SETTING the Standard for Automation™

ISA

ISA Delhi Section

Energy And Emission :

Monitoring And Control

Presented by : Piyush Tewari & Monali Fegade
Emerson
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ISA-D: "Fertiliser , Food and Pharma Symposium-2023"

Our Vision & Approach To Solve Industry's Challenges From Floor to Cloud™

Increase Energy Efficiency & Reduce Waste

Improve Productivity, Speed, & Agility

Create Safer, More Reliable Operations
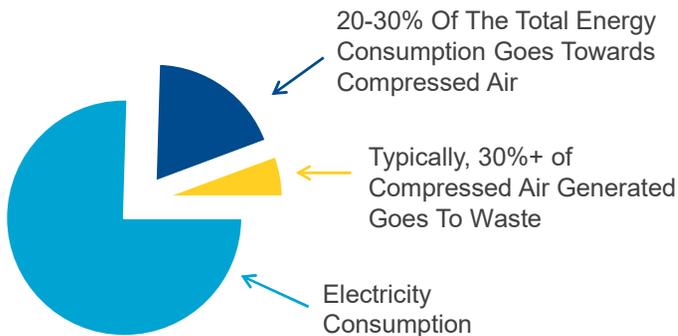
Gather Insights & Empower Workforce

Why Compressed Air?

Challenges With Pneumatic Machines and Systems

Air Leakages

Compressed Air Generated Goes To Waste Due To Leaks And Suboptimization Of Machines

20-30% Of The Total Energy Consumption Goes Towards Compressed Air

Typically, 30%+ of Compressed Air Generated Goes To Waste

Electricity Consumption

Inefficient Usage Of Air "Standby Loss"

Machines often consume compressed air even when not producing product & generating revenue

Production

Non-Production / Idle
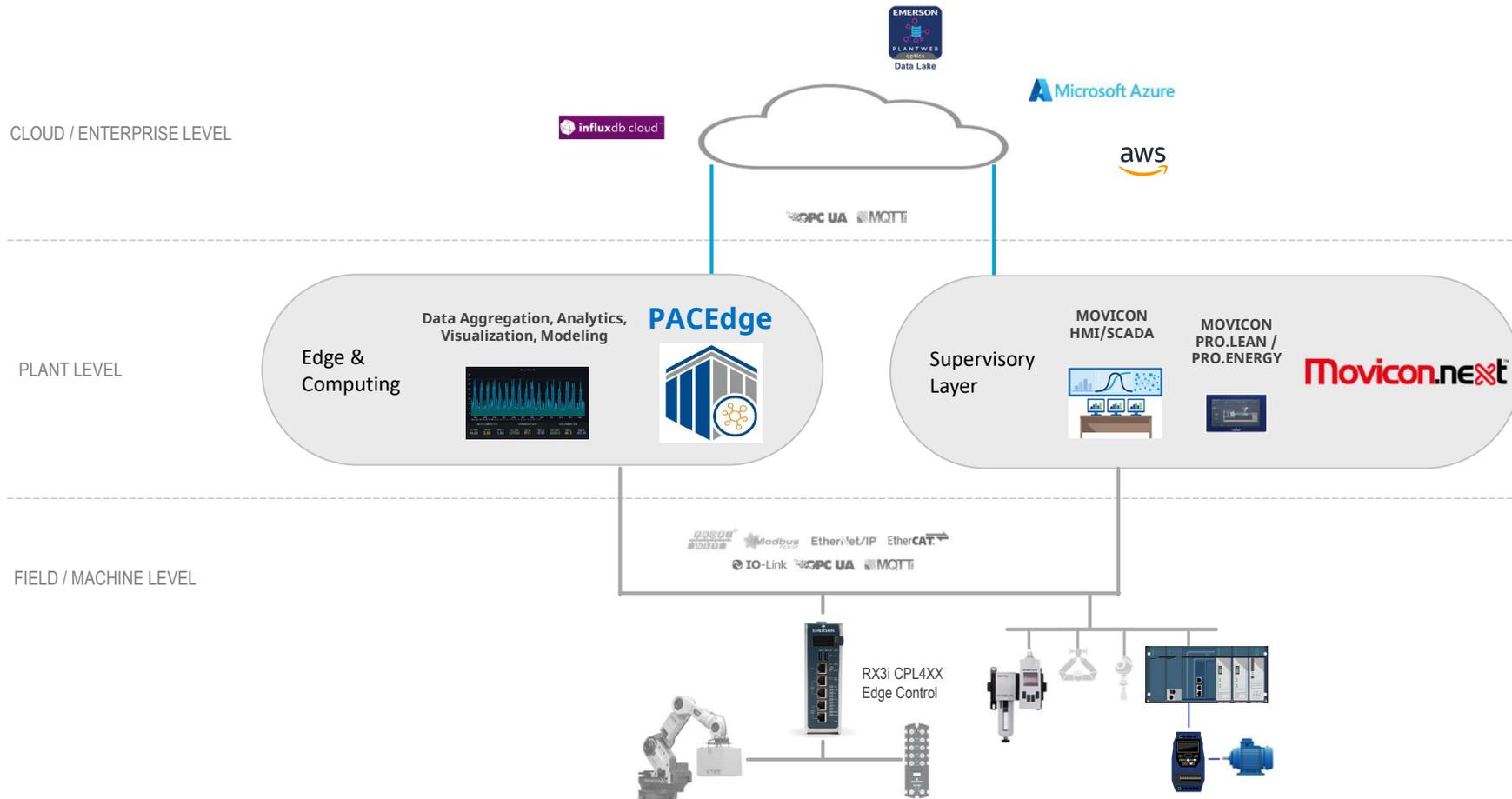
Air Consumption Waste

