

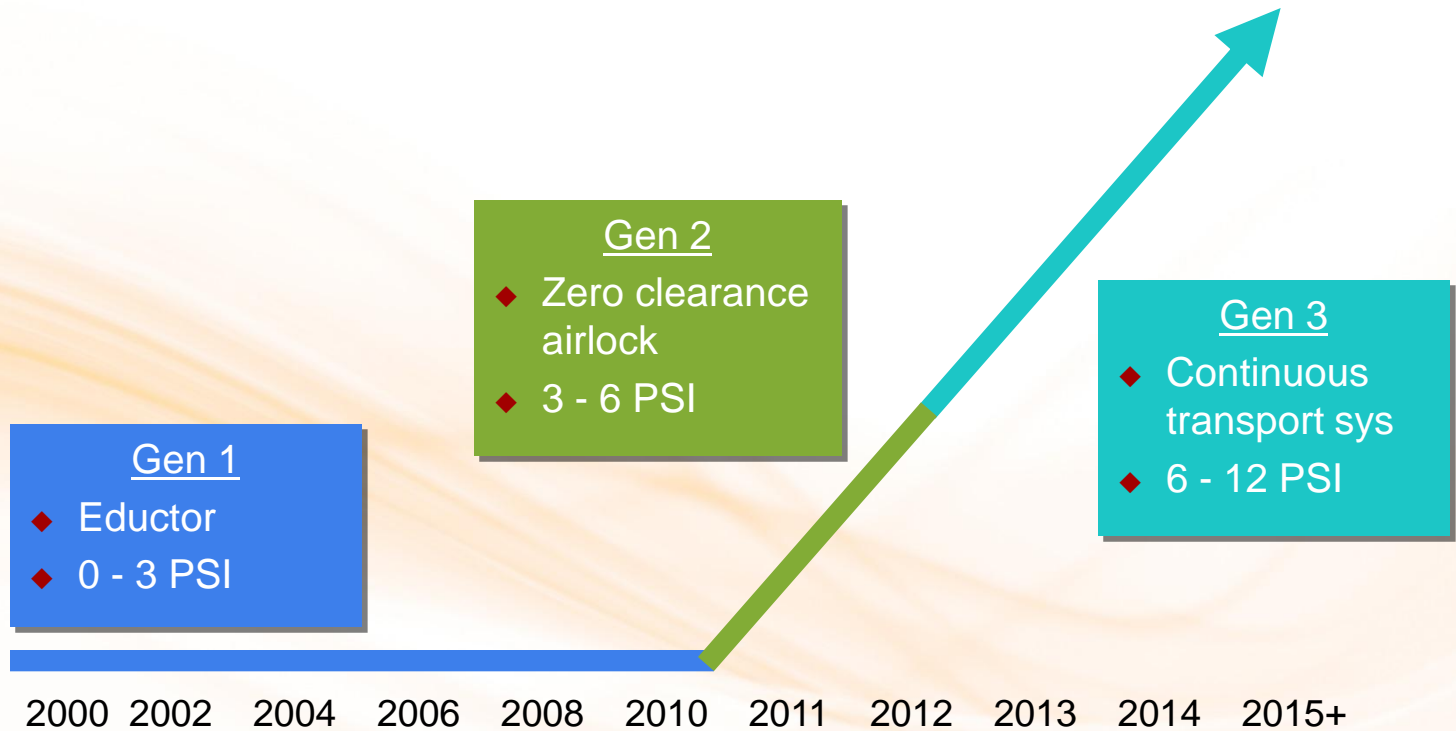


**Mcilvaine
Hot Topic
ACI Material Handling Gen 3**

June 20, 2013

Progression of ACI Technology

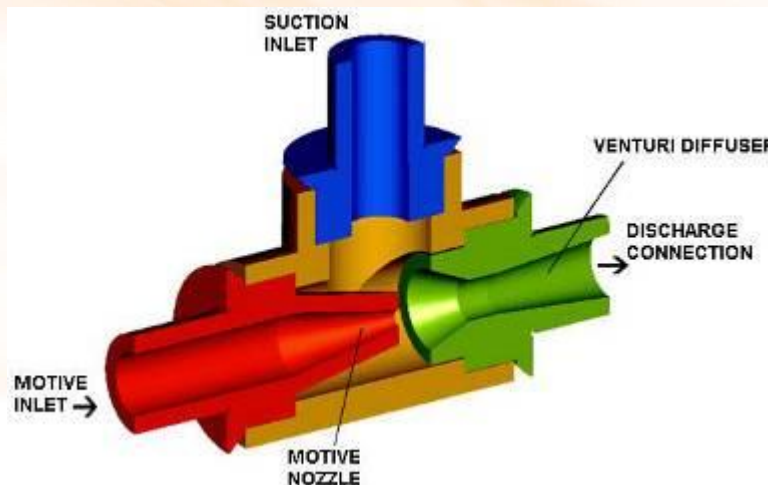
- ◆ Gen 1
