Enterprise Manufacturing Services to Enhance Energy Effectiveness and Sustainability Management
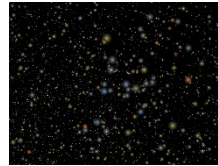
Presented by **Ales Soudek – Center of Excellence**

OSIsoft, LLC

Agenda

- Key Initiatives
- Examples
  - Anglo American Platinum
    - Data Quality
    - Energy Monitoring
    - Condition Based Maintenance
  - Syncrude Canada
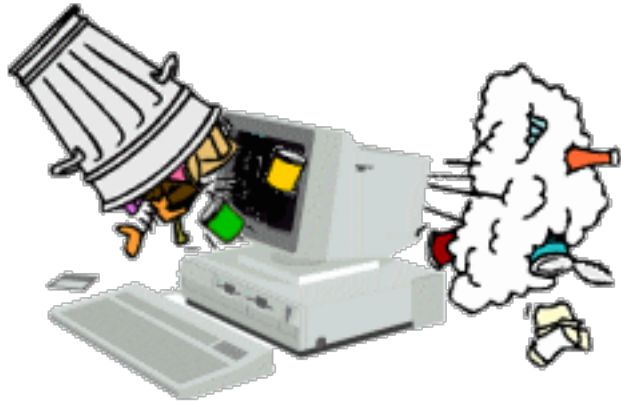   - Mobile Asset Monitoring

Key Initiatives

- Energy
- Water
- Operational / Equipment Effectiveness
- No Magic Bullet - Big Bang
  - Lots of Little Bangs

Good Foundation

- Data Quality

How Good Is Your Data?