Air Consumption

Time
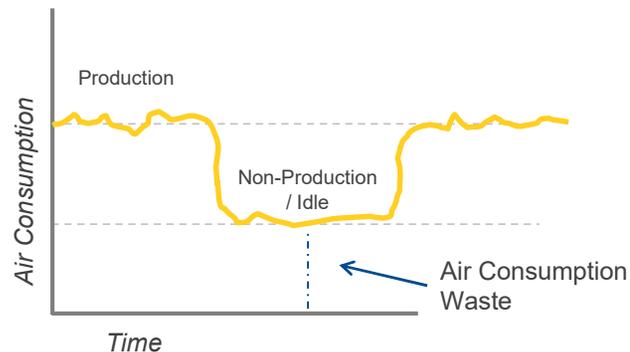
Maintenance Intensity & Costs

On Average,

76%

Of Business Still Manually Test For Compressed Air Leaks Across Their Facility Costing an Average of

$46K

per machine due to service, equipment & training investments[1]

1. Source: Hanover Research n=719

PACEdge and Movicon Software Suites

CLOUD / ENTERPRISE LEVEL

PLANT LEVEL

FIELD / MACHINE LEVEL

EMERSON
PLANTWEB
optics
Data Lake

Microsoft Azure

influxdb cloud

aws

OPC UA | MQTT

PACEdge
Data Aggregation, Analytics, Visualization, Modeling

Edge & Computing

Supervisory Layer

MOVICON HMI/SCADA

MOVICON PRO.LEAN / PRO.ENERGY

Movicon.next

Modbus | EtherNet/IP | EtherCAT.

IO-Link | OPC UA | MQTT

RX3i CPL4XX Edge Control

EMERSON

Jumpstart Your Energy Savings Journey

Emerson Discrete Automation, Compressed Air Manager is a ready-to-go hardware & analytics package that jumpstarts your path towards maximizing energy utilizations, reducing waste and energy costs.

Compressed Air Manager
Ready-To-Go Hardware & Software Solution

Improve Energy Efficiency & Reduce Energy Costs

Benchmark Air Consumption Trends
Deep Dive Into Machine or Plant Consumption
Visualize CO2 Impact & Energy Costs

Empower Your Workforce

Create Thresholds
Quickly Identify Energy Reduction Opportunities
Prioritize & Improve Maintenance Procedures

Scale Within Your Network
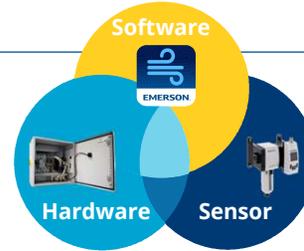
Edge-Enabled Technology
Industry Standard Communication Across Sensors & Hardware e.g., OPC-UA

