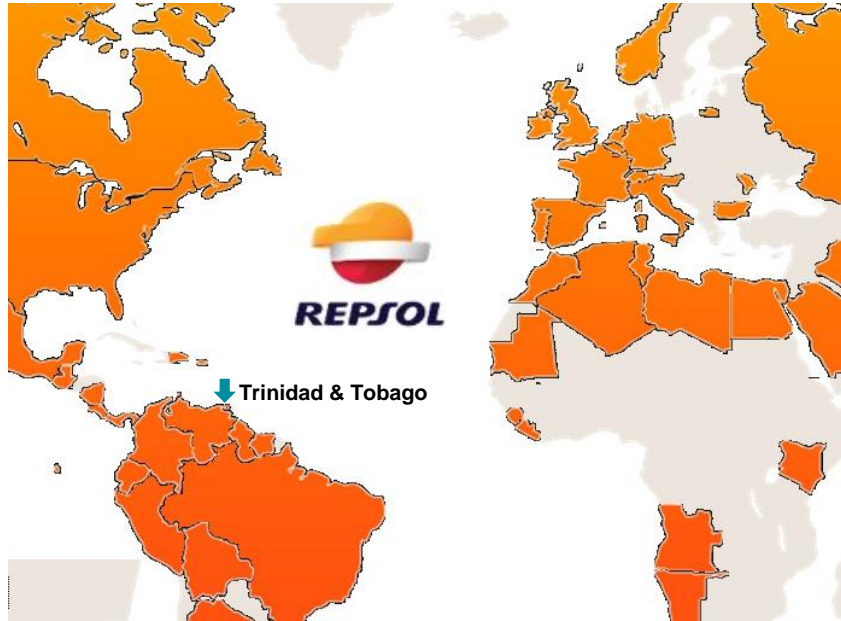# Enhanced Offshore Fire and Gas Monitoring in Real-time with the Enterprise PI System and SCADA

Presented by **John O. Brathwaite, B.Sc.Eng, M.ASc.Eng**

Who or what is Repsol?

Trinidad & Tobago

Repsol International is a Spanish based petrochemical company with assets and / or a presence in 50 countries worldwide.

Repsol is engaged in a mix of upstream (oil and gas production) and downstream (petrochemical processing) business.

Innovation:
At Repsol, we believe that the key to our competitiveness and development resides in our ability to generate new ideas and put them into practice in a spirit of cooperation and continuous collective learning.

Repsol Exploration and Production Trinidad and Tobago

- ❑ Repsol Exploration and Production is a relatively small oil and gas operator in Trinidad and Tobago.

- ❑ Repsol operates and owns fourteen offshore platforms approximately 20 miles off of the East Coast and owns 30% of bpTT

- ❑ Repsol bought these platforms from bptt and began operating in Trinidad and Tobago in 2005

- ❑ Repsol produces approximately 13000 boepd.

"ENERGY FOR PROGRESS AND SOCIAL WELL BEING"

Problem Statement / Objectives

- An offshore Fire and Gas Detection and Suppression system must be able to attain high dependability given challenges of :