Data Quality Initiative at Anglo Platinum

Business Challenge

Instruments Critical to Safety

100,000+ Instruments

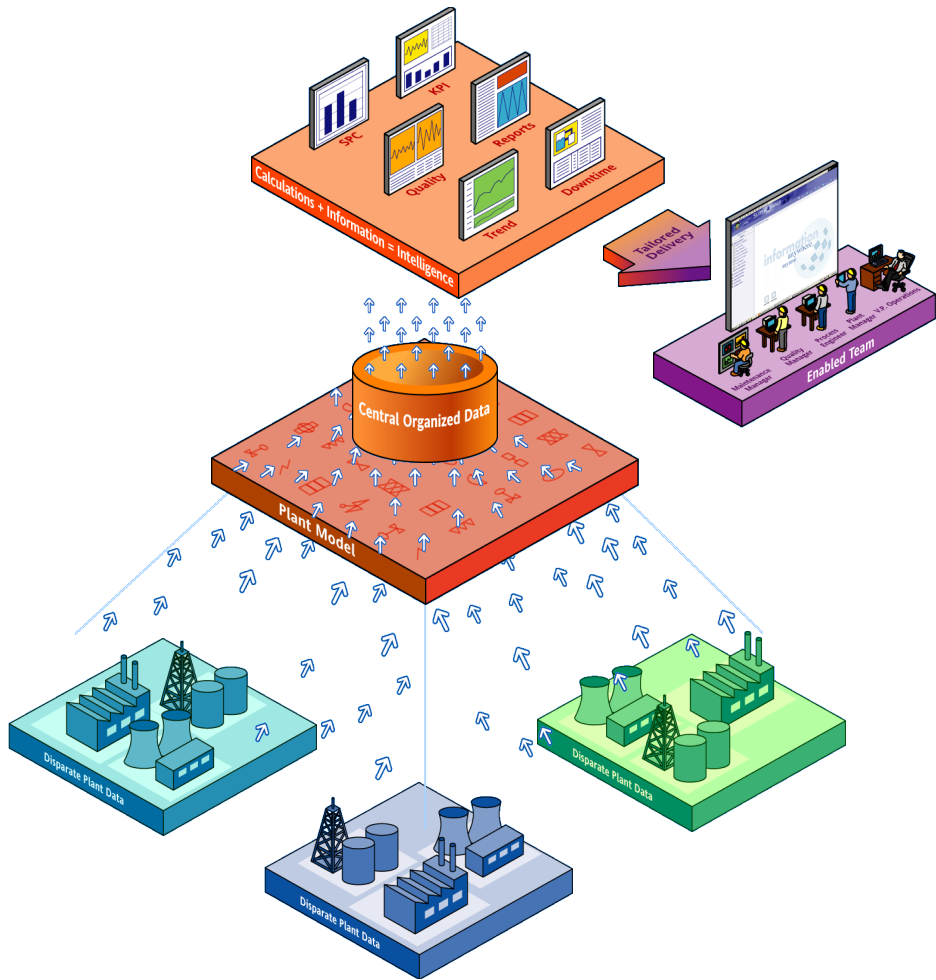700,000 Tags

Low Maintenance

Improve Business & Operational Decisions

Bad Quality Data
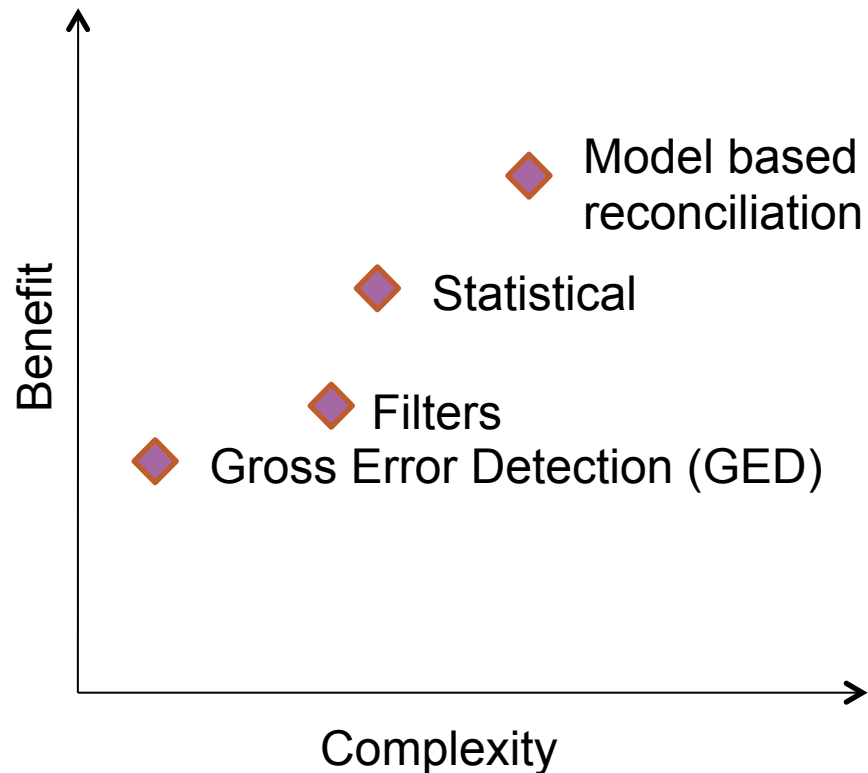
Scalable Solution

Templatizable

Rapid Deployment

Automatically Handle Configuration Changes

Enterprise Architecture

- Distributed Architecture
  - Limited Network Bandwidth
- Local Calculations
- Select Data Rolled-up to Central PI System
- Master PI AF Replicated to Sites

Data Validation Methods

Gross Error Detection

| Category	Description	Fault state	Analogue	Digital
Good	Good data quality		X	X
Missing Data	Data point is missing	Yes	X	X
Not Running	Equipment or process not running		X	X
High	Data point is above the process high limit	Yes	X	
Low	Data point is below process low limit	Yes	X	
Not Updating	Data is not updating	Yes	X	
ROC	High rate of change	Yes	X	
Simulated	Simulated data	Yes	X	X
Qbad	Quality bad indicator from the control system	Yes	X	X