- ◆ Gen 2
- ◆ Gen 3



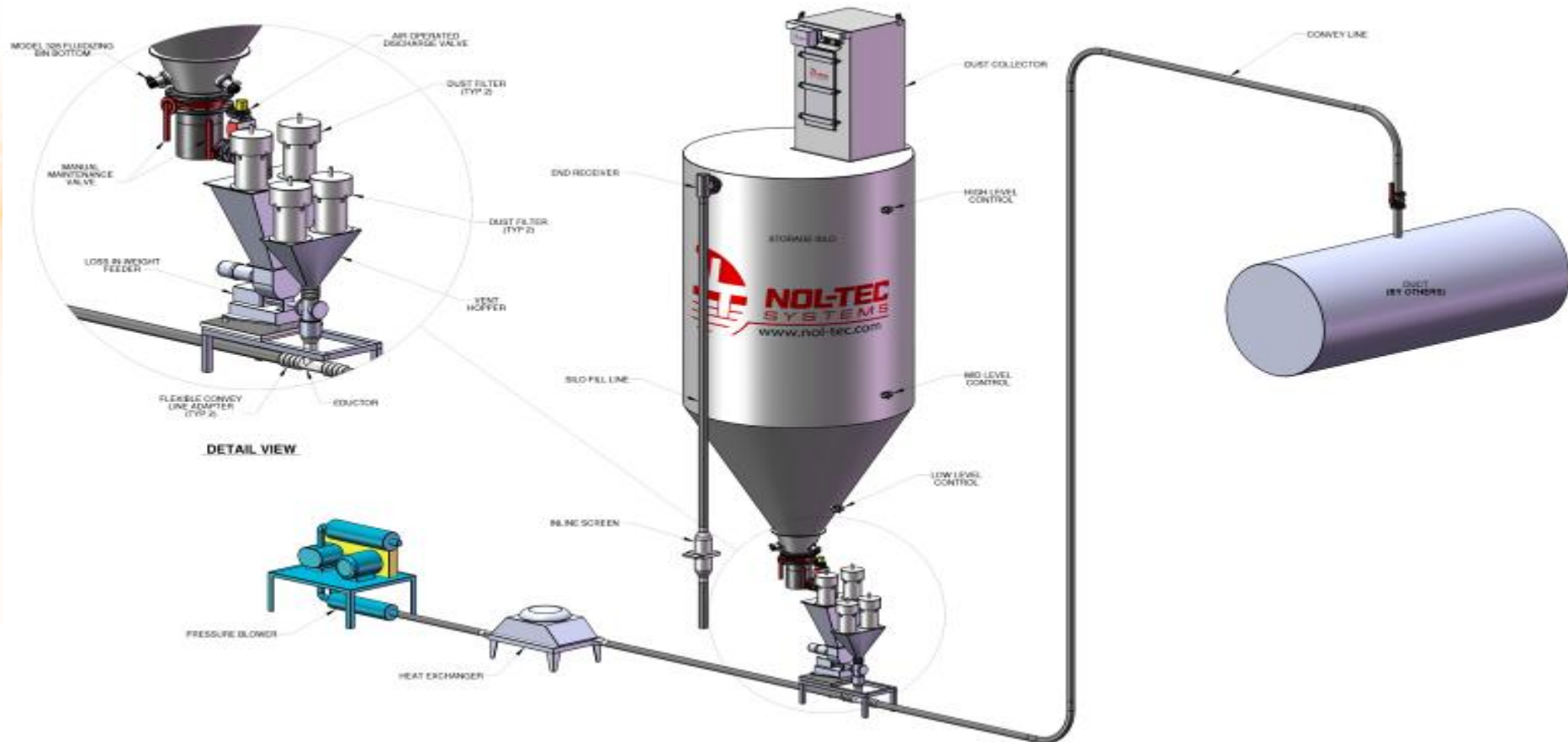
A collaborative technology approach driven to deliver meaningful solutions to convey new carbon products to help meet Hg limits