    - Operating budget,

    - People On Board restrictions,

    - Low availability of chopper seats for service contractors

    - Reliability of offshore reports as to F&G system status

    - Maintaining safety critical barrier integrity with end device bypasses
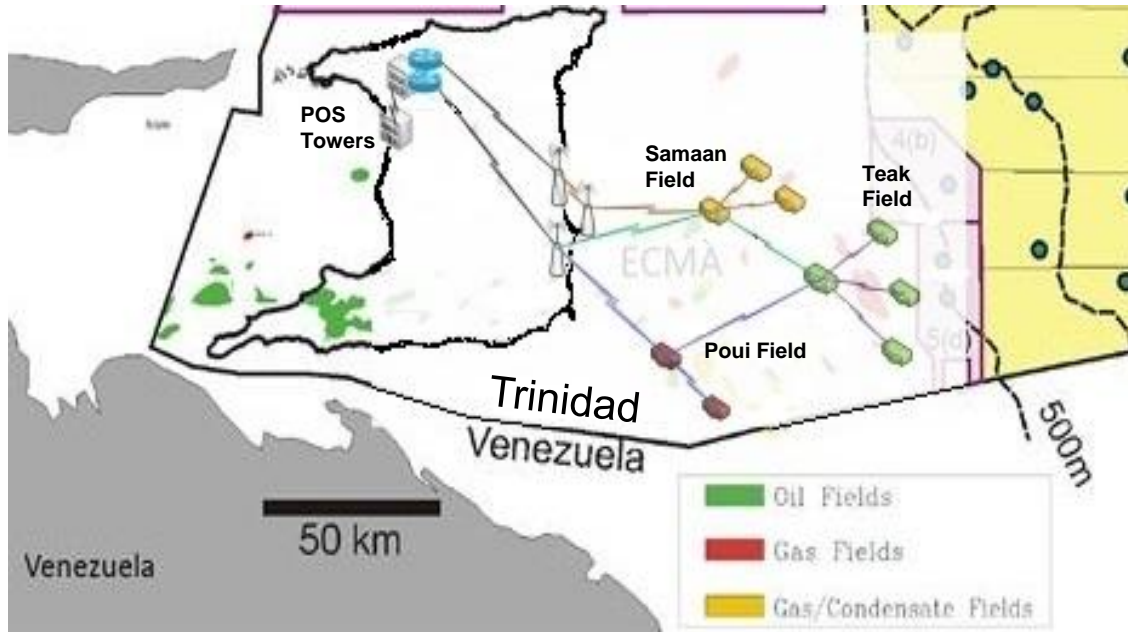
Some offshore hazards

- Methane or CH4
- Hydrogen Sulphide or H2S
- Fire

A Clear and Present Danger:

- Piper Alpha (07/06/1988, North Sea): 167 lives lost, >27 billion US in losses
- Deep Water Horizon (04/22/2010,GoM): 11 lives lost, >100 billion US in losses
- Poui Alpha (03/19/2011, T&T): 0 lives lost, >27 million US in losses

# Teak, Samaan and Poui: Communication backbone

- ❑ Offshore oil and gas production from nine geographically dispersed platforms off of the east coast of Trinidad (and Tobago)
- ❑ Supervisory Control And Data Acquisition (SCADA) consumes communication backbone bandwidth
- ❑ Communication backhaul upgrade and control system segregation project in progress