Instrument Monitoring Results
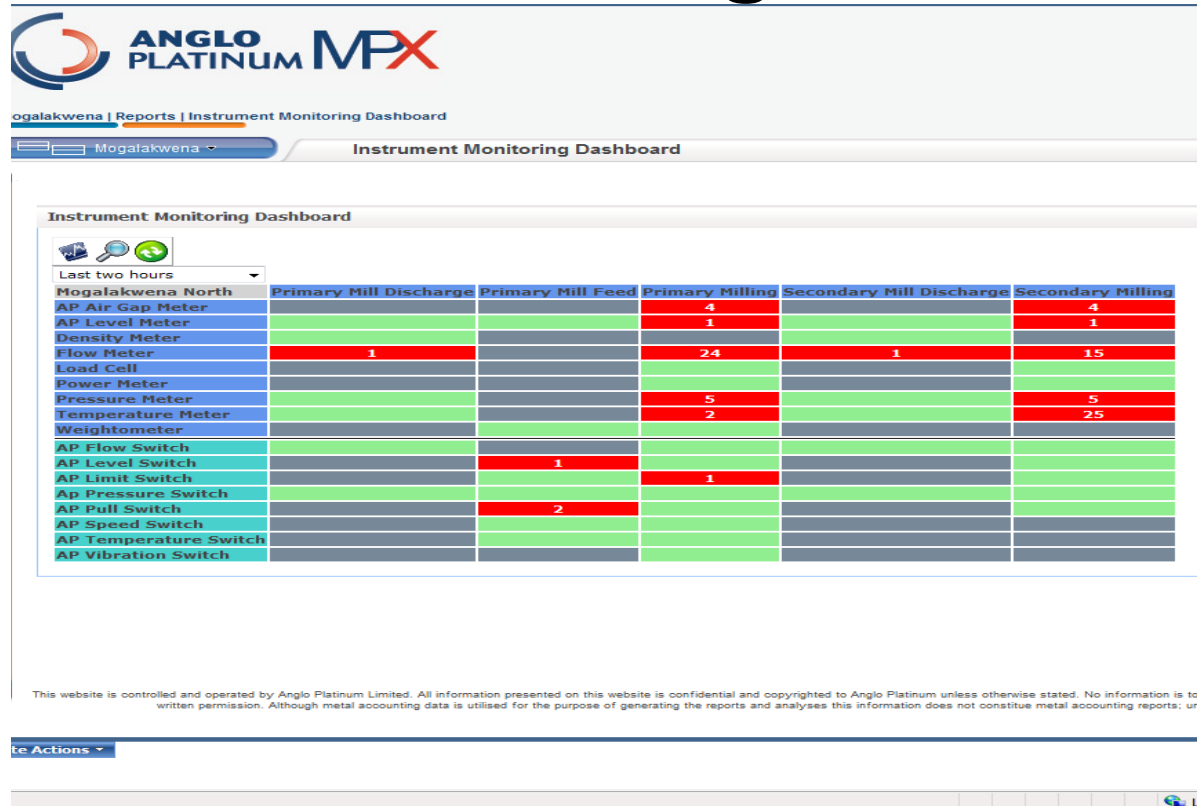
Anglo Platinum - Data Validation

"Data validation and instrument monitoring results in
- Better data quality
- Supports "One version of the truth"
- Better decisions"

Michael Halhead
Lead Process Control Engineer
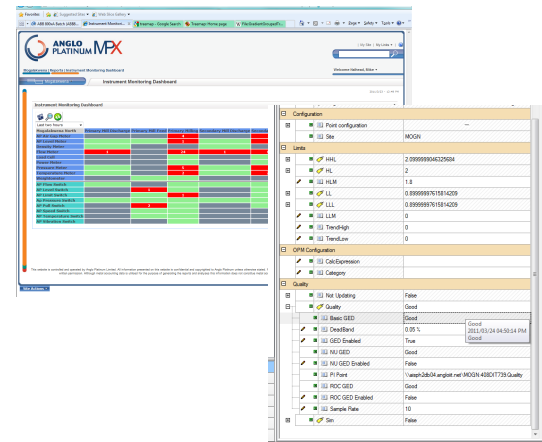
Business Challenge

