



# An EA For Barrick Gold

## Timing Is Everything

Presented by **Iain Allen**

Senior Manager – Mining Information Technology

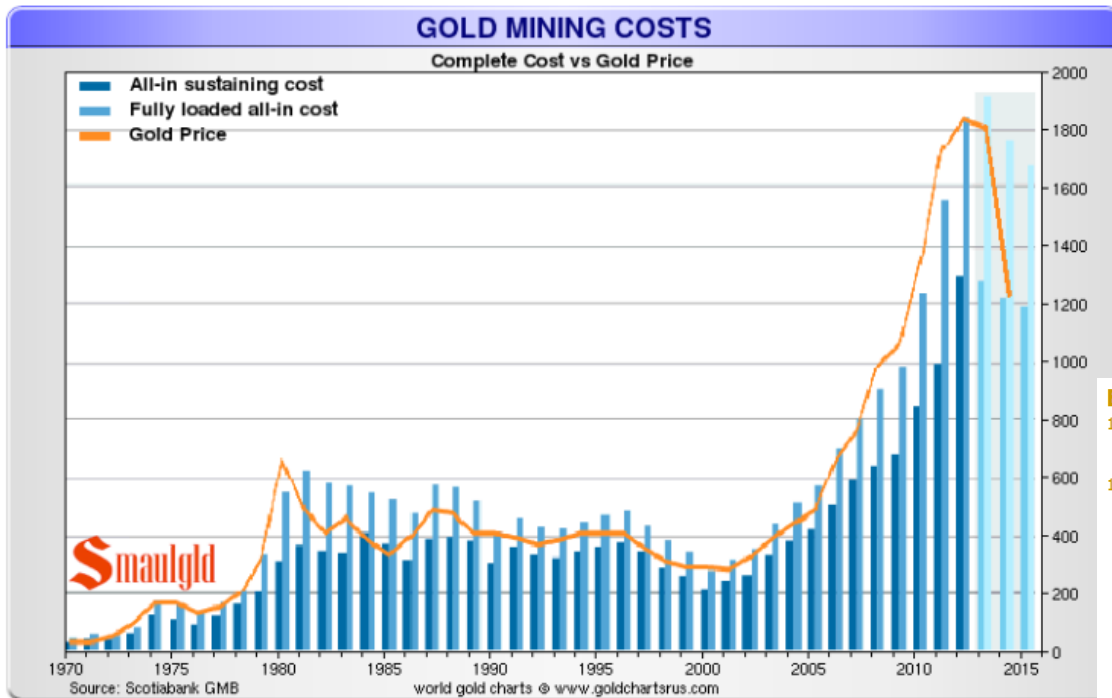


“Without data, you are just another person with an opinion”

“If you don’t measure it,  
you can’t manage it”

