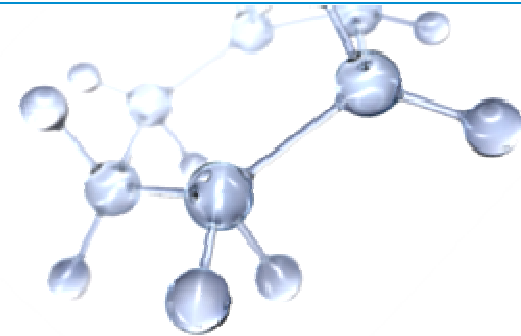


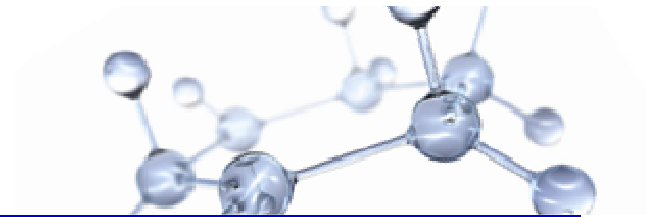
Development & Implementation of Honeywell BMA at ExxonMobil Refineries



Honeywell Users Group 2010

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George Ridding, ExxonMobil Research and Engineering
Francine Van Olst, ExxonMobil Research and Engineering

Table of Contents



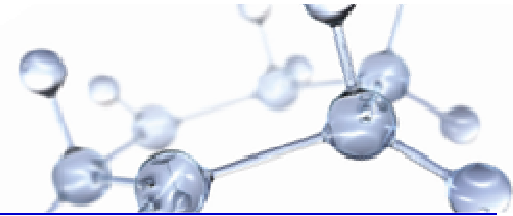
- Strategic Technology
- Vision for a Common Solution
- OM&S Operations Automation
- Work Process
- Architecture Overview
- Integration with DCS and Business Systems
- Development & Testing Activities
- Support Activities
- Future Developments and Enhancements
- Summary

BMA=Blending Movement Automation
OM&S=Oil Movements & Storage
ERP=Enterprise Resource Planning

DCS=Distributed Control System
OpenBPC=Open Blend Property Control
EBC=Experion Blend Controller

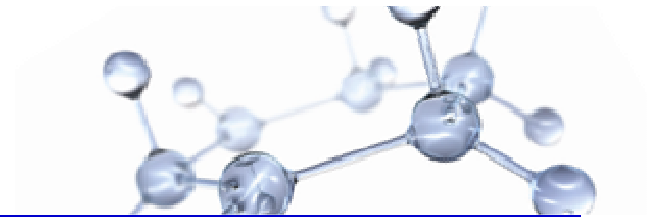
ExxonMobil
Research and Engineering

A Strategic OM&S Technology



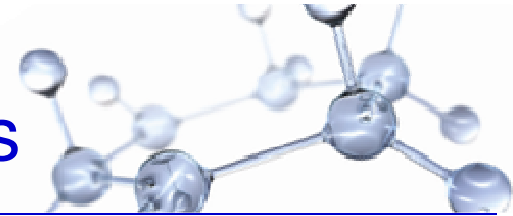
- Replaces existing refinery legacy systems (e.g. IBM ACS / HW Series 40 / Custom Applications) for refining OM&S process control and blending optimization
- Blend optimization migration to OpenBPC started in 2003
- OM&S phase started with three European sites
 - + 2 of 3 sites started with OpenBPC earlier
 - + Cutover in progress at 2 sites and will be fully online by 4Q10
 - + Site sizes: 200-300 KBD
 - + Well established OM&S automated work processes
- Later phases for other sites in the ExxonMobil circuit
 - + Seven more sites already planned
 - + Others to follow

Vision of a Common Solution



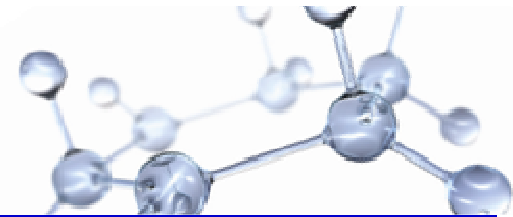
- Global project team delivers a common solution across sites
- Different site requirements met by the comprehensive BMA functionality
- Minimize site “specials” / customization
- Extensive configurability of the software “building blocks”
 - + Selective components based on local business requirements
 - + Add elements to match local site facilities
 - + Interfaced through Experion, keeping BMA common
 - + Varying work practices and security models are well handled
 - + Local language capability