- Bad data quality
- Caused equipment failures
- Large number of instruments
- Business/Operational decisions need improvement
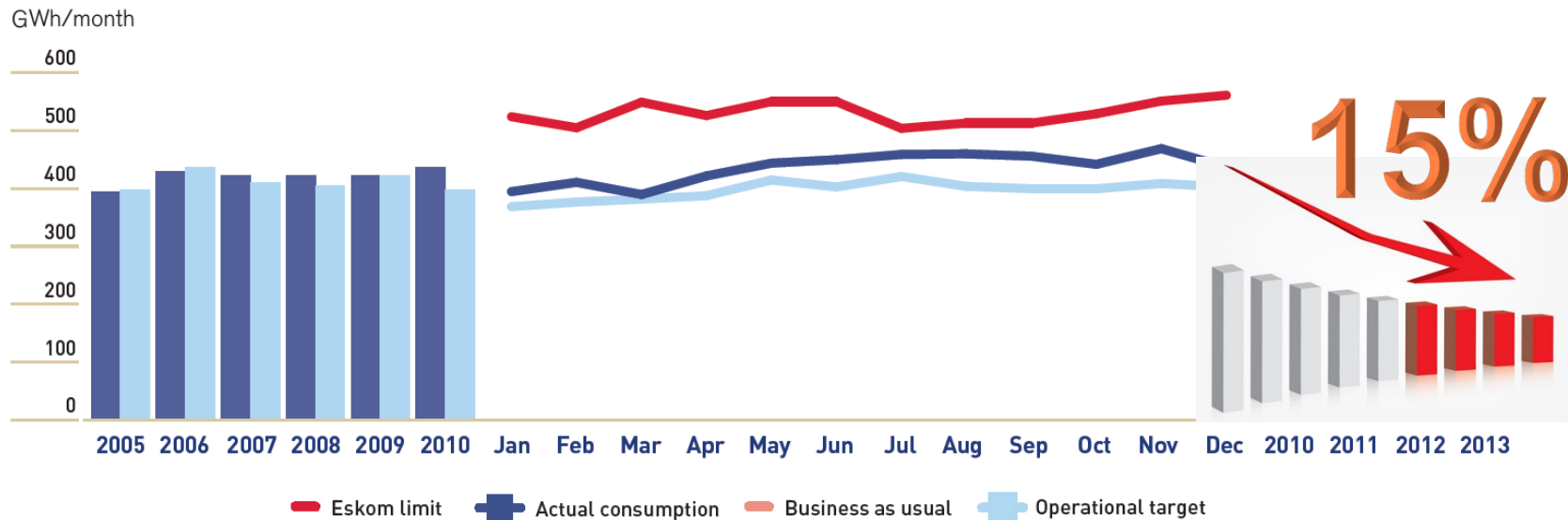
Solution

- Use PI AF to organize
- Use PI ACE to calculate
- Custom WebPart to visualize
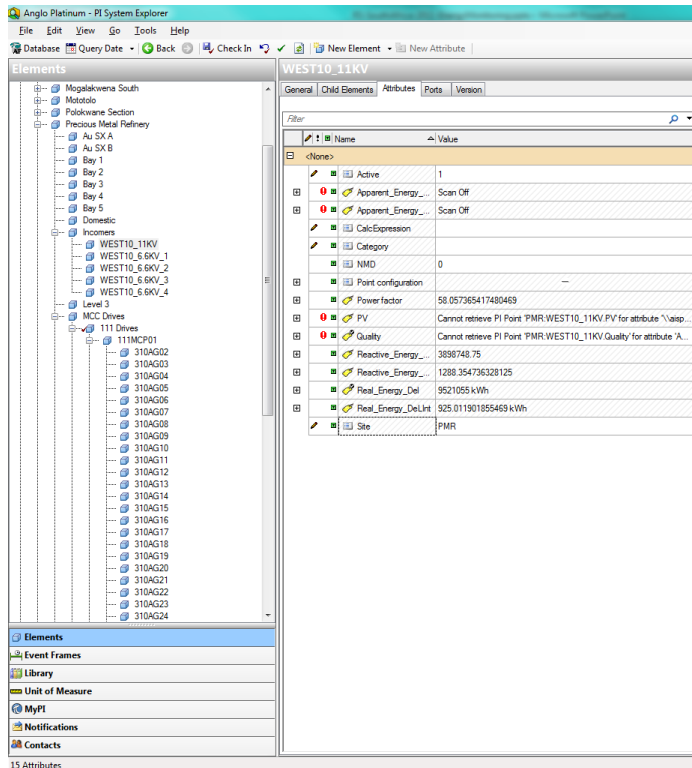- Use OLEDB Enterprise for reporting

Results and Benefits

- Better quality information
- Better decisions
- Clear visibility instrument status
- Prevention of equipment failures

