



Journey to Asset-Based Data The Kellogg Story

Presenter

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The Engineer and the PhD

- What gets measured gets done.
- If you don't measure results, you can't tell success from failure.
- If you can't see success, you can't reward it.
- If you can't reward success, you're probably rewarding failure.
- If you can't see success, you can't learn from it.
- If you can't recognize failure, you can't correct it.
- If you can demonstrate results, you can win public support.

(Osborne and Gaebler)



The Miracle of Historical Data

- 1999-2000 Kellogg creates OAE (Operational Asset Effectiveness) group
- 2000 OSI PI is selected as the data historian
- Developed tag naming/creation standards – Based loosely on BOM number of equipment
- Performance targets established
- The link to SQL – The power of the daily report linked to a data historian.
- Plant increases operational efficiency of process and packing from 65 – 80%
- The Dashboard is born



Kellogg's Journey to Asset Based Data



The Daily Report

Date	Shift	Line	CaseCode	Desc	Act Cases	Sch Cases	Per Adh	Act Pkgs	Sch Pkgs	Avg Owt	Per Owt	Ibs Owt	OOF
	1	101-0001			4,992	5,226	96	0	52,260	0.07	0.63	215	9,289
	1	101-0003			3,348	3,103	108	0	37,236	0.11	0.68	266	10,546
	1	101-0004			608	0	0	0	0	0.12	0.32	62	19,990
	1	101-0006			388	108	359	0	1,512	0.10	0.28	34	8,733
	1	102-0005			2,220	2,697	82	0	32,364	0.08	0.58	135	336
	1	102-0006			72	0	0	0	0	0.30	1.42	16	393
SubTotal					11,628	11,134	645		123,372			729	49,287
	2	101-0001			2,880	5,226	55	0	52,260	0.05	0.48	95	9,305
	2	101-0002			452	0	0	0	0	0.21	1.10	70	13,681
	2	101-0003			3,861	1,554	248	0	18,648	0.04	0.25	110	10,642
	2	101-0004			124	0	0	0	0	0.10	0.56	10	20,393
	2	102-0005			660	0	0	0	0	0.08	0.55	38	433
	2	102-0006			1,008	1,312	77	0	15,744	0.21	1.01	161	418
SubTotal					8,985	8,092	380		86,652			484	54,871
	3	101-0001			5,328	5,226	102	0	52,260	0.06	0.51	186	9,306
	3	101-0002			3,015	2,275	133	0	27,300	0.17	0.94	396	13,716
	3	101-0003			4,428	3,103	143	0	37,236	0.07	0.47	242	10,658
	3	101-0004			45	0	0	0	0	0.00	0.00	0	20,817
	3	101-0006			2,760	12,500	22	0	12,500	0.13	2.66	22	9,022
	3	102-0005			660	0	0	0	0	0.05	0.36	25	484
	3	102-0006			1,296	1,312	99	0	15,744	0.61	2.88	591	253
SubTotal					17,532	24,416	498		145,040			1,463	64,255
Grand Total					38,145	43,642	1,523		355,064			2,675	168,414



Kellogg's Journey to Asset Based Data



The Dashboard

Mod 6 50% full

Mod 6 Speed 0.01

Mod 11 1 lbs/min

Mod 26 20% full Surge

Pelletizers

1	5
2	6
3	7
4	8

Temp Rice Inv 449,000

1	2	3	4	5	6	7
99	84	12	100	1	100	

Tempering Hrs 43 7 36 29 0 0 15

Bran 600 Sec 2 1 %

Coater 1 %

Rice Mod 15 Thayer Mod 16 Thayer

Rice Cook 900 Sec

Line	Bag Rate	OWTS	Bad Scans	Metal Hits	SKU	Case Count
Line 1	B1	0	N/A	-21	3800012382	0
	B2	0	N/A	-24		N/A
	B3	2	N/A	Cartoner -24		N/A
	B4	1	N/A	PV -21		Total N/A
Line 3	B1	40	0.25%	-3	3800076861	3539
	B2	40	0.31%	-7		N/A
	B3	40	0.33%	Cartoner -4		N/A
	B4	40	0.29%	PV -5		Total N/A
Line 2	B1	0	N/A	0	3800059659	0
	B2	0	N/A	0		N/A
	B3	0	N/A	Cartoner 0		N/A
	B4	0	N/A	PV 0		Total N/A
Line 4	B1	0	0.38%	-6	3800059662	1116
	B2	0	0.42%	-8		N/A
	B3	0	0.52%	Cartoner 18		N/A
	B4	0	0.42%	PV -6		Total N/A
Line 6	B1	0	0.27%	-4	3800078706	0
	B2	0	0.32%	-6	3800010757	2990
	B3	0	0.22%	Cartoner -6		4475
	B4	0	N/A	PV 1		Total 2990