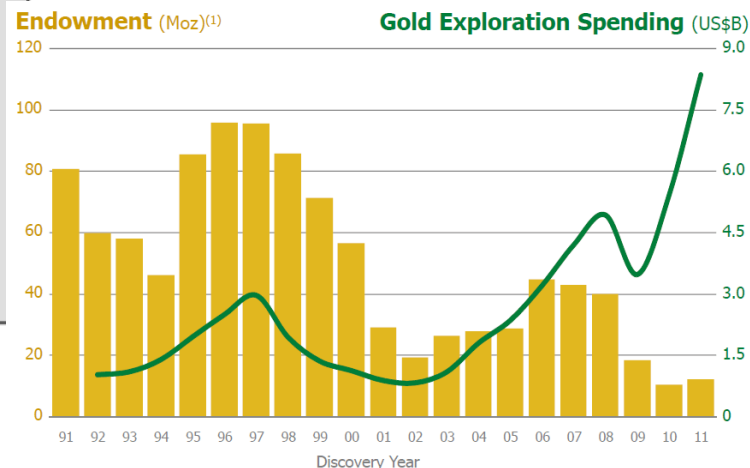


# The Gold Mining Business



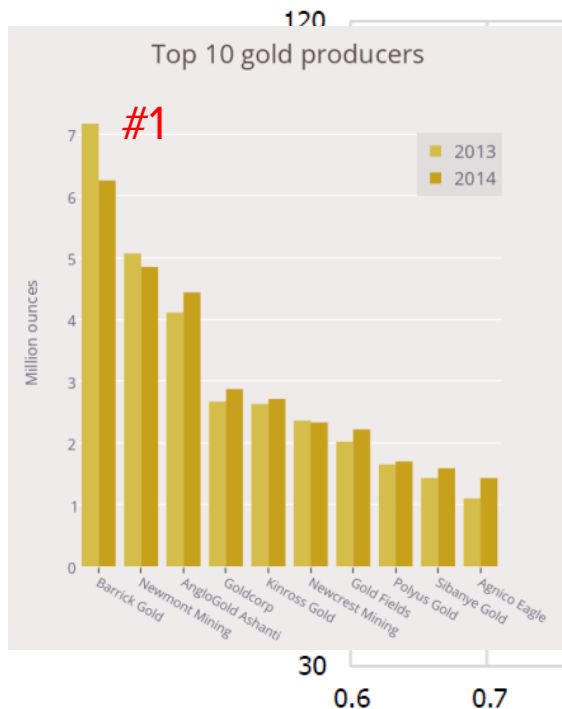
Less and less bang  
for the Exploration buck!

Tough and getting tougher  
Cost control is paramount



# Barrick in the Gold Mining Business

## Reserve Ounces (Moz)



(1) Source: Company filings. See final slide #4.

Company	Market Cap (US\$Bn)
Goldcorp	15.88
Barrick	14.43 #2
Newmont	11.09
Newcrest	8.12
Agnico	6.43
Anglogold Ashanti	4.09
Yamana	3.95
Eldorado	3.53
Gold Fields	3.43
Polyus	3.43

#1  
Barrick  
104 M oz

14

# Barrick Gold - Then and Now

2012 - 25 operating mines, ~7.5 million ounces of gold produced @ US\$915 (AISC)  
Reserves 104.1 million ounces



# Barrick Gold - Then and Now

2014 - 14 operating mines, ~6.25 million ounces of gold @ US\$864 (AISC)