Energy Monitoring Initiative at Anglo Platinum
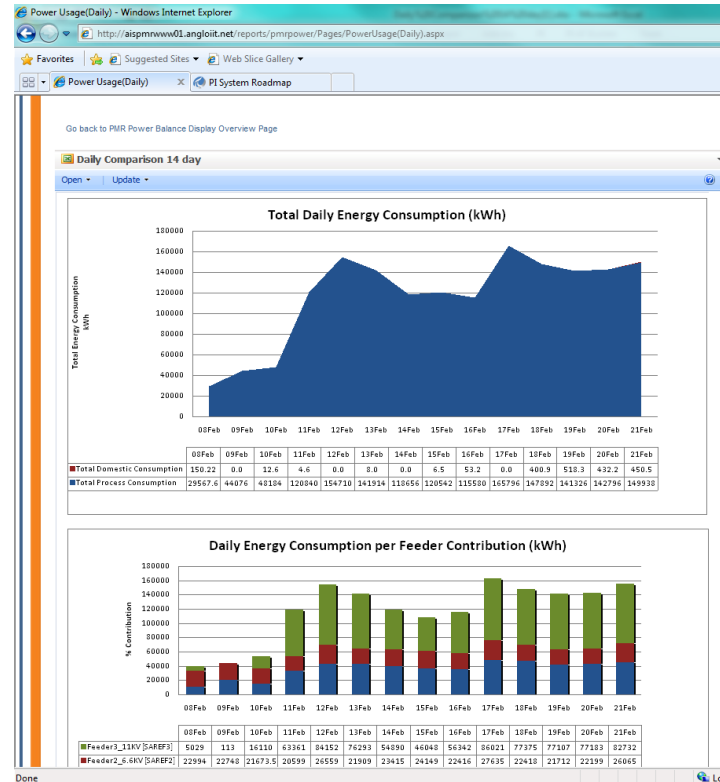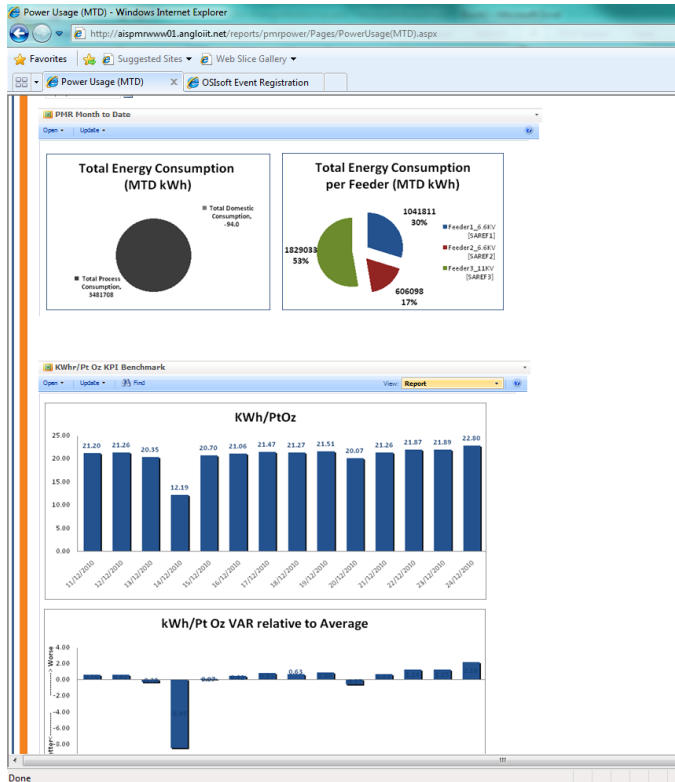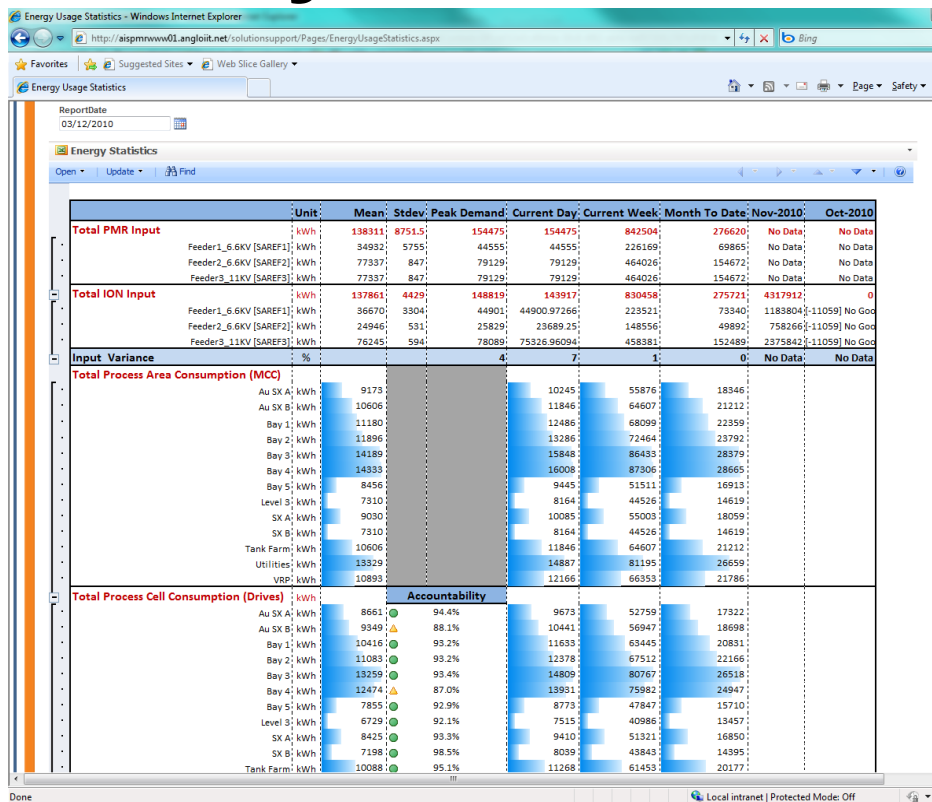
Business Challenge