Integrated Automation and Fire & Gas Control Networks

Teak Alpha Production

Teak Alpha Drilling

Teak OCOT / Echo
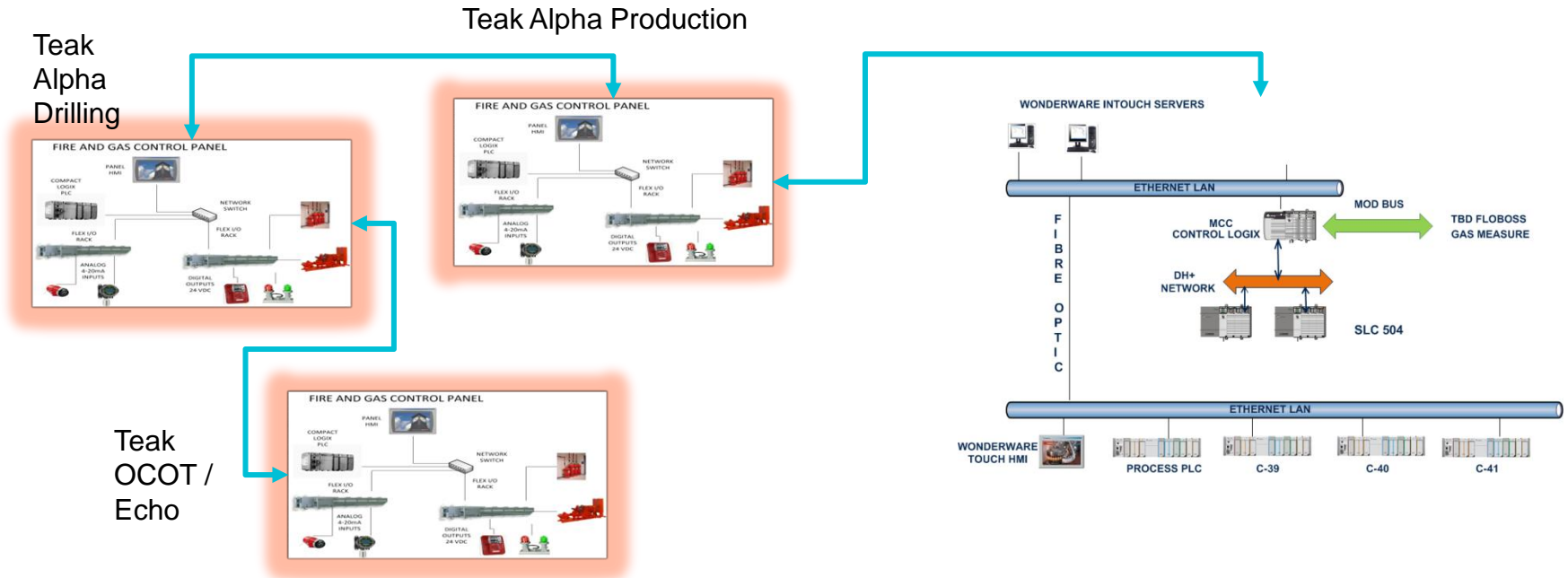
- ❑ PLC fire & gas systems: Teak Alpha Production, Teak AD, Teak Echo / OCOT.
- ❑ Linked through multi-mode fibre and copper

TSP Fire and Gas Panel Architecture

FIRE AND GAS CONTROL PANEL
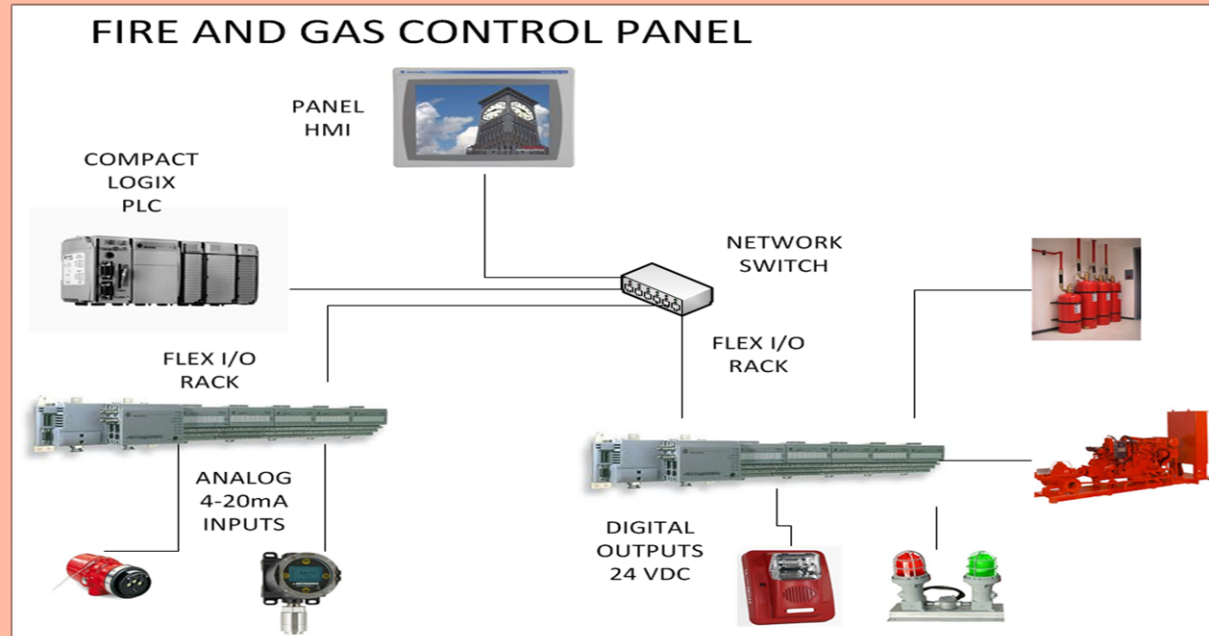
- ❑ End devices are hardwired with supervised direct 4-20 mA / 24 VDC digital circuit to PLC cards.
- ❑ Panels are Allen Bradley Compact Logix and Flex I/O technology
- ❑ Abnormal conditions are detected by remote end devices and registered in PLC and HMI.
- ❑ Executes the warning alert or emergency action via horn/strobe/panel buzzer/suppressant/deluge