Brown Sugar Tank Level BSS - 24 hour

POUNDS
Max Fill = 95,000 lbs
Current Temp deg F

Coconut Oil Tank Level CNO - 24 hour

POUNDS
Max Fill = 58,000 lbs
Current Temp deg F

Dx Chocolate Tank Level Choc - 24 hour

POUNDS
Max Fill = 140,000 lbs
Current Temp deg F

WHSE Belts

F Line ● G Line ● Robot ○

K1N ● K1S ● Wt ■

Vendo Total 1044

1 510 ● auto

2 537 ● auto

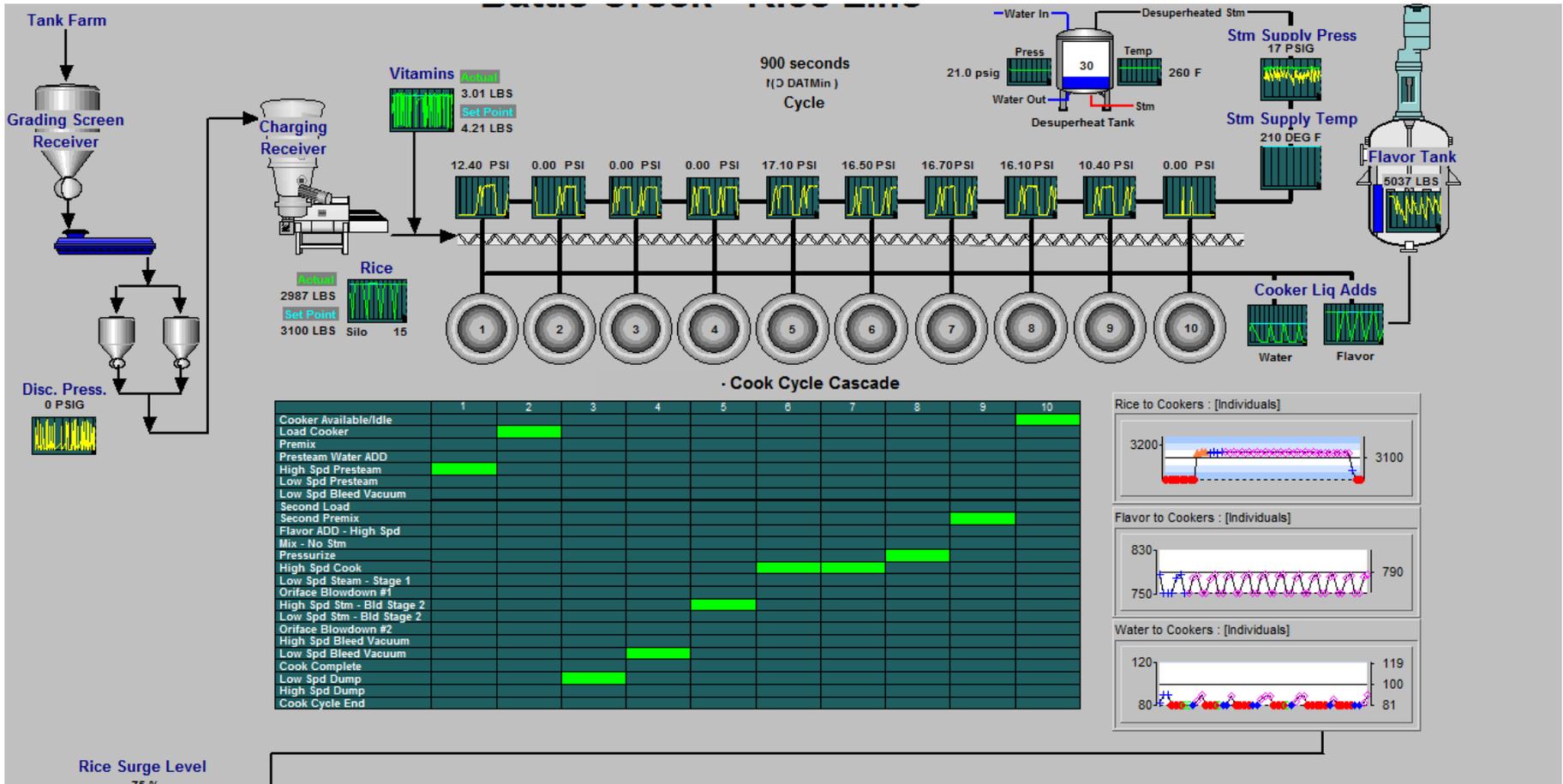
12:12 9/26/2014



Kellogg's Journey to Asset Based Data



The Process Flow





PI AF and Asset-Based Analytics – What's the big deal?? The Old Way

- Small group of PI super users
- Thousands of individual tags created to standards
- Can you look up this? Can you build me that?
- Difficult for PIWorld to link a tag to the floor
- The link to SQL – The power of the daily report linked to a data historian.
- 2010 – Responded to maintenance requests to track run time hours on certain assets for predictive maintenance.
- Built maintenance dashboard for monitoring a small group of “high value” assets



PI AF and Asset-Based Analytics – What's the big deal??

The BIG Idea

- The AF door
- The SAP opportunity
- Both are strong asset based tracking systems
- Can we leverage the countless hours of learning SAP structure when we develop the AF model and standards?
- Cool idea but how??
- Enter Jason Prosser (Stone Technologies) “The PI Prof”
- Developed custom IH01(Functional Location Structure) SAP > AF
- Truly linked a real SAP asset to a data historian