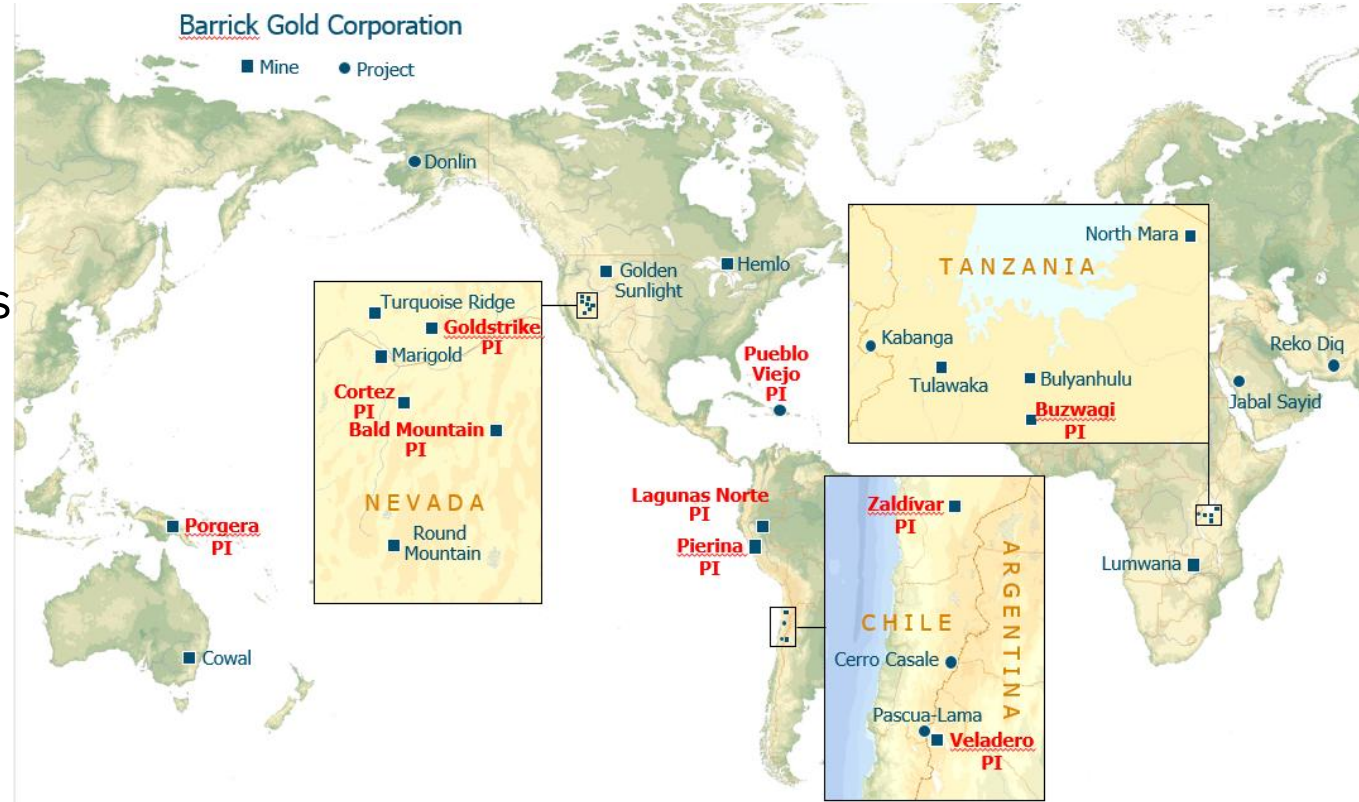
Reserves 93 million ounces





# History of PI System in Barrick Gold

- Customer since 1998
- 10 PI Servers with a total of 146K tags
- Basic installations without common infrastructure across sites





# Why Does Barrick Need An EA?



# Why An EA? Corporate Mandates!



“Secure Barrick's License to Operate by establishing strong Environmental management systems, aligned with international standards.”

# Why An EA? OSIsoft Resources



## Center of Excellence



The Center of Excellence — Your industry expert on PI System® implementation.