Plant Information (PI) System Architecture

| PI Notifications	PI Data Archive	Failover / Management Services
PI Asset Framework (PI AF)	Data storage Management Services Audit trail PI Batch	PI MCN Health Monitor & System Management Tools
PI SDK Integration	Real-time Interfaces	ERP

- ❑ Real-time database: data elements are stored with time stamps, not in tables
- ❑ Designed for process plant monitoring and control
- ❑ PI AF: user customised hierarchical or asset-centric model
- ❑ PI Notifications: event triggers e-mail to end user alerting

9

PI F&G Dashboard Architecture
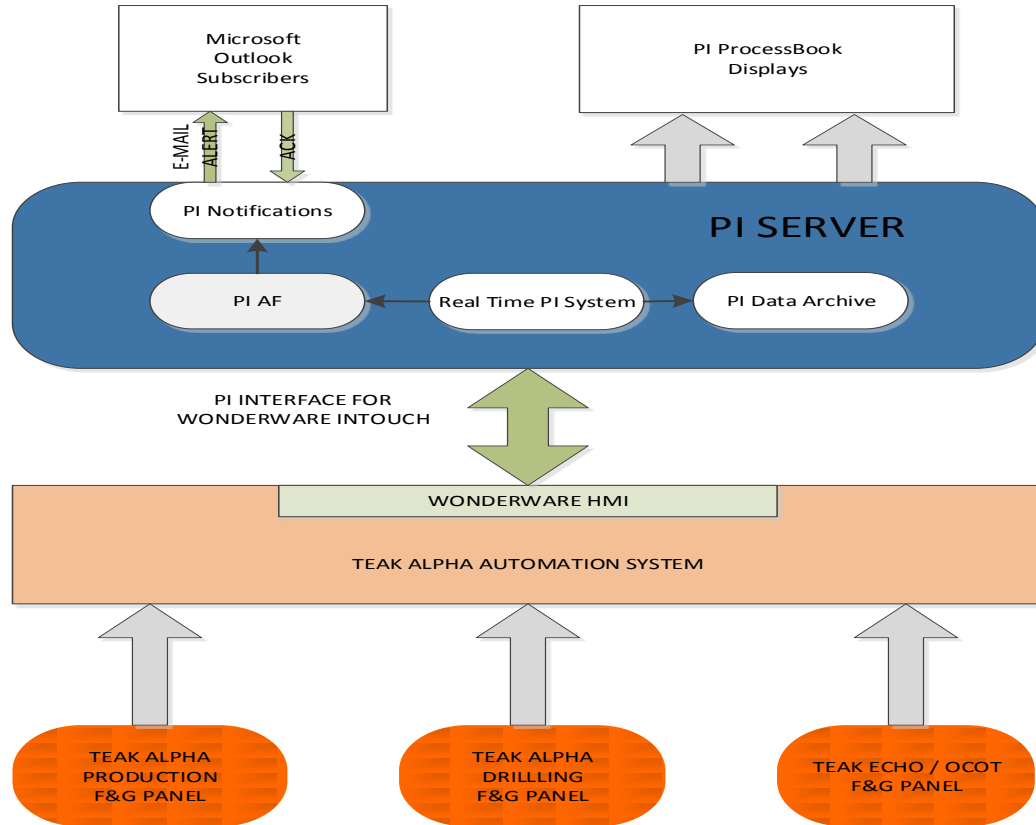
- ❑ Data from the F&G panels are sent to the Wonderware HMI via the automation network
- ❑ PI Interface for WonderWare Intouch transfers data to the PI Data Archive.
- ❑ PI Notifications (alert conditions from F&G panel) are forwarded to selected e-mail subscribers
- ❑ PI ProcessBook display dashboards allow end users to immediately determine the health of the overall system down to sensor level.