Kellogg's Journey to Asset Based Data



SAP – If you can learn this PI will be a piece of cake

Functional Location Structure: Structure List					
Functional loc.		0390	Valid From		09/26/2014
Description		Battle Creek Plant			
0390	Battle Creek Plant	345680390	PM_PROMT	001	
2400000000049782	0390 MECHANICAL DOCUMENTATION	I	1.000	EA	
2400000000049783	0390 ELECTRICAL DOCUMENTATION	I	1.000	EA	
	nonstock bom test	N	12.000	EA	
23000000000226166	GLOVE, WORK, X-LARGE, LEATHER	L	1.000	EA	
23000000000226165	GLOVE, WORK, LARGE, LEATHER	L	1.000	EA	
0390-FACB	BLDG 100 NORTH PLANT FACILITIES		345680390	PM_PROMT	001
0390-FACB-BUILDG	BLDG 100 FACILITIES		345680390	PM_PROMT	002
0390-FACB-ELECTR	ELECTRICAL SUBSTATIONS		966170390	PM_PROET	001
0390-FACB-ENVIRN	BLDG 100 FAC ENVIRONMENTAL		966170390	PM_PKGMT	001
0390-FACB-ENVIRN-1 0	PACKING ENVIRONMENTAL 1.0 PKG M99		966170390	PM_PKGMT	003
0390-FACB-ENVIRN-1 0	PROC DOCK ENVIRONMENTAL 1.0 PROC DOCK 12/13/14		966170390	PM_PKGMT	003
0390-FACB-ENVIRN-1 0	REC ENVIR ENVIRONMENTAL 1.0 REC M30		966170390	PM_PKGMT	003
0390-FACB-ENVIRN-1 3	PROC NORT ENVIRONMENTAL 1.3 PROC NOR		966170390	PM_PKGMT	003
0390-FACB-ENVIRN-1 3	PROC SOUT ENVIRONMENTAL 1.3 PROC SOU		966170390	PM_PKGMT	003
0390-FACB-ENVIRN-1 5	PROC NORT ENVIRONMENTAL 1.5 PROC NOR		966170390	PM_PKGMT	002
10014896	KB N PROC AREA AC0001@1.5-G7		966170390	00/00/0000	PM_PROMT
10014897	KB S PROC AREA RF0001@1.5-G9		966170390	00/00/0000	PM_PROMT
10014898	KB N PROC AREA AC0005@1.5-G18-G19		966170390	00/00/0000	PM_PROMT
10014899	KB N PROC AREA RF0005@1.5-G18		966170390	00/00/0000	PM_PROMT
10014900	KB 1.5 FACILITY MCC 100-F14-27		966170390	00/00/0000	PM_PKGET
10014901	KB MOD 99 FA7720@2.0-F-14/15		966170390	00/00/0000	PM_PROMT
10014902	KB BRN&RCE PROC FA7721@1.5-G2		966170390	00/00/0000	PM_PROMT
10014903	KB BRN&RCE PROC HV7700@1.5-G4		966170390	00/00/0000	PM_PROMT
10014905	KB BRN&RCE PROC HV7701@1.5-G7		966170390	00/00/0000	PM_PROMT
10014906	KB BRN&RCE PROC HV7702@1.5-G11		966170390	00/00/0000	PM_PROMT
10014907	KB BRN&RCE PROC FA7723@1.5-G12		966170390	00/00/0000	PM_PROMT