Organize

- Totalizers, Performance Equations (PEs) and PI ACE.

- Totalizers and PEs configured using PI AF Templates

- The AF-Link facilitates ACE

Corporate Visibility

Data Analysis

- Data is rolled up using PI AF
- Show clearly where the power is being used

OSIsoft Software and Services Used

- The following OSIsoft Products were used to provide this solution:
    - PI Server
    - RDBMS Interface
        - ION Data
        - LIMS Data
    - OPC Interface
        - Real time process data
    - PI ACE
    - PI AF
        - Including custom Data References (Rollup DR)
    - PI DataLink and PI DataLink Server
    - PI ProcessBook for displays
    - PI WebParts
    - PI OLEDB Enterprise

Anglo Platinum - Energy Monitoring

"Implementing high level metrics and analyses linked to production clearly shows were the power is used allowing focused energy reduction initiatives. A roll out to the concentrators is in the planning stages. Due to the scale of the concentrator operations the potential benefits are enormous."

Thobile Mukuna

Process Engineer

AngloAmerican
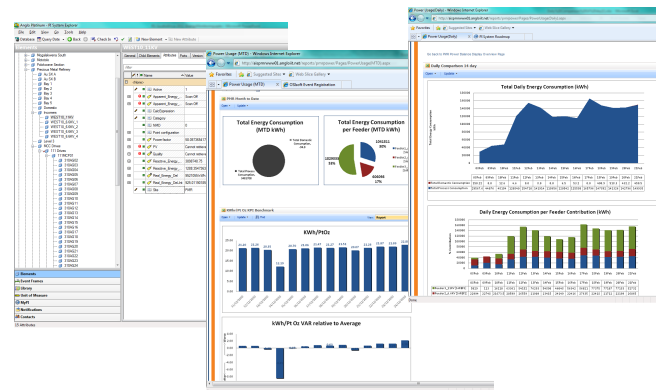
Business Challenge

- Large electricity consumption - 450 GWh/month
- Target 15% reduction in electricity consumption 2008 to 2014
- Company-wide integrated approach to energy saving is required

Solution

- Use PI AF - granularity and roll-up
- Visibility - power use at every level
  - PI WebParts and SharePoint, Silverlight
- High level metrics - KPIs
- Provided ability for users to drill down to every level of granularity

Results and Benefits

- Enterprise visibility of all electrical consumption
- Significant time reduction for analysis
- Easy construction of BI cubes
- Just making the data visible resulted in a 1% reduction in electrical power use.