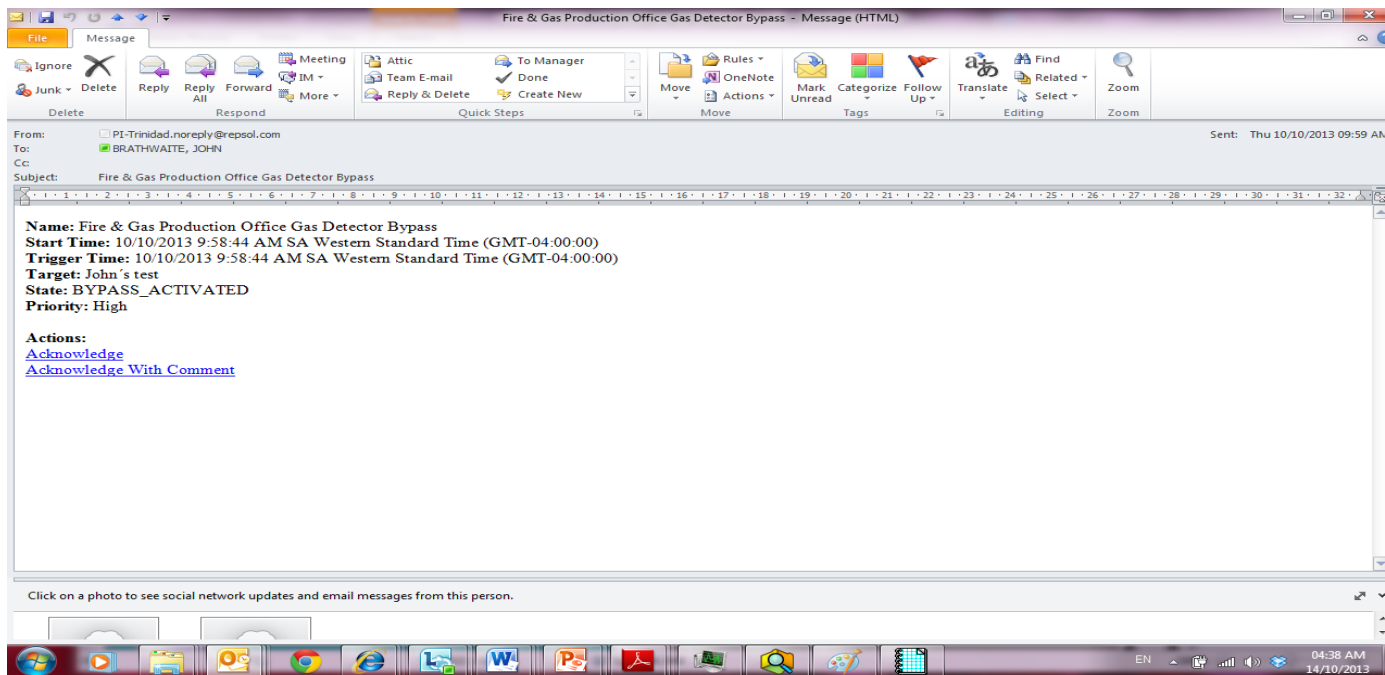# Teak A Production F&G PI ProcessBook Dashboard