Ready-To-Go Solution

Auto-Configuration of Sensors
Preconfigured Software & Hardware
Reduce Config Timelines & Barrier Of Adoption

Compressed Air Manager Solutions

Compressed Air Manager

✓ Productized – Lowers Technology Adoption Barrier

✓ Focused Use-Case to Start Small, Scale Fast & Prove ROI

✓ Simplified update manager for future versions 1.0.X

✓ App-style GUI for control of all functions

✓ For Sensors: Add, commission, edit, delete **It's that easy**

✓ OPC UA as connector - Industry 4.0 ready

Compressed Air Manager Features
Part Number for Each World Area Created

Compressed Air Manager

Software embedded in Edge Hardware / Enclosure

+

- PoE
- I/O
- Edge HW & SW
- Power Control
- Certifications

Up To **x10** Aventics AF2 Air Flow Sensors

Analytics & Monitoring Features

- Track Air Consumption Trends & Stats
- Identify Areas of Waste / Underutilization
- CO_2 Emissions Impact & Associated Costs

- Analytics Integrated Within Emerson Edge HW
- **PACEdge** Software with pre-built UI

Hardware Features

Bill of Materials Adjusted For Local / Regional Needs.

Cabinet Hardware Features:
- Edge Hardware **PACSystems RXi2** w/ SW
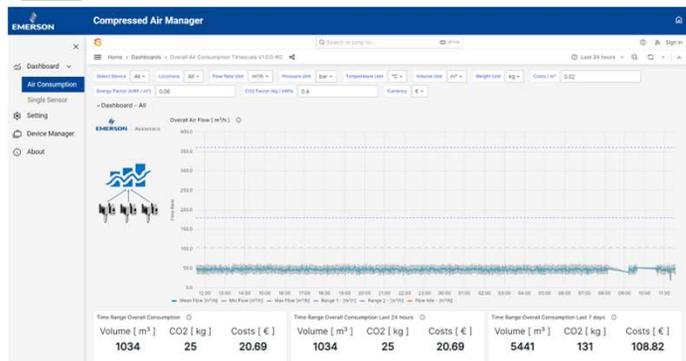- I/O and Switch Connecting Up To x10 AF2
- Power Control Supply - **SolaHD**

Air Flow Sensor Features:
- Connect Up To x10 **Aventics AF2** Flow Sensors
- Ethernet-Based (OPC UA / MQTT)
- Captures Air Flow, Volume, Temperature

- - - - Local Switch
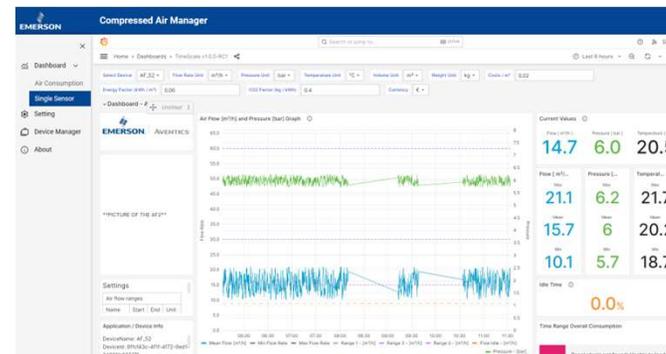——— Direct to Enclosure

Software Features

Device Manager
- Add, commission, edit, delete of AF2 sensors
- Automatic parameterization of AF2
- Overview of the sensor in Device Manager

Dashboard – Single Sensor View
- Visualization of airflow and pressure
- Calculation of statistics like max, min, mean for flow, pressure and temperature
- Calculation of KPIs like volume, CO_2 emission, cost and IDLE time
- Statistics based on selected time ranges

Dashboard – Air Consumption View
- Visualization of overall airflow, pressure and temperature
- Calculation of statistics for max, min and mean
- Calculation of KPIs like volume, CO_2 emission and cost
- Statistics based on selected time ranges

Settings – Restart & Update View
- Installation of Update Packages trough browser window
- Extension of CAM software with new features or improvements

Compressed Air Dashboard "Homepage / Summary Of Air Consumption"

Compressed Air Sensor View "View Specific AF2 Device"