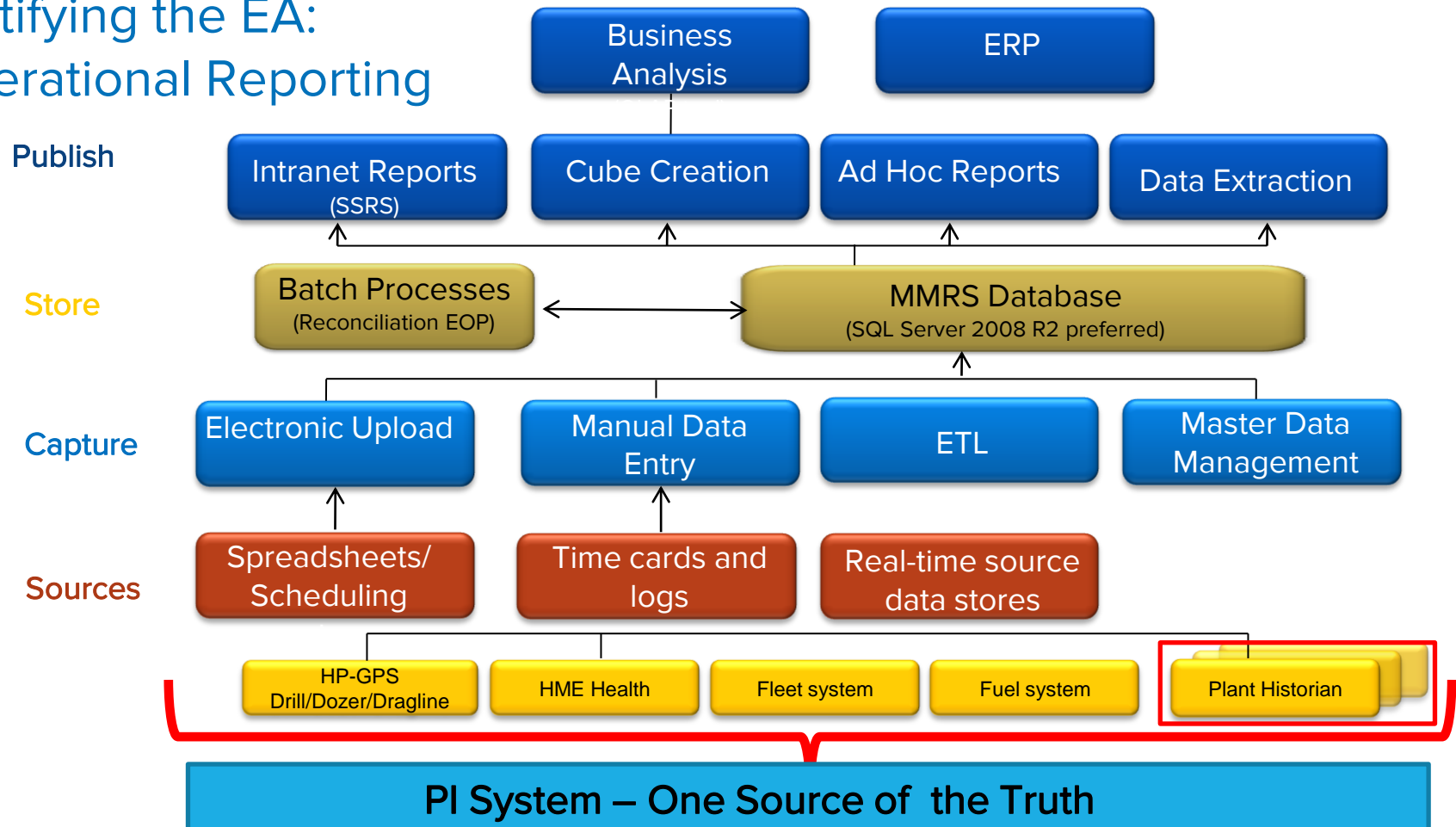


# Justifying The EA

# Justifying the EA: The Team



# Justifying the EA: Operational Reporting








# Justifying the EA: Energy Management

Data stored in the PI System was instrumental in optimizing Oxygen Plant operation, resulting in a \$1,000,000/mo energy saving.

Processing **OXYGEN PLANT**

 **BARRICK**  
PUEBLO VIEJO

- 4000 tpd plant with 99.5% O<sub>2</sub> purity
- T1 commissioned in July and T2 in August 2012





# Justifying the EA: Water Management

“Water is a critical component in mining and it’s also an essential but scarce resource in many parts of the world. I can tell you from first-hand experience that it is a very emotional issue.”

Dr. Mei Shelp, Barrick Hydrologist



The Margajita River used to flow dark red due to acidic water discharged by the previous operator of the Pueblo Viejo mine. Barrick’s water treatment plant has led to dramatic improvements in the river, decreasing acidity levels, increasing water flow and returning the water to its natural color.

# Justifying the EA: Stakeholder Reporting

- Biodiversity
- Materials Management
- Water Management
- Air Emissions Management
- Waste Rock and Tailing Management
- Reclamation