Condition Based Maintenance Initiative at Anglo Platinum

Business Challenge

Non Standard Methods

Time Consuming

Non Standard Reason codes

Easy Rollout

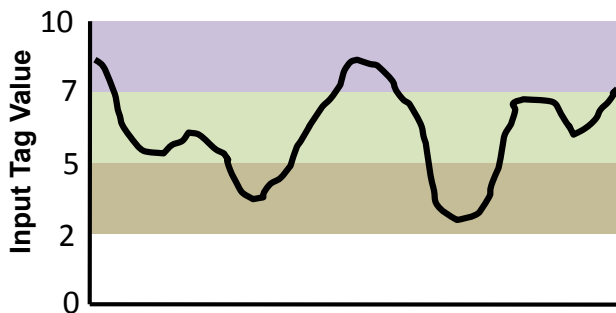Everyday Task

One Enterprise System

Done in Excel Spreadsheets

No Client Installs

User Configurable

Change Insensitive and Scalable

Solution – Process Diary

- Operational States

Example: Use any or all of the conditions below;
Create Event When > 7	with template A
Create Event When < 5	with template B
Create Event When between 5 and 7	with template C
Create Event When not between 5 and 7	with template D
Create Event When = "Digital State"	with template E

Solution – Based on Event Frames

Anglo Platinum – Process Diary

"Started out with condition based maintenance in mind.
The resulting "Process Diary" can be used for Downtime,
Slowtime, KPI's, basically anything that can be configured."

Michael Halhead
Lead Process Control Engineer

AngloAmerican
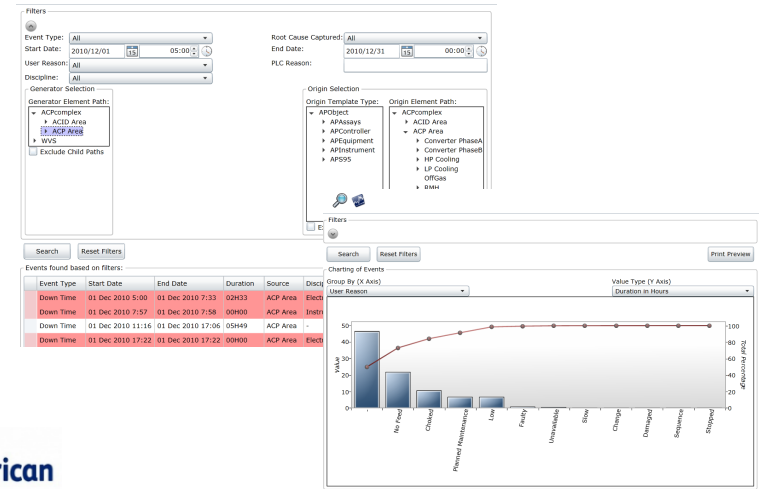
Business Challenge

- Non-standard methods
- Time consuming
- Replace Excel solution
- Provide Enterprise easily configurable solution

Solution

- PI Event Frames and PI AF
- PI ACE to create events
- Custom Silverlight screens using PI AF controls

Results and Benefits

- Time savings
- Enterprise-wide standardization
- Flexibility – not just CBM
- Compare years of data
- User configurable

Asset Monitoring Initiative at Syncrude

Business Challenge

- Prolong Life of Mobile Assets
- Data Shadows
- Need Real-time Events
- Fit into Existing Application
- Low Maintenance
- Scalability