Emission
Monitoring & Control
Why & How

Tank Farms Cover a Lot of Real Estate and Present Considerable Risks to Personnel, the Environment, and Equipment If Not Properly Maintained

Fire hazard

12% of Tier 1 and 2 Safety Incidents Involve Storage Tanks[1]

Refineries and Terminals Accounted for 74% of Tank Accidents[2]

1/3 of Tank Accidents Are Caused by Personnel Error or Equipment Failure[2]

Fire and Explosions Account for 85% of Tank Accidents[2]

77% of Bulk Petroleum Storage Tank Terminal Locations Are Within 1 Mile of Communities with > 300K Residents[3]

Product Loss

$5.5M

Approximate Value of Crude Oil lost annually

Source: NYMEX Spot Prices August 2021

Environmental

VOC control regulations (GB 37822-2019) enforced in China in July 2020.
Korea and Thailand have followed suit

Source: Internal study

These Risks Affect Various Stakeholders and Have Explicit and Implicit Costs

Emerson's integrated tank top portfolio ensures complete safety, tank integrity & emission control

Tank Blanketing

PVRV

Vapor Recovery

Emergency Venting

Out-Breathing

In-Breathing

MAWP
ERV Setpoint
PVRV Press. Setpoint
Vapor Recovery Setpoint
Max Out-Breathing
Max In-Breathing
Flowrate
TB Setpoint
PVRV Vac. Setpoint
ERV Vac. Setpoint
MAWV
Setpoint
Normal Breathing Region

Out-Breathing

In-Breathing

| Tank Rupture |
| Emergency Venting |
| Vapor to Atmosphere |
| Vapor Destruction / Vapor Recovery |
| |
| Blanketing Gas In-Breathing |
| Oxygen In-Breathing |
| Emergency In-Breathing |
| Tank Implosion |

EMERSON

Our PVRV's 10% overpressure technology, low leakage rate and high flow make them the preferred choice

10% overpressure tech saves OPEX

- Establish valve set point closer to tank MAWP without sacrificing flow capacity
- Reduces emissions & tighter pressure control
- Cost control by controlling product loss **(OPEX SAVINGS)**
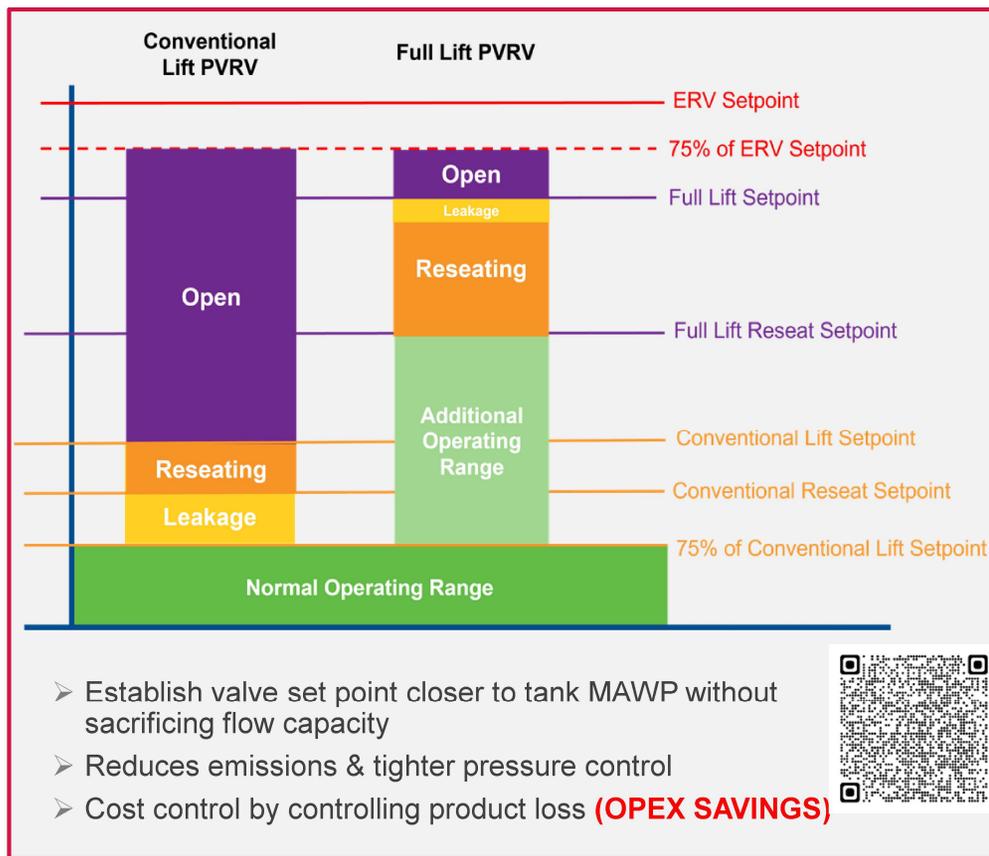
Industry wide lowest leakage