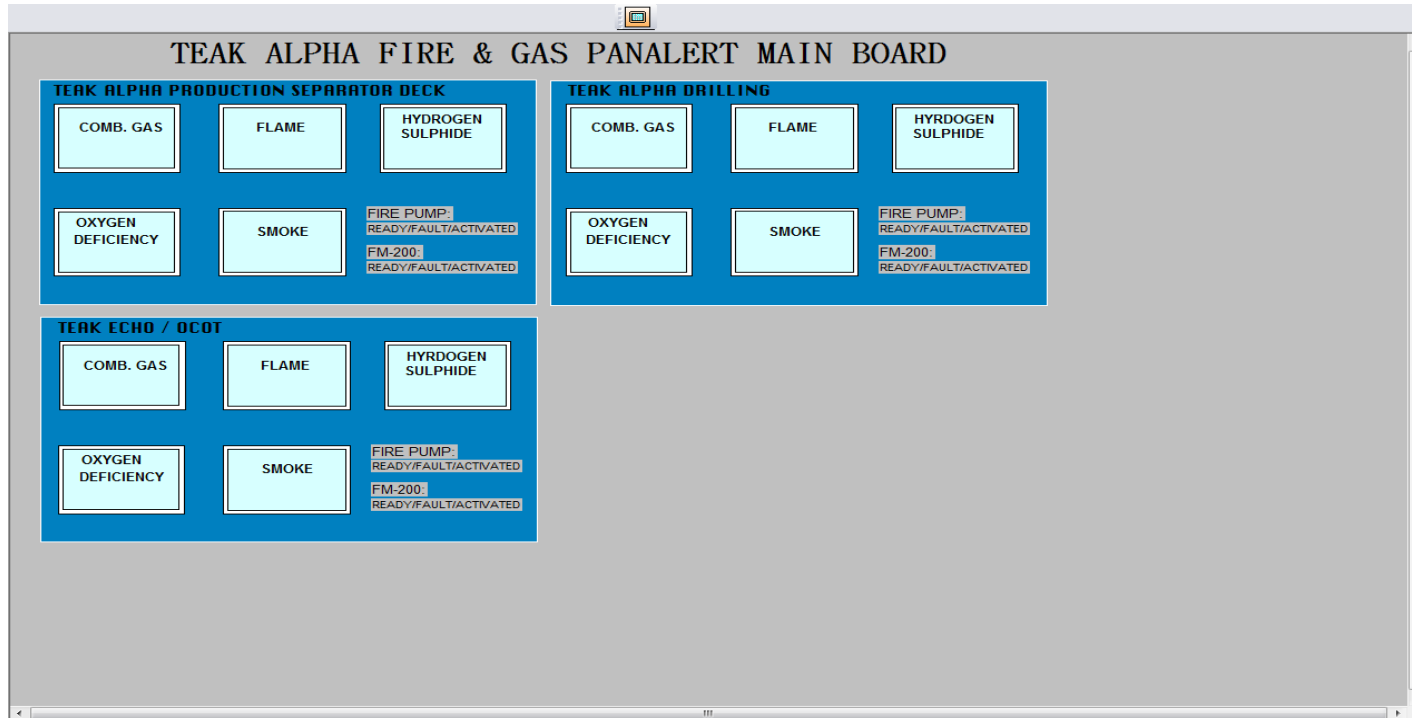
☐ Mimics the feel and usability of the offshore local panels

