

# **REINHOLD ENVIRONMENTAL Ltd.**



## **2012 APC Round Table & Expo Presentation**

July 16-17, 2012, in Baltimore, MD / Hosted by Duke Energy, Entergy,  
FirstEnergy, Southern Company & TVA

All presentations posted on this website are copyrighted by Reinhold Environmental, Ltd (RE). Any unauthorized downloading, attempts to modify or to incorporate into other presentations, link to other websites, or obtain copies for any other uses than the training of attendees to RE's Conferences is expressly prohibited, unless approved in writing by RE or the original presenter. RE does not assume any liability for the accuracy or contents of any materials contained in this library which were presented and/or created by persons who were not employees of RE.



**Effects of Halogen Additive to Existing APC Controls**  
**Reinhold Environmental APC Conference Baltimore MD**  
July 17, 2012

**Terry Marsh**  
*VP Fossil Power Lead*



# Halogen additive for Hg Control Specific Experience



- ▶ Total of 14 full scale Trials
- ▶ Trial Coal Diversity
  - 2 Bituminous
  - 4 Lignite
  - 3 Lignite and PRB blend
  - 5 PRB
- ▶ Unit Size from 120MW to 880MW
- ▶ All had ESP and 3 Units had a FFBH
- ▶ 2 Units were equipped with FGD
- ▶ 5 Units with SCR

# Proven Benefits of Halogen Injection Directly Into Gas Stream for Enhanced Mercury Oxidation



- ▶ Easier to optimize Halogen quantity than Halogen on the coal
- ▶ Maximum oxidation at lowest cost
- ▶ User can optimize oxidation and minimize sorbent material use
- ▶ Typical oxidation efficiency 85% to 95%
- ▶ Has achieved Hg reduction greater than 90% at the stack without any sorbent material other than ash

# Halogen Distribution System



# Halogen Distribution System



*Halogen Mixing Pump and Distribution Pumps*



*Halogen System Primary Manifold*



*Individual Lance Control*



*Lance port configuration*

# Halogen Injection Lances with Atomized Spray Nozzles



- ▶ Documented negative affects
  - Ash build up should lance leak. Water droplets can cause accumulation of solids (wet ash) on braces and walls
  - Slight increase in CPM