BMA Automates OM&S operations



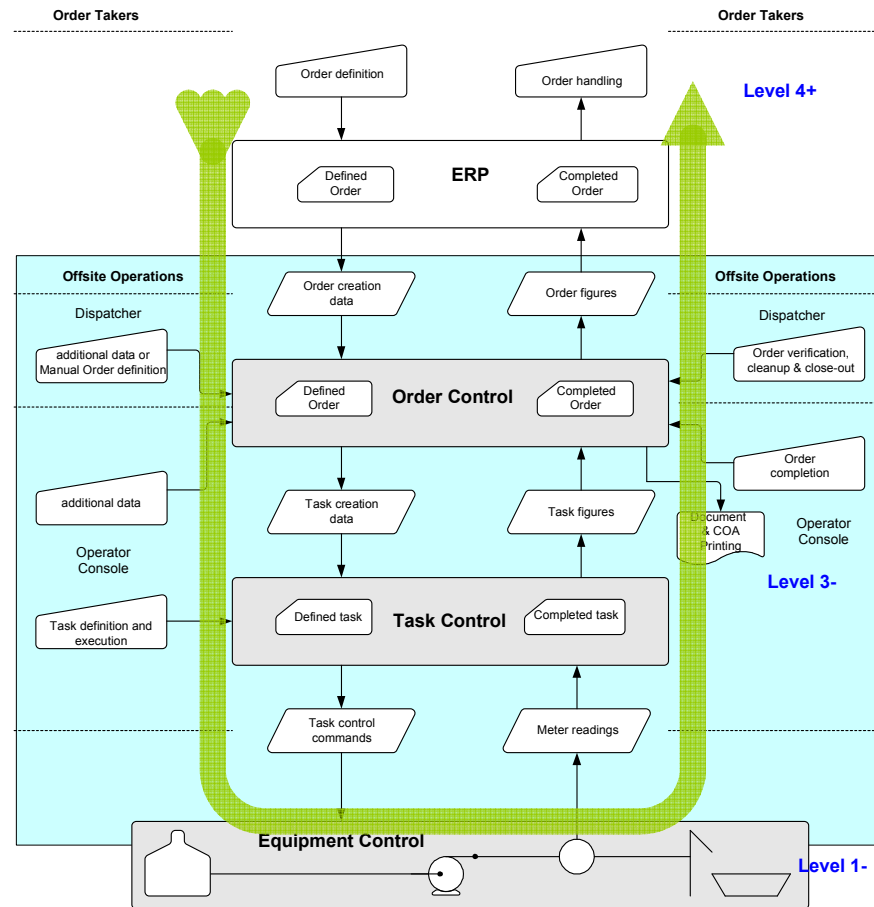
- Order Control (i.e. Dispatching operations) for both Custody Transfer and Internal Movements
 - + Order download from ERP / scheduler systems
 - + Receipt and Shipment, Unit Feed and Rundown, Tank Transfer, Recirculation, Blend etc
 - + Modes of Transportation (e.g. Marine, Pipeline, Truck, Railcar)
 - + Reconciliation of loaded quantities
 - + Actuals reporting back to ERP for invoicing
 - + Shipping documents (legal requirements)
 - Task and Equipment Control
 - + Path selection, sequence definition and execution
 - + Equipment handling (e.g. Pump group, Vapor Recovery, Meter, Sampler, Additive Injection)
 - Inventory and Equipment Monitoring
 - Product Certification and Release
-

