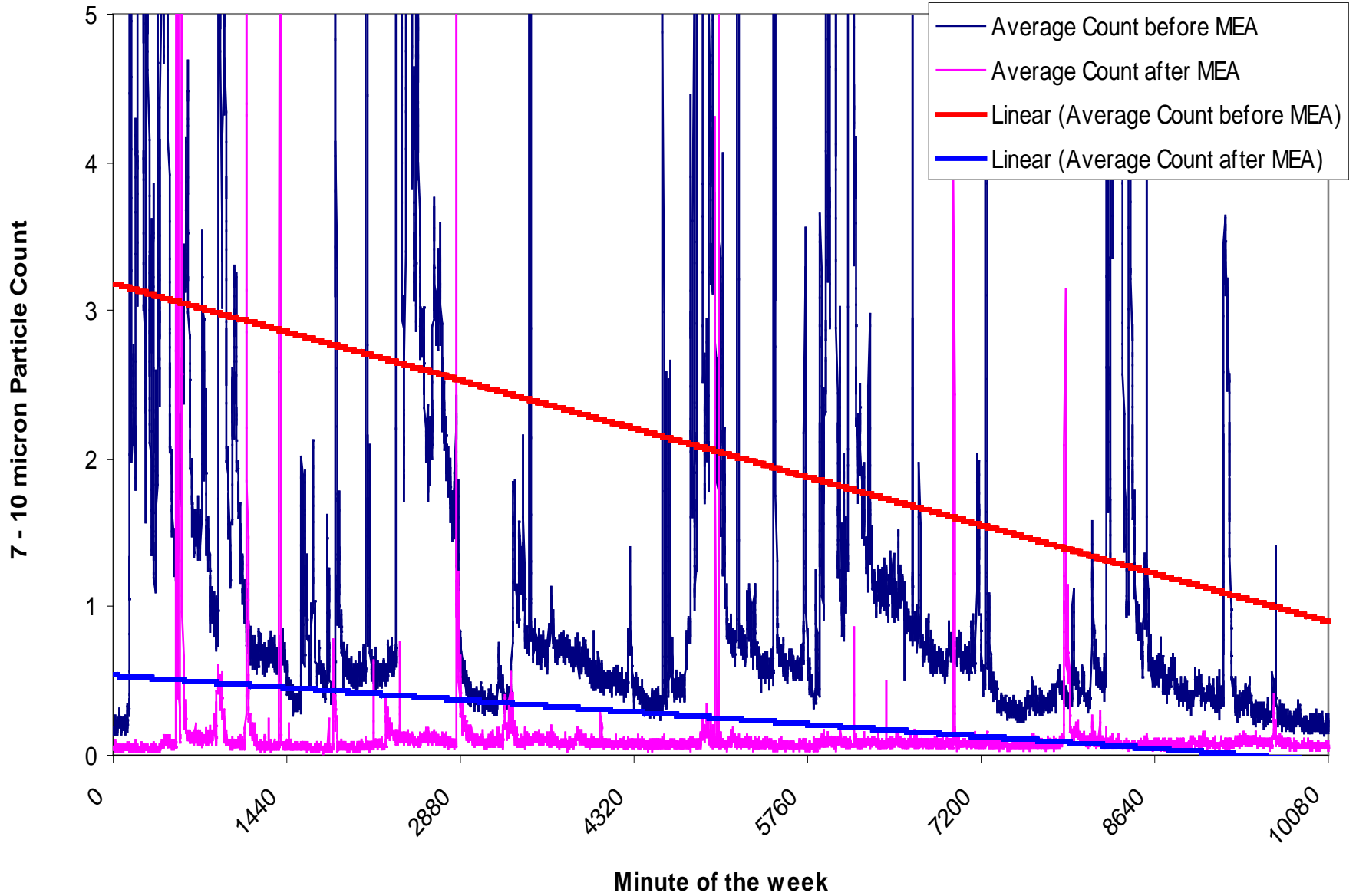




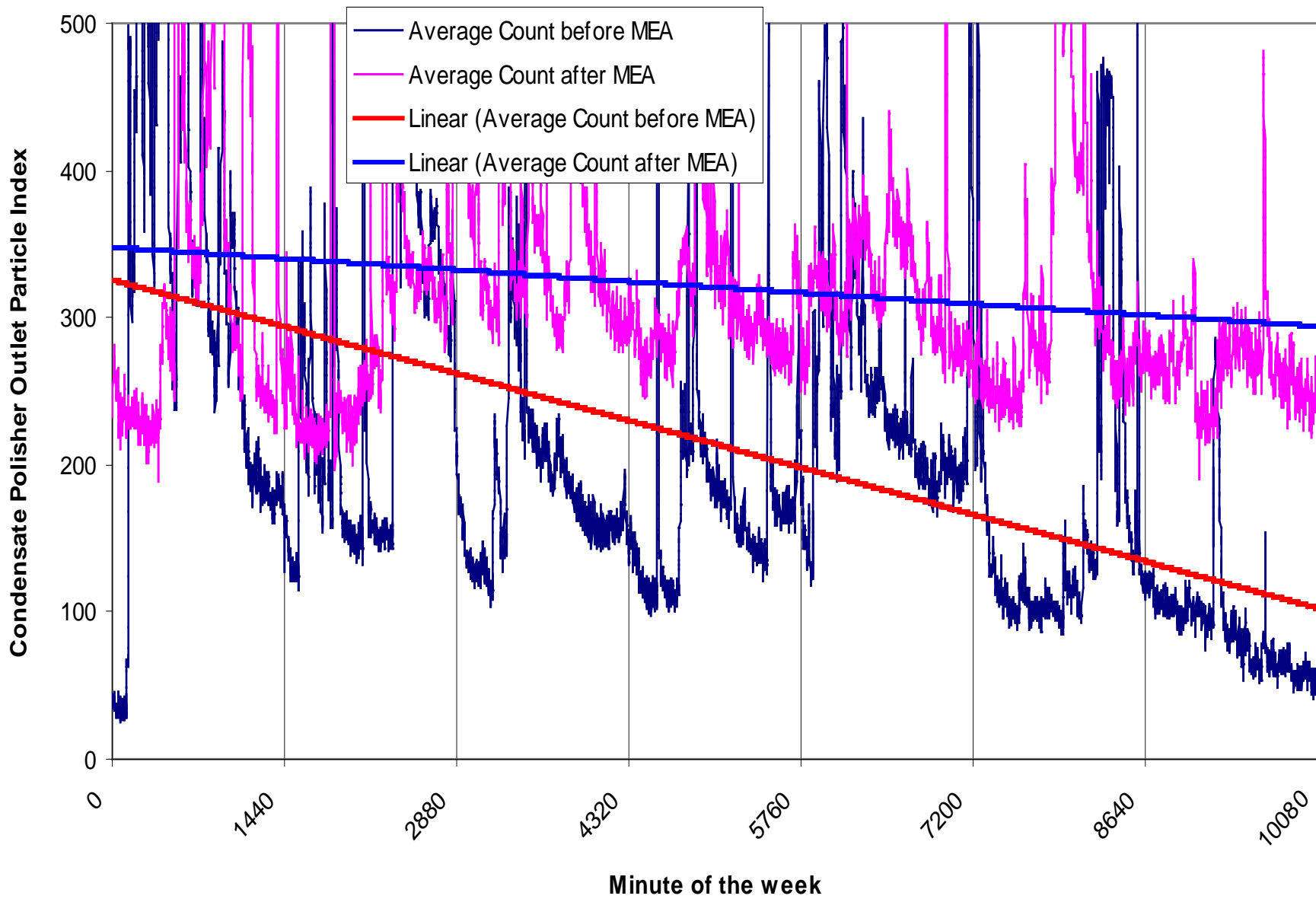
# Average 5 - 7 micron particle count



# Average 7 - 10 micron particle count



# Average Condensate Polisher Outlet