Teak Echo / OCOT Detector Status and Layout
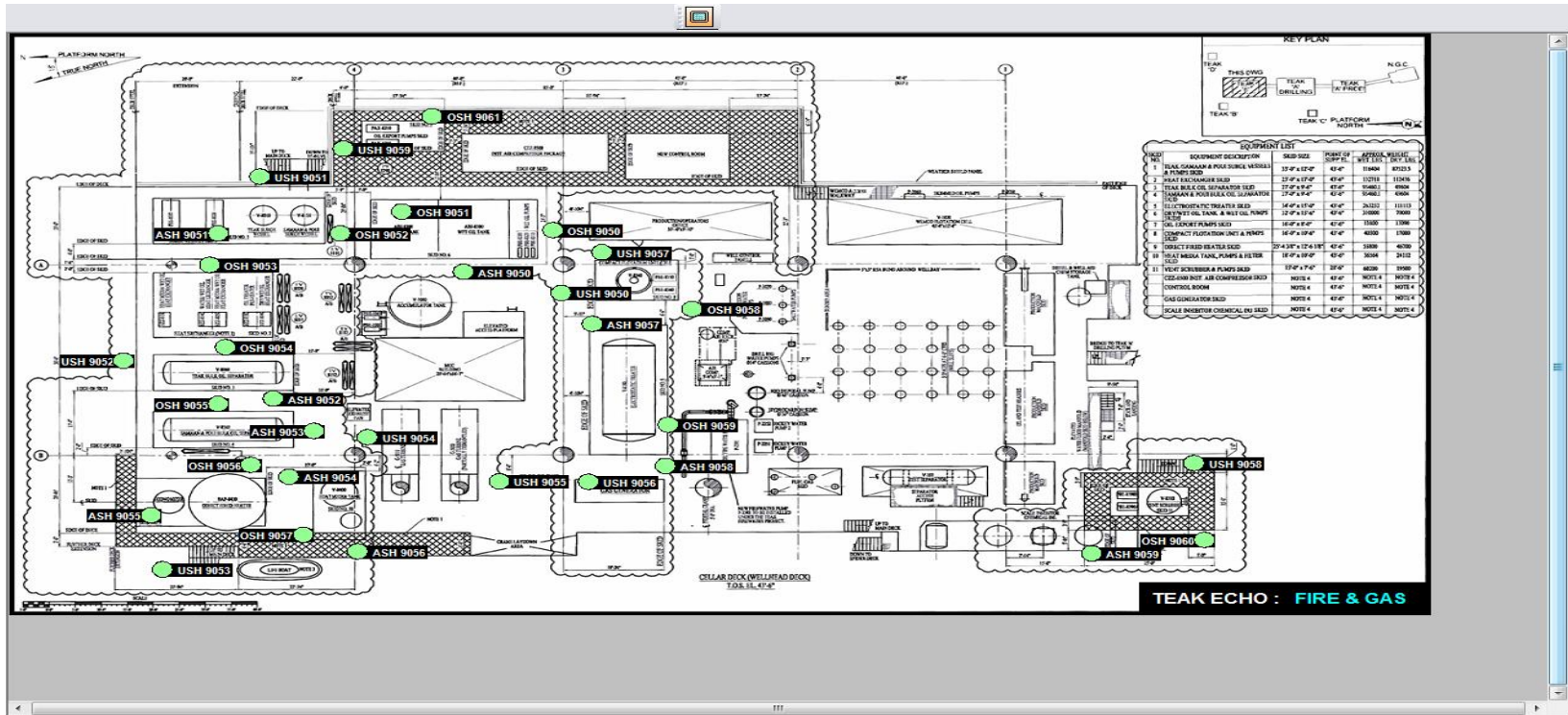
☐ Assists in identifying the physical location of the abnormal condition