Work Process

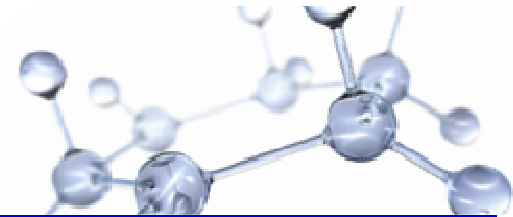


WORKPROCESS

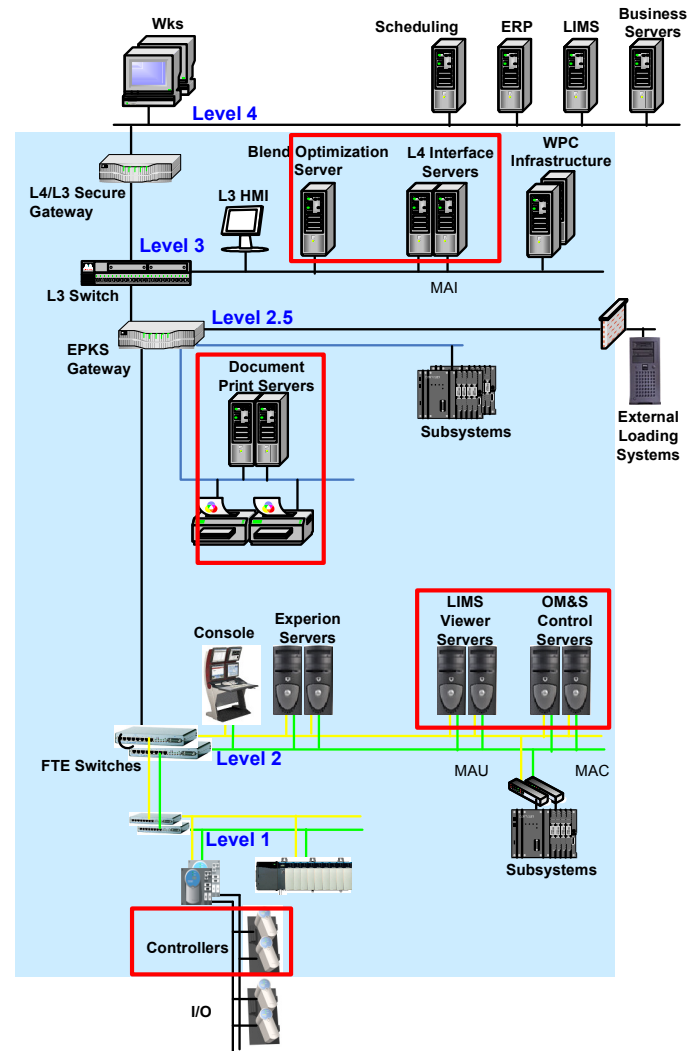
- Integrated
- Automated
- Segregation of Duties