Business Challenge

Test Case#	Area	Complexity	Test Case Name
001	General Monitoring	Minor	Out of Range
002		Minor	MDSP Offline
003	Power Train Management	Minor	Torque Convertor Overheating
004	Lubrication Management	Minor	Auto-lubrication Frequency
005	Engine Management	Minor	Throttle Position Condition
006		Minor	Turbo Failure
007		Minor	Injector Failure
008		Minor	Engine Oil Dilution
009		Minor	Coolant Temp Delta
010	Steering/Braking Management	Minor	Service Brake Applied at Speed
011		Minor	Brake Overheating
012		Major	Steering Pumps Cycle
013		Major	Braking Pumps Cycle
014	Frame Management	Minor	Improper Strut Charge
015		Minor	Deflation
016		Minor	Airborne
017		Minor	Side Load
018		Minor	Front Load
019		Major	Max Rack
020		Major	Max Pitch
021		Major	Max Roll
022		Minor	Abusive Dumping
023		Minor	Abusive Loading
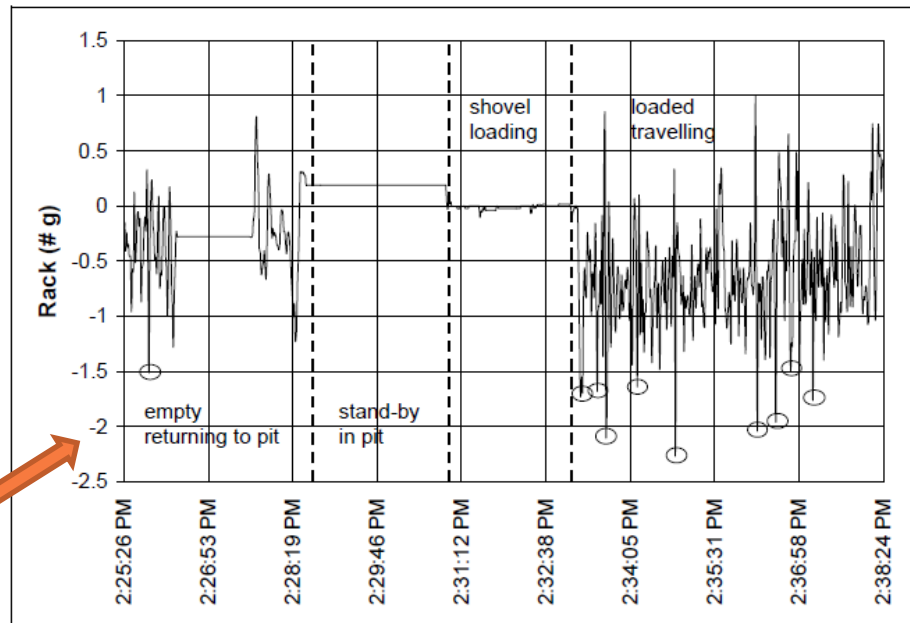
Syncrude Canada – Mobile Asset Monitoring

Syncrude chose the PI System and an Enterprise Agreement as an integral part of their tar sands mining and refining operation.

Derek Hatchey
PC&A Applications Team
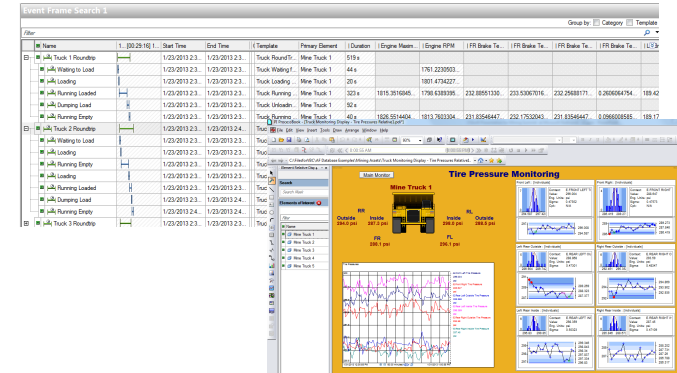
Business Challenge

- Large number of trucks and other mobile equipment
- Existing system - allows analysis of events days later
- Data shadows – maybe up to 72 hours
- Prolong life of assets

Proposed Solution

- Data from onboard systems to PI Archive via the UFL interface
- Truck templates in PI AF & PI ACE to trigger calculations
- Event Frame Interface to generate Events
- PI OLEDB Enterprise to populate Events to existing Oracle database

Potential Benefits

- Data shadows are handled by PI ACE and Event Frame interface
- Real-time generation of events and analysis
- Ability to make decisions in real-time

Conclusion

- Lots of Little Bangs

- Keep it Simple

- Enterprise Deployment

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Center of Excellence Engineer

OSIsoft, LLC

"A wise man never tries to warm himself in front of a painting of a fire" – Czech proverb

THANK YOU

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