API 2000 7th edition permissible leakage : **0.5 to 20 SCFH at 75%** of set pressure

Our leakage rate : **<0.1 SCFH at 90%** of set pressure

Key distinguishing factors

- High flow capacity helps **reducing CAPEX** due to downsizing
- PPS coating for sticky and corrosive fluids
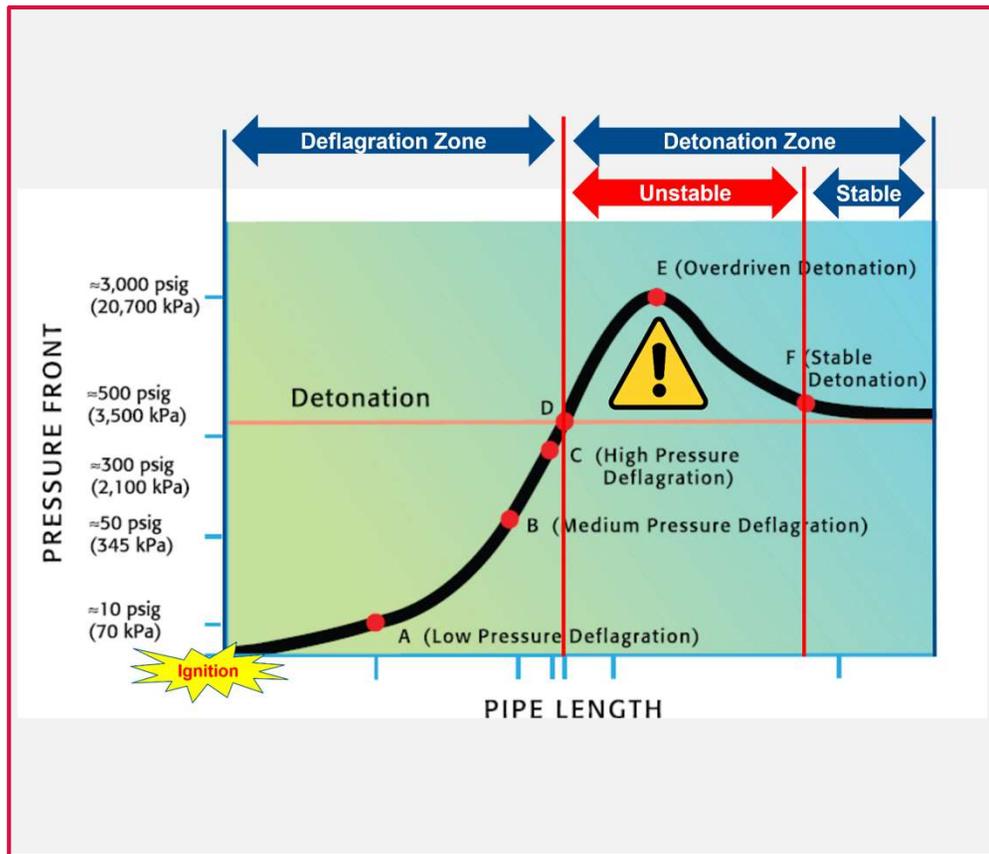- Steam jacket for freezing atm.