10014909	KB COM CENTR HV7705@1.5-D.920		966170390	00/00/0000	PM_PROMT
10014910	KB MOD 03 FA7715@1.5-F10		966170390	00/00/0000	PM_PROMT
10019755	KB BR M27 COATING BUILDING HVAC UNIT		966170390	00/00/0000	PM_PROMT
0390-FACB-ENVIRN-1 5	PROC SOUT ENVIRONMENTAL 1.5 PROC SOU		966170390	PM_PKGMT	002
0390-FACB-ENVIRN-2 0	PKG ENVIR ENVIRONMENTAL 2.0 PKG M30		966170390	PM_PKGMT	001
0390-FACB-ENVIRN-2 0	PR ENVIR ENVIRONMENTAL 2.0 PROC M30		966170390	PM_PKGMT	001
0390-FACB-ENVIRN-2 5	PROC ENVR ENVIRONMENTAL 2.5 PROC ENVR		966170390	PM_PKGMT	001
0390-FACB-ENVIRN-MECH ROOM	ENVIRONMENTAL MECH RM M30		966170390	PM_PKGMT	001
0390-FACB-ENVIRN-NON PROC M30	ENVIRONMENTAL NON-PROC M30		966170390	PM_PKGMT	001
0390-FACB-FINES	FINES COLLECTION		345680390	PM_PKGMT	001
0390-FACB-FIRE S	BC N PLANT FIRE SYSTEMS		966170390	PM_PKGMT	001
0390-FACB-ROLLIN	NORTH PLANT ROLLING STOCK		345690390	PM_PKGMT	001
0390-FACB-SHOPS	NORTH PLANT SHOP EQUIP		326070390	PM_PKGMT	001
0390-FACB-TOOLRM	MECHANICAL DEPARTMENT TOOL ROOM		326070390	PM_PROMT	001



Kellogg's Journey to Asset Based Data



PI AF – Same Look and Feel

The screenshot displays the OSIsoft software interface. On the left, a tree view shows a hierarchy of elements under '0390'. A green box highlights a specific asset: 'KB BRN&RCE PROC HV7702@1.5-G11'. The main window shows the details for this asset, with a green box highlighting the 'Filter' table.

Name	Value
IntID	0
SAP Asset Number	10014906
SAP Description	KB BRN&RCE PROC HV7702@1.5-G11
SAP Name	KB BRN&RCE PROC HV7702@1.5-G11



PI and SAP – The tie between the asset and analysis

The screenshot shows the OSIsoft software interface. On the left, a tree view displays a hierarchy of elements under '0390'. The 'Supply Fan' element is selected and highlighted in blue. On the right, the 'Supply Fan' details pane is open, showing various tabs: 'General', 'Child Elements', 'Attributes', 'Ports', 'Analyses', and 'Version'. The 'Attributes' tab is active, displaying a table of attributes. A green box highlights the 'Run Time' and 'SAP Asset Number' attributes.