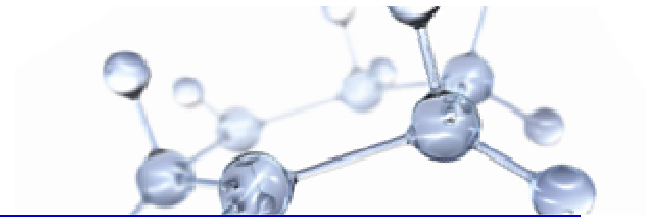
Architecture Overview



- Distributed
- Standardized
- Security
- Redundancy

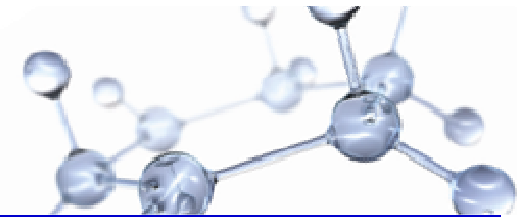


Integration with DCS and Business Systems

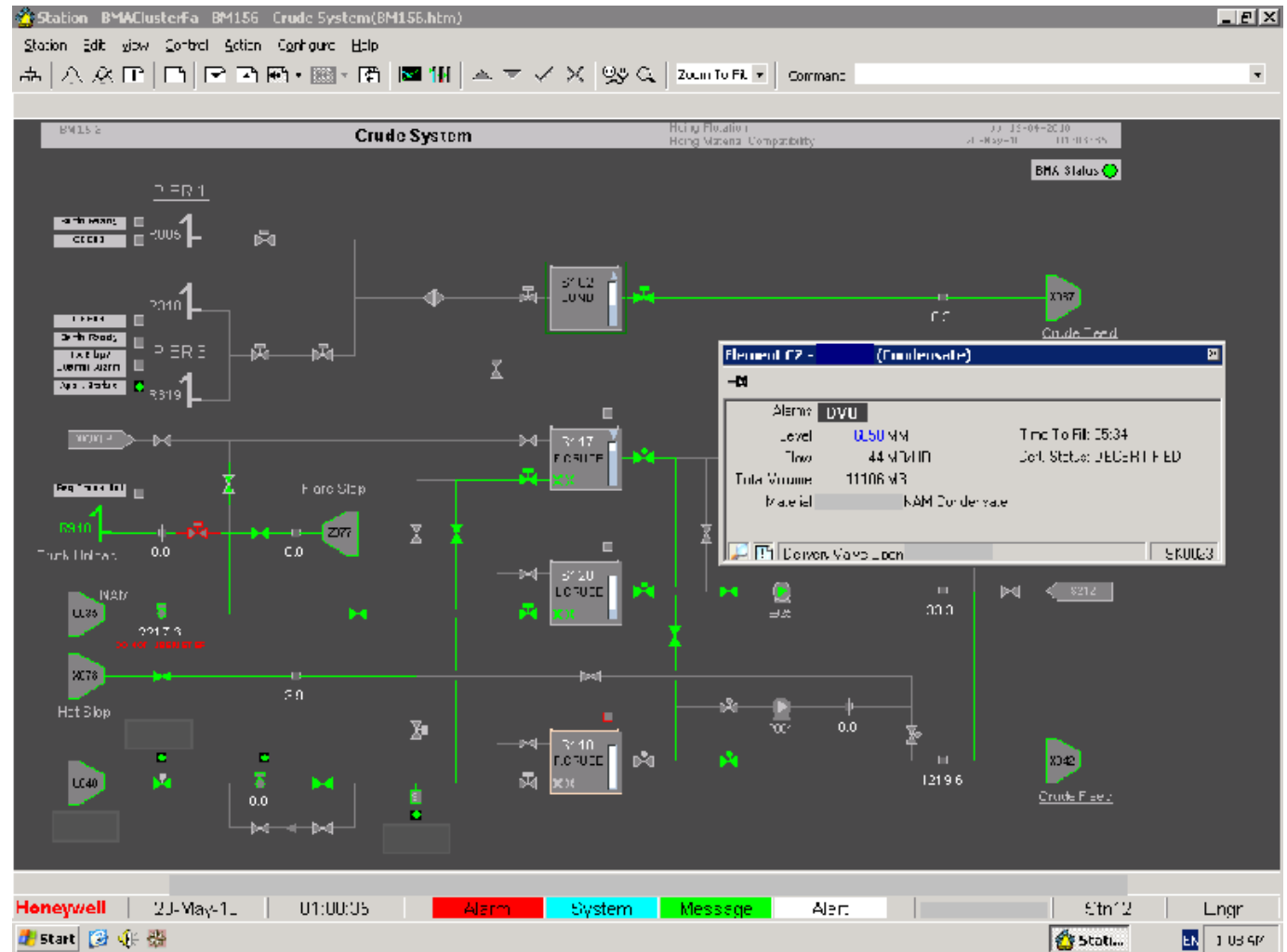


- Experion input/output from/to instrument sub-systems (including tank gauging systems)
- Experion UI (User Interface) and alarm/event functions
 - + Extensive event capture capabilities
- Interfaces from/to Terminal Automation Systems
- ERP (e.g. SAP) for order information using XML Service
- Bi-directional Lab data using LIMS Viewer and/or PHD
- Blend archiving using Blend Management
- Interfaces to external business systems (e.g. government agencies)

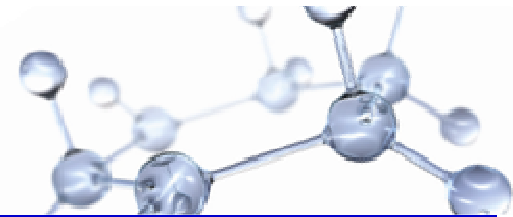
Typical BMA Tank Farm Graphic



- ASM Guidelines
- Coordinated shapes
- Integrated Alarming
- Order Creation
- Degraded Mode