Particle Index





2009 inspection



2011 inspection





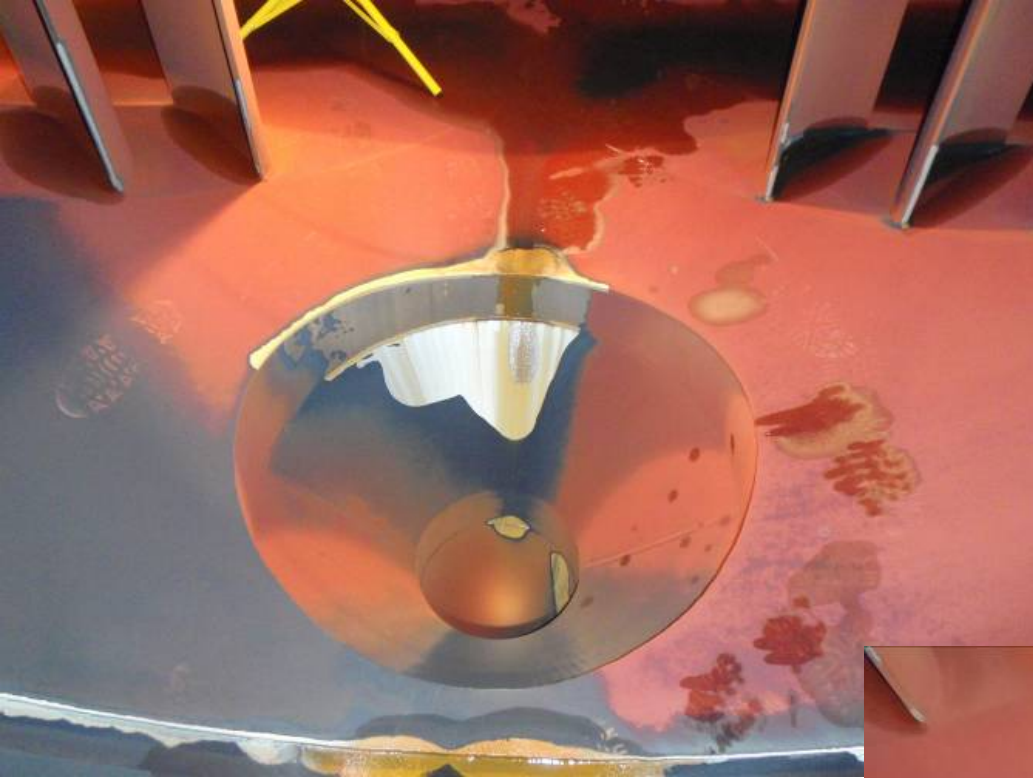


2009 inspection



2011 inspection





2009 steam turbine condensate  
Duct drain.



2011 inspection