Progression of Technology

- ◆ Gen 1
 - ◆ Gen 2
 - ◆ Gen 3
- ◆ What is Gen 1?
 - **Eductor system**
 - Creates venturi – uses ~10-12 PSI to generate 2 PSI
 - Designed to pull negative on feeding device
 - Promotes PAC to flow downstream versus upstream
 - Used in conjunction with air source (PD blower, regen blower, or compressed air) and LIW feeder



PAC System Equipment Gen I



Progression of Technology

◆ Gen 1

◆ Why an eductor for Gen 1?

◆ Gen 2

◆ Gen 3

- PAC is very fine (like smoke) and slips past a standard rotary airlock
- Eductor creates a venturi effect to solve this
- Works up to 2 PSI of downstream convey line pressure
- Gen 1 PAC scenarios that fit this 2 PSI category:
 - Lower Injection Rates (5-100 lbs/hr)
 - Shorter Distances (less than 400 ft)
 - Non-Resistant Splitting or No Splitting

Progression of Technology

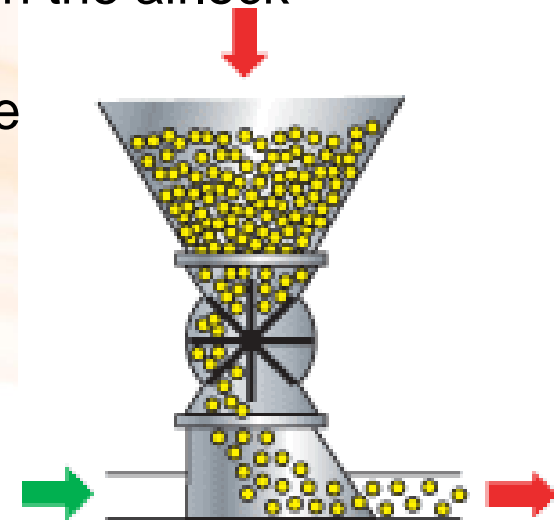
- ◆ An evolving market...
 - Finer particle size on PAC products
 - Increases mercury removal
 - Changes pneumatic conveying conditions.
 - Increasing required injection rate.
 - Increase in convey line back pressure
 - Increasing required conveyed distance.
 - Increase in convey line back pressure