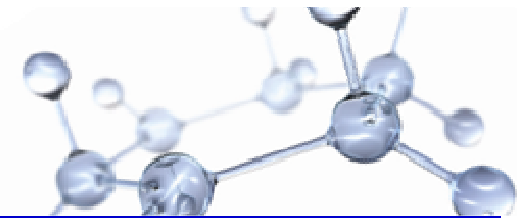


Order Detail for ERP data



- Primary UI
- Configurable
- Easy operator training

Task Detail



- Operations Monitoring
- Configurable
- Single window for blending tasks

Station CF_ESV01A DMA Task Detail(omaTaskDetail.htm)

Station Edit View Control Action Configure Help

Zoom To Full Command

OMA Task Detail Location: Assets\Offsites\Control-HI task

Order Detail Task History Val Rec PB

Task Dt: Task008 Material: BMFLEXLPG - Flexibaker LPG Alarm: Disabled Diodium: 0 LF Rate: 0 Target Flow: 200.0
 Order D: 01000002 Desc: Shipment(BM - S(BMI -)) Alarm: Enabled Duration: 0 LCV-Index: 0 Actual Flow: 0.0
 Task Sts: ACTIVE Comment: Next Event: Event Time: 01 Jan 70 01:00 VRU: NOVRU FLP Rate: 0 Target Volume: 0
 Type: Shipment Site: 00 Mar 00 17:41 Additive: No FJF Volume: 0 Actual Volume: 0
 Unit Hei: 0.00 Not heigh: 0 Max Loh: 0

Detail Message Tool Configuration Next event Alarms

Description	Material	Monitor Task	Status	Oper Action	Select Path	Path Status	UHG
Shipment(BM ->BM)	BMFLEXLPG - Flexibaker LPG		ACTIVE	Select	Command		US
BM ->BM ->UM	JMI_LXLIU - Flexibaker LPG		ACTIVE	Select	Command	FJF low	US US
BM ->EM ->BM	BMFLEXLPG - Flexibaker LPG		ACTIVE	Select	Command	FJF low	US US
BM ->BM ->BM	BMFLEXLPG - Flexibaker LPG		RELEASED	Select	Command	Ready to Swing In	US US
UM ->UM ->UM	JMI_LXLIU - Flexibaker LPG		ILLUJLU	Select	Command	Ready to Swing In	US US

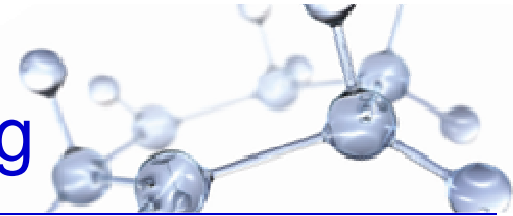
Element	Description	Material	UseType	Status	Volume
BM	Flexibaker LPG	BMFLEXLPG - Flexibaker LPG	SOJFCE_TANK	OPEN	
BM	Suction Valve		VALVE	OPEN	
BM	Suction Valve	BMFLEXLPG - Flexibaker LPG	SECLINE	PROCESS OFF - FLOWED	0
BM	Suction Valve		MANVALVE	OPEN	
BM	Suction Valve	BMFLEXLPG - Flexibaker LPG	SECLINE	FRESSURE RELIEVED	0
BM	Dummy Pump Valve		PSFLIDT	CLOSE	
BM	Flexibaker LPG delivery		PUMP	RUN	
BM	Dummy Pump Valve		PSEUDO	OPEN	
BM	DS Flex LPG (Supply)	JMI_LXLIU - Flexibaker LPG	SLINE	PROCESS OFF - FLOWED	0
BM	DS Flex LPG (Supply)		SRCDESTRM	OPEN	
UMTK	Slave Task Control		SLAVETASKLUN	RUN	
UMTK	Master Task Control		MASTERTASKC	RUN	

Sequence Detail Sequence Actions Material Configuration All Path Elements Path Sequence List