Name	Value
Loop Number	0
Run Time	346 h
SAP Asset Number	10014906
Status	STOPPED
Tag Name	0-



PI AF – The Power of the Template

- Standards are paramount
- Tag naming driven out of the AF Template
- Template based analysis drives availability and consistency of available data
- Reduces workload on the “super user” group
- Saves rollout time
- Get help!!

The screenshot displays the PI AF software interface. On the left is a 'Library' tree view showing a hierarchy of templates under '0390-BattleCreekPlant'. The 'Temperature Controller_DEGF' template is selected. The main window shows the configuration for this template, with tabs for 'General', 'Attribute Templates', 'Ports', and 'Analysis Templates'. A table lists the template's attributes:

Name	Description	Default Value
Prefix		PIC
PV		0 °F
SP		0 °F

On the right, a configuration panel shows the following settings:

- Name: PV
- Description: (empty)
- Configuration Item: (empty) Indexed:
- Categories: (empty)
- Default UOM: degree Fahrenheit
- Value Type: Double
- Default Value: 0 °F
- Data Reference: PI Point
- Settings... button
- Path: \\%Server%\%Element%\%Attribute%



Kellogg's Journey to Asset Based Data



PI – Allen Bradley ControlLogix

- AOI(Add On Instructions) template driven naming and programming
- Perfect Fit for PI AF and standard tag creation.

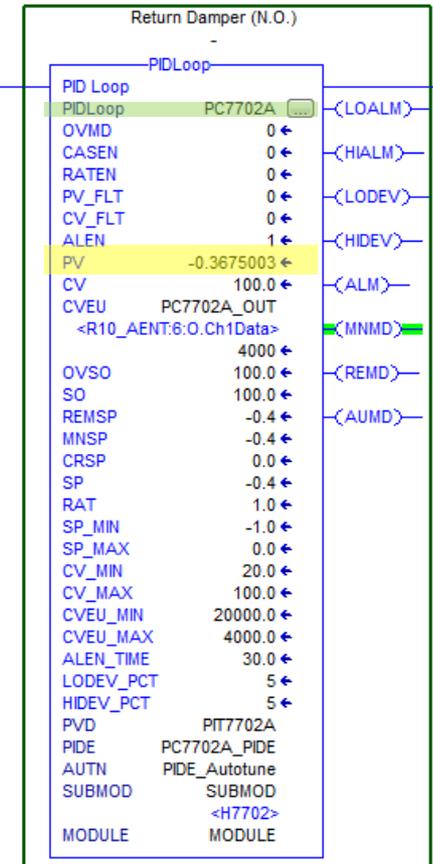
Return Air Damper Controller

General Child Elements Attributes Ports Analyses Version

Filter

Name	Value
CV	-0.400000005960464 %
Loop Number	7702A
Mode	MANUAL
Prefix	PC
PV	-0.313750267028809 inH2O
SAP Asset Number	10014906
SP	55 inH2O
Tag Name	PC7702A

Name	Value	Force Mask	Style	D
PC7702A	{...}	{...}		PI
PC7702A.EnableIn	1		Decimal	BT
PC7702A.EnableOut	1		Decimal	BT
PC7702A.OVMD	0		Decimal	BT
PC7702A.CASEN	0		Decimal	BT
PC7702A.RATEN	0		Decimal	BT
PC7702A.PV_FLT	0		Decimal	BT
PC7702A.CV_FLT	0		Decimal	BT
PC7702A.LOALM	0		Decimal	BT
PC7702A.HIALM	0		Decimal	BT
PC7702A.LODEV	0		Decimal	BT
PC7702A.HIDEV	0		Decimal	BT
PC7702A.ALM	0		Decimal	BT
PC7702A.MNMD	1		Decimal	BT
PC7702A.REMD	0		Decimal	BT
PC7702A.AUMD	0		Decimal	BT
PC7702A.ALEN	1		Decimal	BT
PC7702A.HI_CLASS1	0		Decimal	BT
PC7702A.LO_CLASS1	0		Decimal	BT
PC7702A.SIM_FB	0		Decimal	BT
PC7702A.PV	-0.3675003		Float	RI
PC7702A.CV	100.0		Float	RI
PC7702A.CVEU	4000.0		Float	RI
PC7702A.OVSO	100.0		Float	RI
PC7702A.SO	100.0		Float	RI
PC7702A.REMSP	-0.4		Float	RI
PC7702A.MNSP	-0.4		Float	RI
PC7702A.CRSP	0.0		Float	RI
PC7702A.SP	-0.4		Float	RI
PC7702A.RAT	1.0		Float	RI
PC7702A.SP_MIN	-1.0		Float	RI
PC7702A.SP_MAX	0.0		Float	RI
PC7702A.CV_MIN	20.0		Float	RI
PC7702A.CV_MAX	100.0		Float	RI
PC7702A.CVEU_MIN	20000.0		Float	RI
PC7702A.CVEU_MAX	4000.0		Float	RI
PC7702A.ALEN_TIME	30.0		Float	RI
PC7702A.SIM_PV	0.0		Float	RI
PC7702A.Ratio_Low_Limit	0.0		Float	RI
PC7702A.Ratio_High_Limit	1.0		Float	RI