Progression of Technology

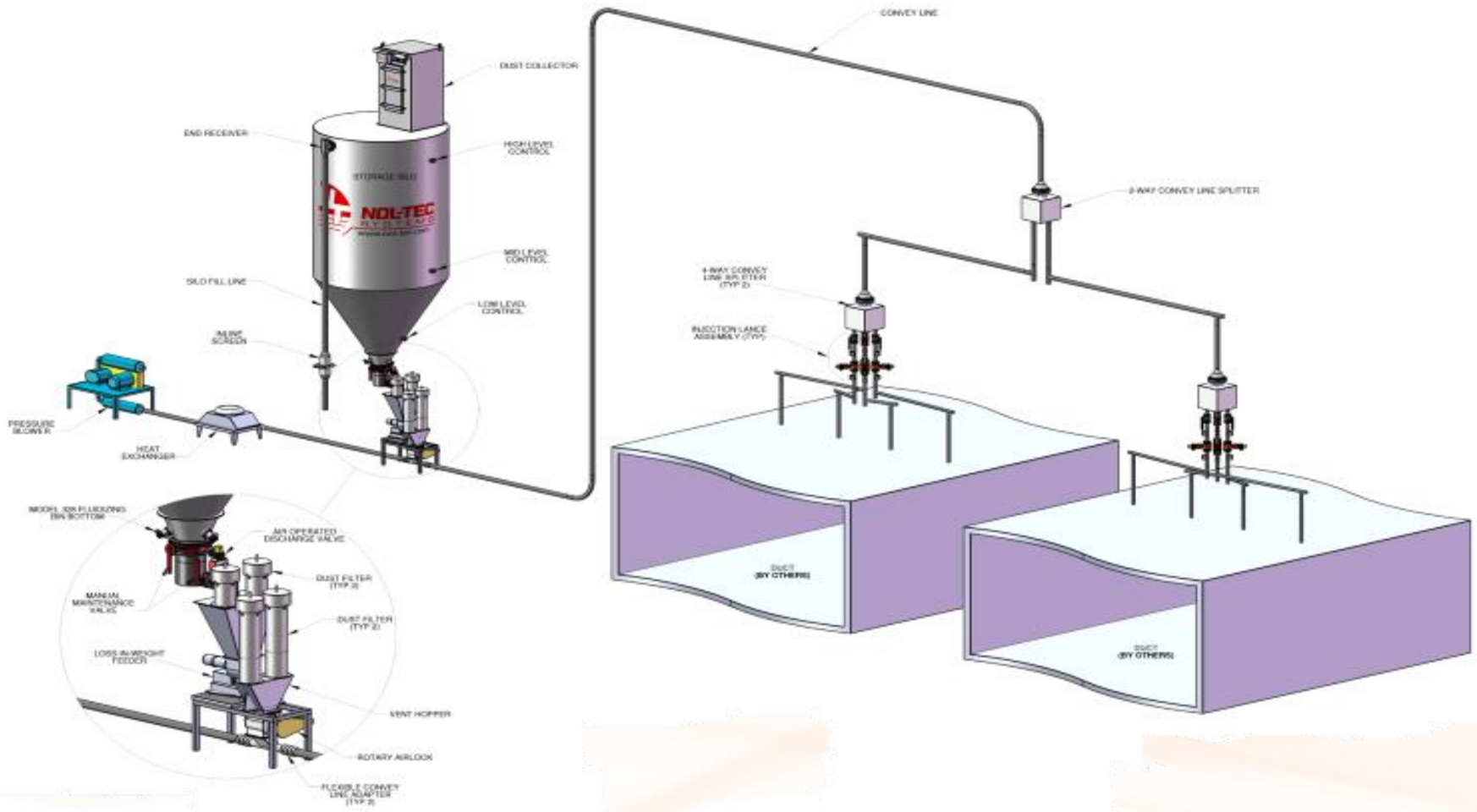
- ◆ Gen 1
- ◆ Gen 2
- ◆ Gen 3

◆ What is Gen 2?