Honeywell 20 May 17 01:20:03 Alarm System Message Alarm

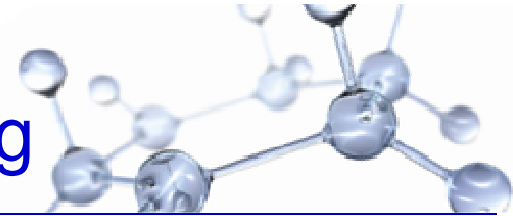
Station - CF_ESV01A -

Application Development & Testing



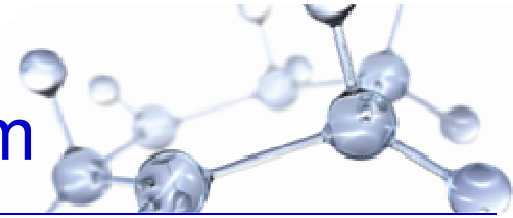
- ExxonMobil worked hard to satisfy our criterion for Technical Readiness
 - + Team of site engineers, operations power users, central engineering experts
 - + Two centrally located development systems plus one at each site
 - + Fifteen functionality test areas with hundreds of test scripts
 - + Frequent reporting to Honeywell with feedback
 - + Testing and qualification for all new major, point, and patch releases
- Concurrent with project work by Honeywell for other customers

Application Development & Testing



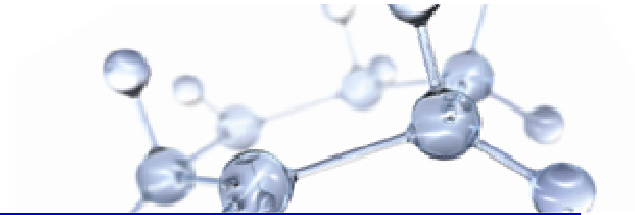
- **Benefits Derived**
 - + Increased development of customer driven functionality in the base product
 - + Improved reliability and performance
 - + Improved capability to efficiently use configuration to modify behavior
 - + Helped develop in-house troubleshooting skills for implementation
- **Expecting Efficiencies in Future Projects**
 - + Maturing engineering tools
 - + Decreased rate of software updates

Establishing the Support Mechanism



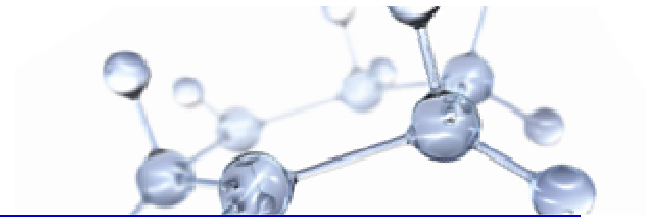
- Jointly established support framework more than a year before cutover
- Tiered support structure
 - + Limited number of expert resources at each site provides Tier 1
 - + Honeywell local or regional ATS resources provides Tier 2
 - + Central engineering experts from ExxonMobil and Honeywell provide Tier 3
 - + ExxonMobil central engineering supports common configuration and upgrades
 - + Benefits Guardianship plus 24x7 support
- Integrated BMA into the existing support agreements and structure
 - + Work process is the same as for Experion

Support in Action



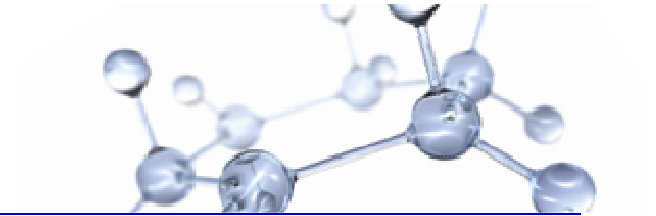
- Established patch / hot fix process used to meet high technical quality needs
 - + Provides updates in a timely and efficient manner
 - + Very important at this early stage in the BMA life cycle
- Sites use telephone, email and website access to report issues depending on priority
- Monthly review of Service Requests at each site
- Continued improvements in Honeywell's SR/PAR reporting will help customers stay informed on status of their issues

BMA Future Developments



- Expectation that Honeywell will continually improve BMA throughout its life cycle
- Influence direction through BMA Customer Advisory Board
- Items for consideration:
 - + Further internationalization and tools for easier maintenance and upgrades
 - + Increased capacity and performance to handle very large OM&S sites
 - + Improvements to property tracking functions for tanks and lines
 - + Simple ratio blender functionality to complement the complex EBC capabilities
 - + EBC platform change
- Stretch life expectancy to protect investment

Summary



- BMA is a strategic, fit for purpose, standard solution for multiple sites
- Complexity that comes with configurability requires skilled resources, but yields positive value in benefits
- Support and software upgrade philosophy needs to be responsive to rapidly changing technology to protect the initial investment