PI Notifications & Bypass Management

- ❑ E-mail alerts can be configured for frequency, mailing lists, and escalation
- ❑ Automatic reminder of bypass activation

Benefits of PI System Front End of F&G-SCADA system

- ❑ Real time monitoring of F&G system health: minimizing system downtime and maximizing availability, quality control of preventive maintenance

- ❑ Historical archiving of F&G system events: timeline of event reconstruction, identifying faults and root causes

- ❑ Better management of control for bypassing

- ❑ E-mail notification of system health issues: bypass, sensor trouble, communication failures, panel fault

- ❑ Superior process safety: assurance of safety barrier integrity

- ❑ High potential for improved safety and production with negligible capital investment

Future Plans and Next Steps

- In development by Repsol is the PI Web Services based 'Bypass Form', which will enable a simple yet powerful means of automating the bypass process across the business unit organizational structure.

- Project will be expanded into remaining Alpha and satellite platforms

- A future project will include PI Interface for OPC DA and PI System High Availability (HA)

- Implementation of 2014 projects will realize independent and secure operation of SCADA with no comingling of corporate and control systems data.

- Implementation of periodic Key Performance Indicator F&G reports using PI DataLink

John Brathwaite

- jbrathwaite@repsol.com
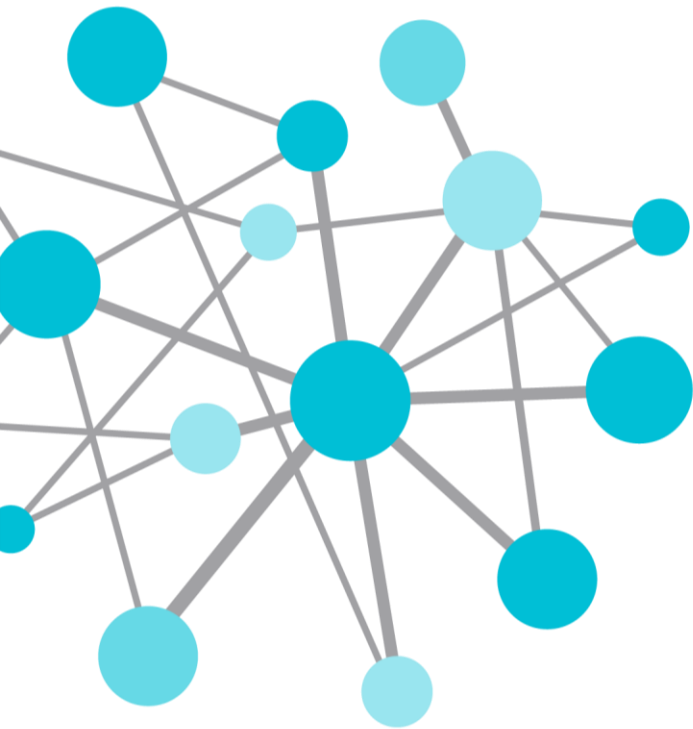- Automation Engineer
- Repsol E&P Trinidad and Tobago Ltd.
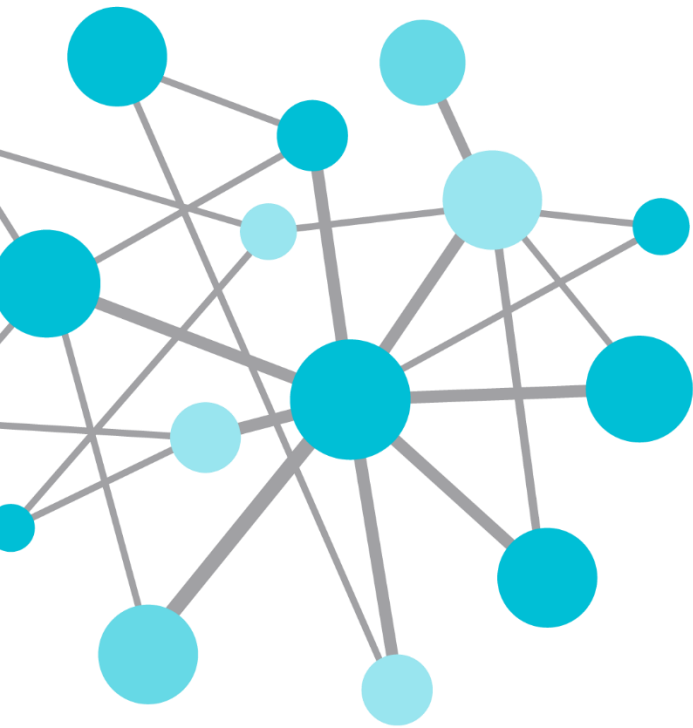
Questions

Please wait for the **microphone** before asking your questions

State your **name & company**

Please don't forget to…

Complete the online survey for this session

eventmobi.com/emeauc14

Share with your friends

#UC2014