Remote monitoring option

- Real time actionable intelligence
- Pallet position indicator
- Asset management tag

Emerson's flame arrestors are designed for unstable detonation & endurance burning

Designed for overdriven case

International certifications

USCG · ISO · FM · energy API

Wide range

- ➤ 1" to 40" size
- ➤ IIA, IIB3, IIC, IIB gas group
- ➤ Short time burn, Endurance burn rating
- ➤ Special material options

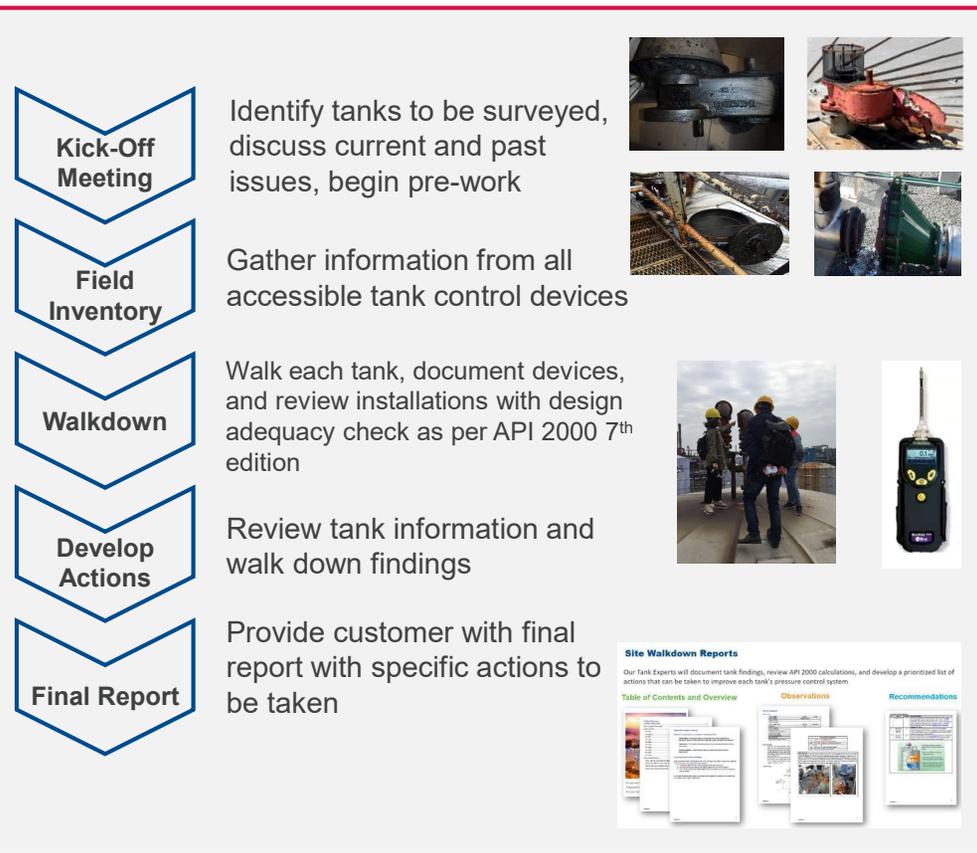## Remote monitoring option

- ➤ Real time actionable intelligence
- ➤ Differential pressure transmitter
- ➤ Temperature transmitter
- ➤ Asset management tag

Engage with Emerson to understand your tank healthiness

Schedule a Tank Walkdown

Kick-Off Meeting
Identify tanks to be surveyed, discuss current and past issues, begin pre-work

Field Inventory
Gather information from all accessible tank control devices

Walkdown
Walk each tank, document devices, and review installations with design adequacy check as per API 2000 7th edition