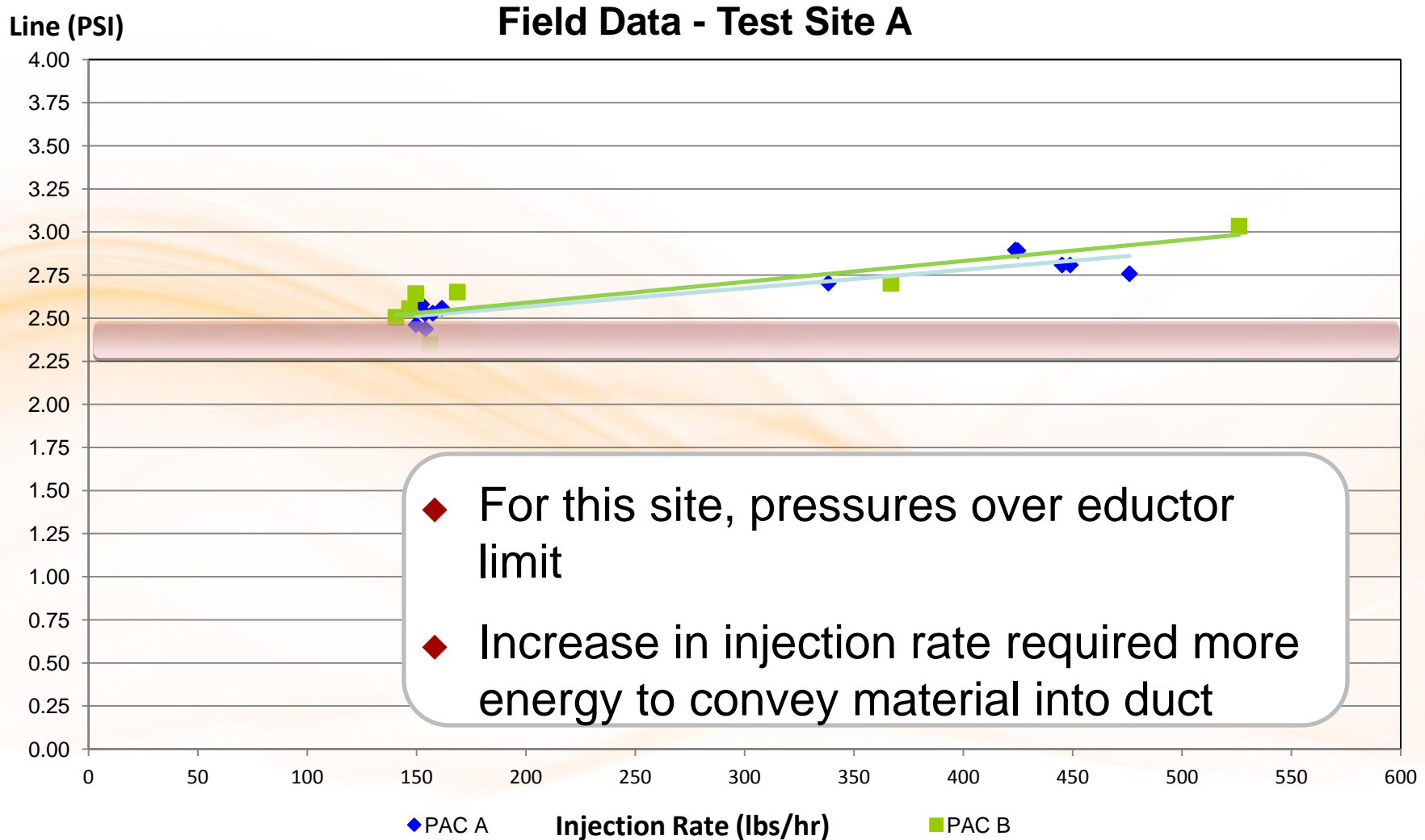
- ***Zero clearance airlock system***
- Eliminates the venturi concept and the 2 PSI limit
- Addresses the problem of the rotary airlock
- Focus on the gap clearances within the airlock
- Accomplishes 6 PSI back pressure
- Longer Distance / Higher Rate
- Resistive splitting