# Positive Affects of Halogen Additive on Existing Systems and APC Controls

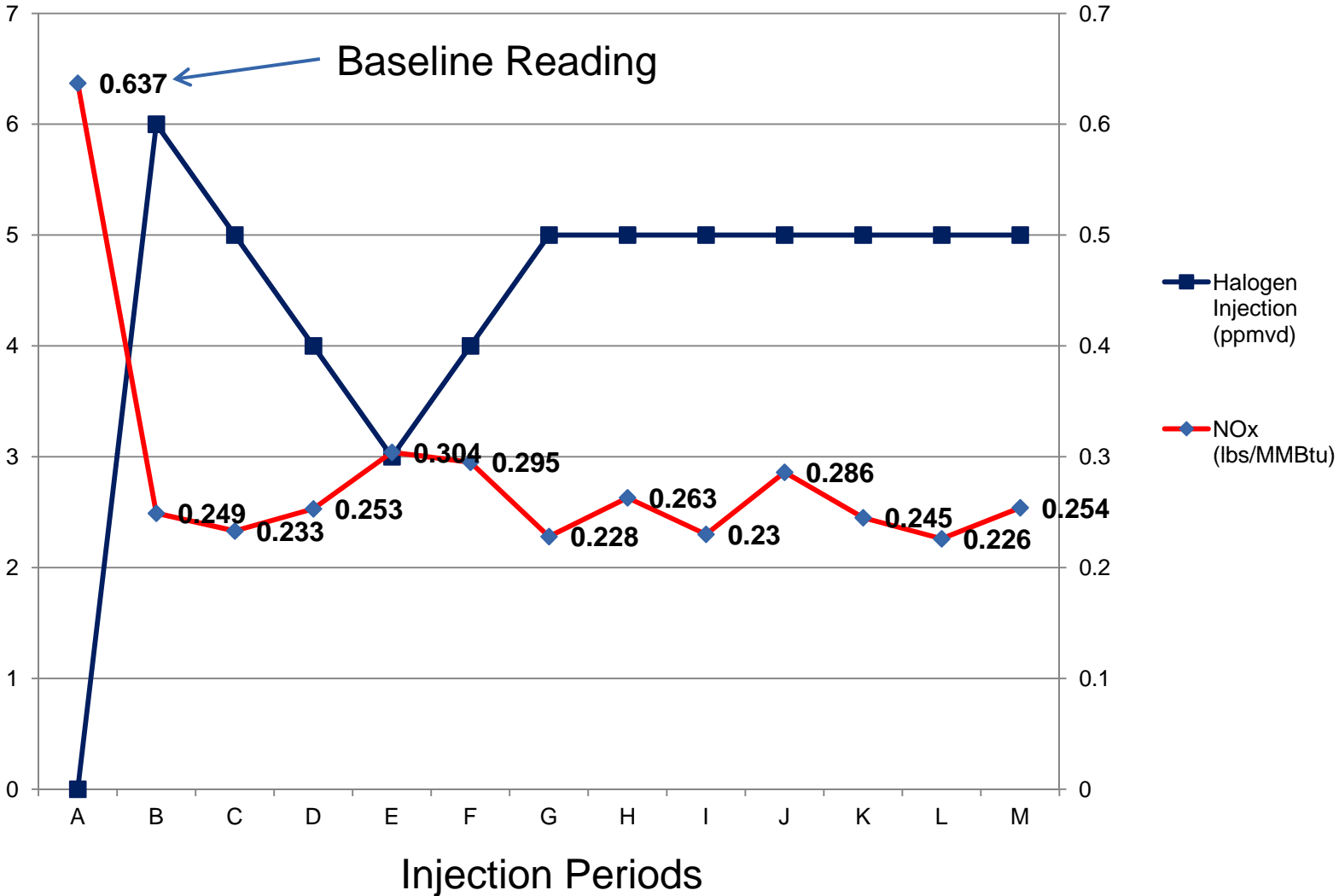


- ▶ Documented positive affects on
  - SCR
  - ESP & FFBH

## ► SCR

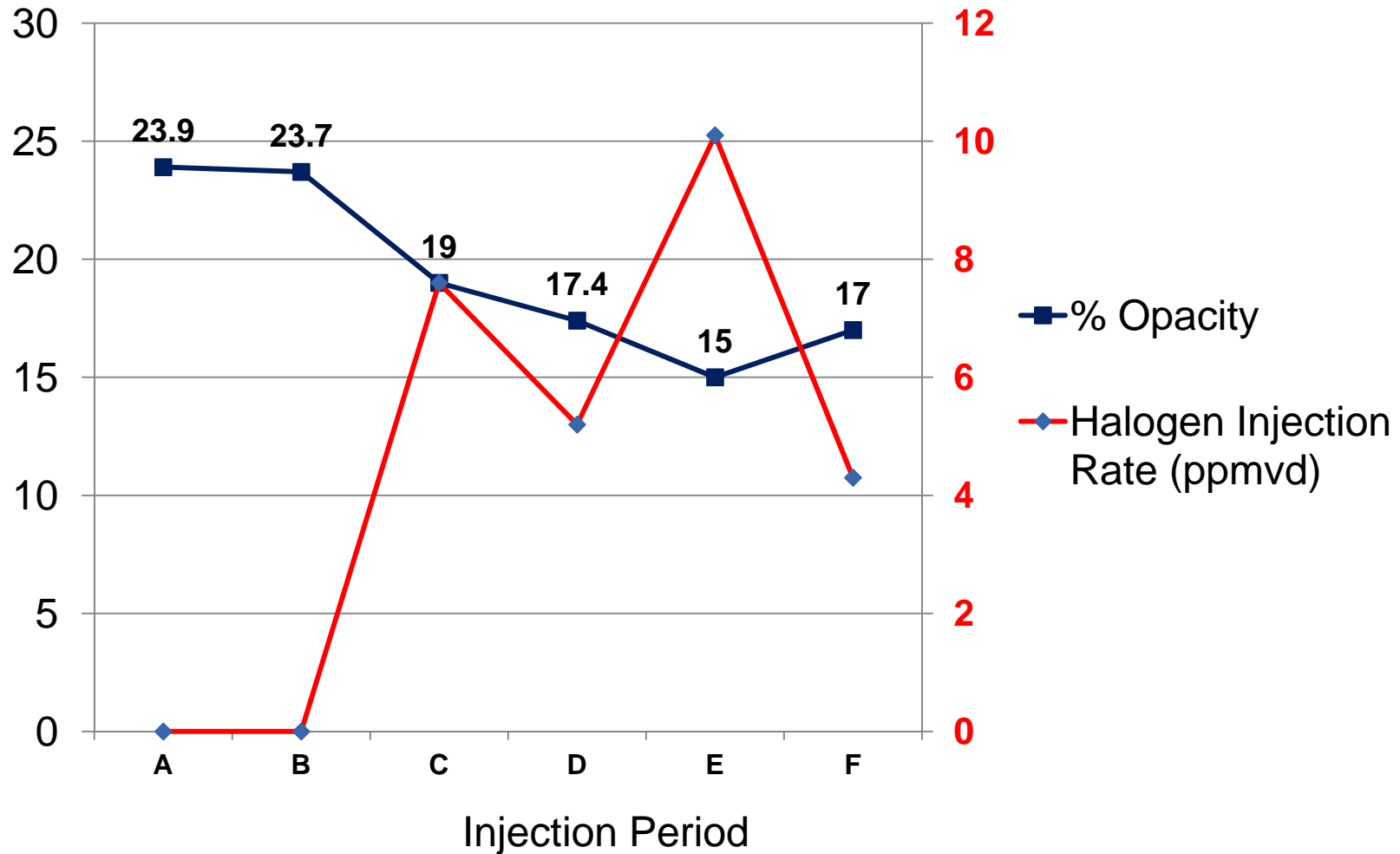
- Gradual notice of NO<sub>x</sub> decreasing overtime as Halogen was added up stream of the SCR during injection
- Halogen helped decrease build up and blockage of ABS at the air pre-heater. Benefit is achieved by conversion of Ammonia Bisulfate (NH<sub>4</sub>)HSO<sub>4</sub> (ABS), melting point 297<sup>0</sup> F and is converted to Ammonia Bromide NH<sub>4</sub>Br, melting point is 846<sup>0</sup> F

# NOx Reduction During Halogen Injection



- ▶ Improved particulate control. Halogen appeared to improve the receptivity of the ESP and FFBH to capture particulate

# During Halogen Injection Opacity Decreased





**Shaw**® a world of **Solutions**™

Thank You