Develop Actions
Review tank information and walk down findings

Final Report
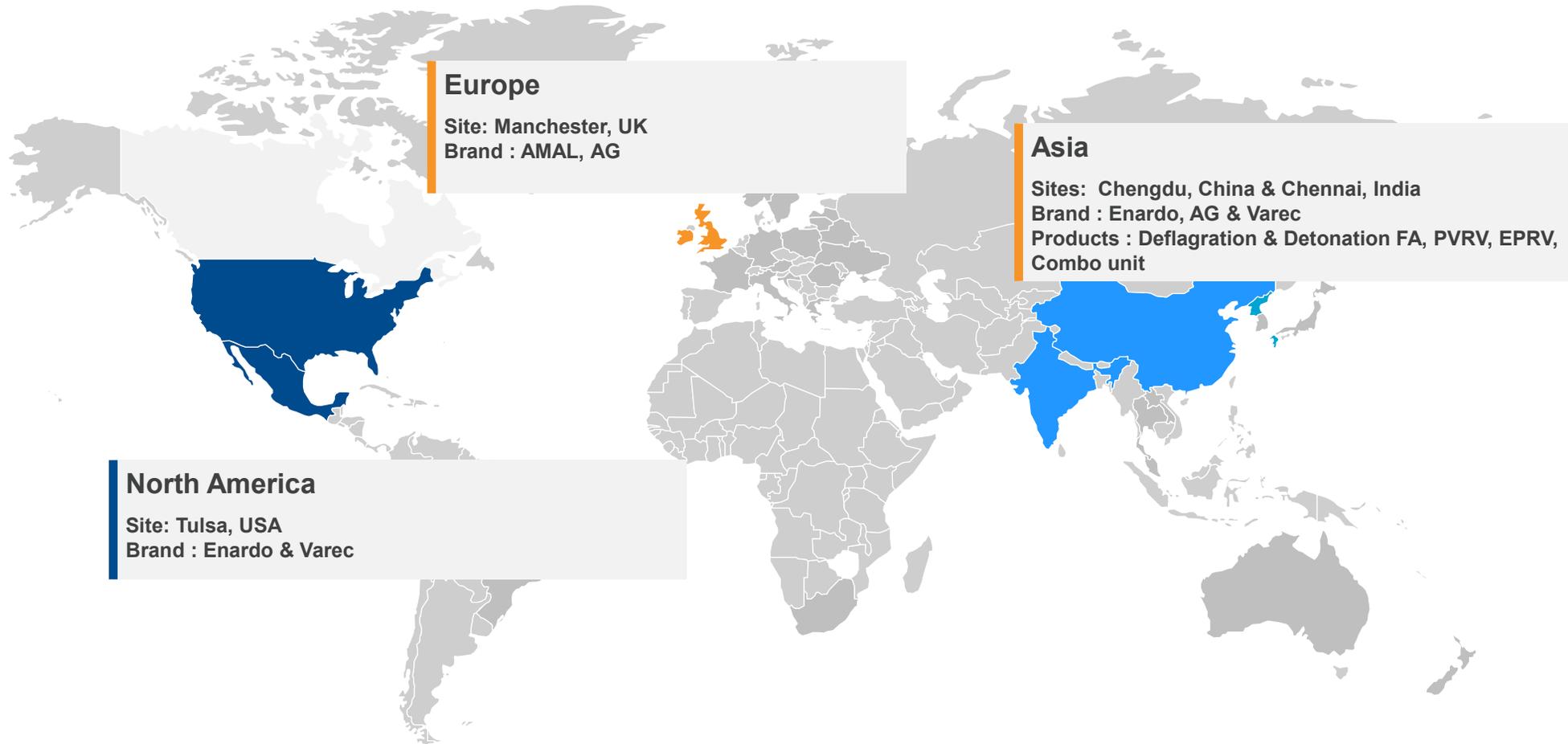Provide customer with final report with specific actions to be taken

Tank University session

➤ Detailed course covering end-to-end theoretical and practical aspects of tank pressure management and safety products

➤ Interact and deliberate process industry trends and drivers with other industry players

➤ Avail our technical consulting services to review your installations

Global footprint of tank products manufacturing

Europe

Site: Manchester, UK
Brand : AMAL, AG

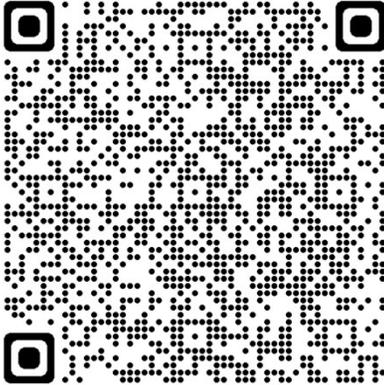**Asia**

Sites: Chengdu, China & Chennai, India
Brand : Enardo, AG & Varec
Products : Deflagration & Detonation FA, PVRV, EPRV,
Combo unit

North America

Site: Tulsa, USA
Brand : Enardo & Varec

Help us help you in your safety journey

Thank-you

Check out our brochures, white papers, success stories and a lot more.

EMERSON