AC System Equipment Gen 2

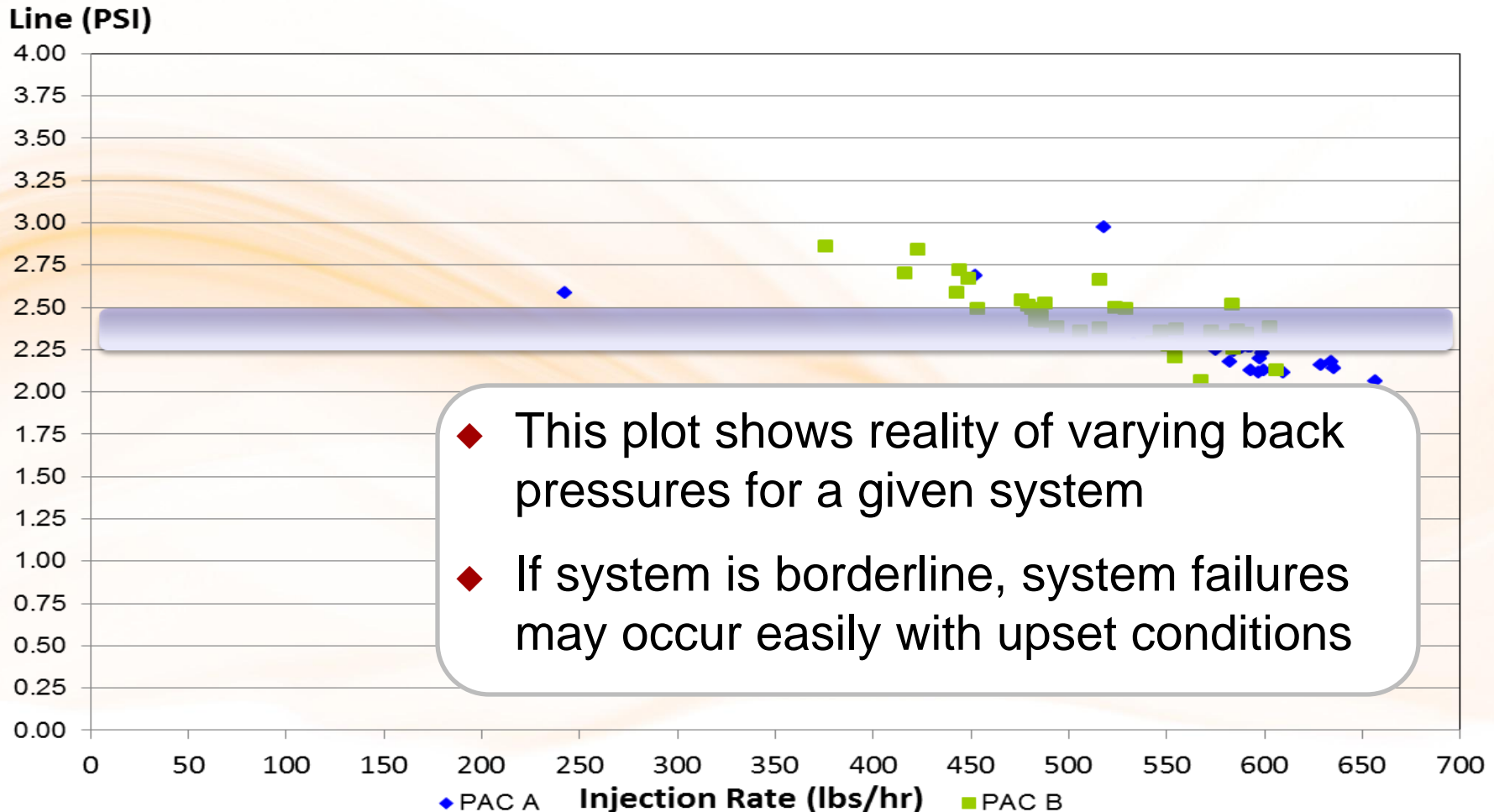


Progression of Technology



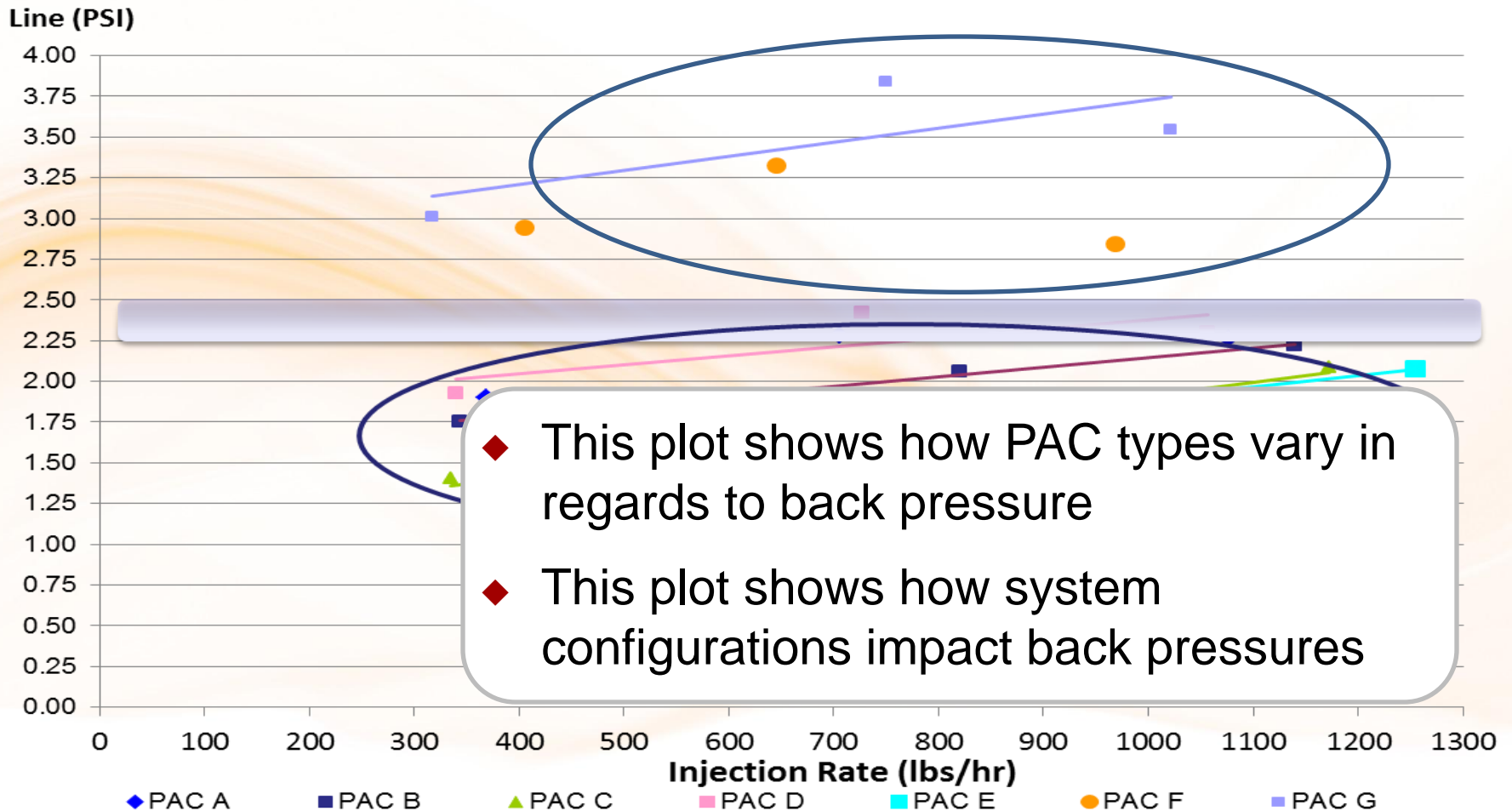
Progression of Technology

Field Data - Test Site B



Progression of Technology

Field Data - Test Site C



Progression of Technology

◆ Reliability...

- Can we eliminate the zero clearance RAL maintenance?

Progression of Technology

- ◆ Gen 1
- ◆ Gen 2
- ◆ Gen 3

- ◆ What is Gen 3?

- ***Continuous transport system***
- Utilizes two weigh hoppers – one re-filling/one weighing
- Creates an “equalized pressure system”
- Zero differential across metering device
- All PD energy available to convey PAC – up to 12 PSI
- Relieve stress of $\Delta P \sim 6$ PSI across rotary airlock
- Improves reliability because $\Delta P \sim 0$ PSI across airlock
- Utilizes standard rotary airlocks
- Key – pressurize weigh hopper to equal the convey line

PAC System Equipment Gen 3



Guidelines for Choosing System

◆ Nol-Tec standards

- Gen 1: Eductor system
 - 2 PSI convey pressure
 - No splitting
 - 400 feet or less
 - 5-100 lbs/hr
- Gen 2: Zero clearance airlock
 - 6 PSI convey pressure
 - Variable splitting
 - Variable distance
 - Variable rate
- Gen 3: Continuous transport system
 - 12 PSI convey pressure
 - Variable splitting
 - Variable distance
 - Variable rate

Questions