PI AF and Asset-Based Analytics – It's More Than an Expensive Maintenance Analyzer

- Production Rates
- Packing Efficiencies
- Downtime analytics
- Capital investment justification
- The link to SQL reporting services

	Name	Value
	Cook Product ID	109000505
	Finish Product ID	109000055
+	Rate Trigger	Good
+	SAP Description	PROCESSING RICE LINE
	SAP Name	RICE
	Thruput	225 lbs/min

	Name	Value
	Cook Product ID	109000008
	Finish Product ID	109000008
+	Rate Trigger	Loss
+	SAP Description	PROCESSING BRAN LINE
	SAP Name	BRAN
	Thruput	2 lbs/min



So What Now

- Empower users – The answer is “No but I’ll show you how”
- Uncover savings
- Move towards run time based maintenance vs. calendar
- Use the power of PI Notifications
- Simplify the SQL link

	Name	Value
	Cook Product ID	109000505
	Finish Product ID	109000055
+	Rate Trigger	Good
+	SAP Description	PROCESSING RICE LINE
	SAP Name	RICE
	Thruput	225 lbs/min

	Name	Value
	Cook Product ID	109000008
	Finish Product ID	109000008
+	Rate Trigger	Loss
+	SAP Description	PROCESSING BRAN LINE
	SAP Name	BRAN
	Thruput	2 lbs/min



Kellogg's Journey to Asset Based Data



Agenda

- 07:30 - 08:30 a.m. Registration and Continental Breakfast
- 08:30 – 09:00 a.m. **Welcome: Industry Trends & Manufacturing Operational Excellence - OSIsoft**
Jason Kurdziel, Account Manager
- 09:00 - 09:30 a.m. **The Journey to Real Time Operational Intelligence - OSIsoft**
Marc Gallant, Regional Manager
- 09:30 - 10:15 a.m. **Journey to Asset-Based Data – The Kellogg Story**
John Gothberg, IT & Control Systems Manager
- 10:15 - 10:30 a.m. Break / Demo Pods
- 10:30 - 11:15 a.m. **Integrating your Plant Information Management System: Strategies for Success**
Kirt Anderson, Senior MES Project Manager – Stone Technologies
- 11:15 - 12:00 p.m. **Rapid Insights with Data Analytics - Tate & Lyle**
Mark Massey, Process Control Software Manager: Global Manufacturing
- 12:00 - 01:30 p.m. Lunch / Demo Prods
- 01:30 – 02:15 p.m. **Analyzing Location for the Most Profitable Supply Chain – Esri**
Ryan Schacht, Account Executive
- 02:15 – 03:00 p.m. **Chocolate PI - The Hershey Company**
Russell Gregg, Sr. Project Manager: IS Global Supply Chain/Manufacturing Systems
- 03:00 – 03:45 p.m. **Evolution of OSIsoft PI to an Enterprise Agreement - Abbott Nutrition**
Rich Colvin, Area IT Manager: ANSC Asia & Ireland
- 03:45 - 04:15 p.m. **Roundtable Review**
- 04:15 - 04:30 p.m. Wrap-up/Seminar Conclusion – Jason Kurdziel, Account Manager, OSIsoft
- 04:30 - 06:00 p.m. Networking Reception / Demo Pods