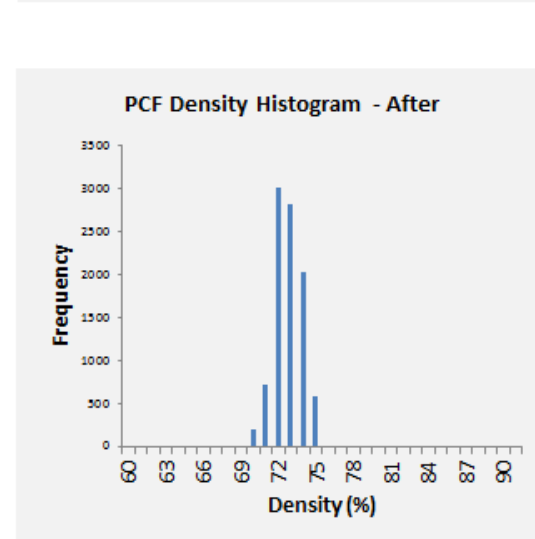
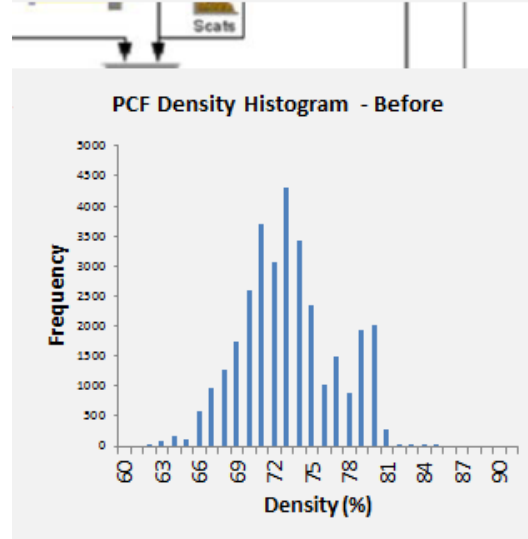
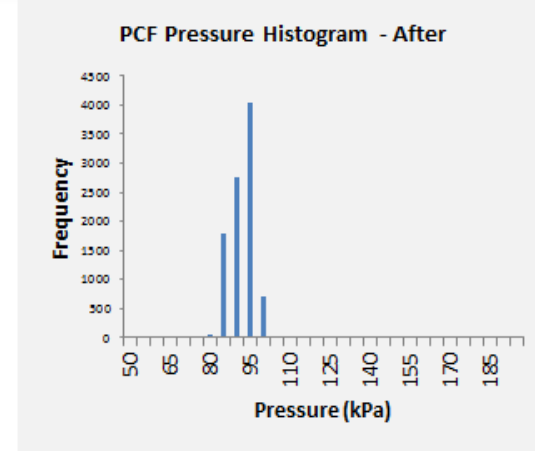
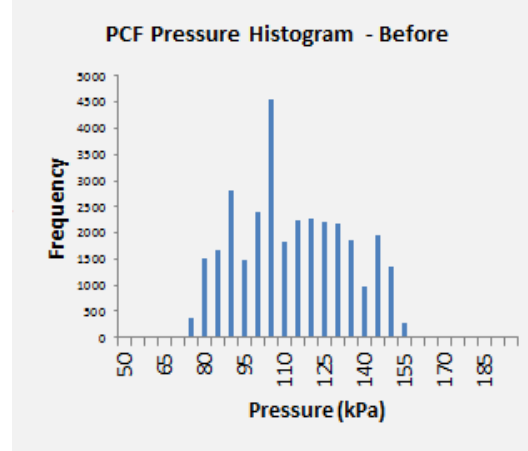


**CARBON DISCLOSURE PROJECT**

# Justifying the EA: Plant Optimization

## Darlot Mine example:

- Increased throughput 10%
- Reduced power consumption 1%
- Leach feed density variability reduced 80%
- Potential \$3.5 million in savings



# Justifying the EA: Did It Work?





# How Are We Using The EA?



# Using the EA: Training



The links below describe our courses in detail:

- [Analyzing PI System Data](#)
- [Building PI System Assets and Analytics in PI AF](#)
- [PI Advanced Computing Engine \(PI ACE\)](#)
- [PI System Administration for IT Professionals](#)
- [PI System Architecture, Planning, and Implementation](#)
- [PI Web Parts User and Administration Class](#)
- [RtReports Administration Class](#)
- [Visualizing PI System Data \(Clients\)](#)

## Courses Schedules & Registration

### Client Courses

- Visualizing PI System Data (Clients)
- Analyzing PI System Data
- PI WebParts Class
- RtReports Administration Class

### Server Courses

- Building PI System Assets and Analytics with PI AF
- PI System Architecture, Planning, & Implementation
- PI System Administration for IT Professionals

### Small Private Online Courses

- Building Basic Displays with PI ProcessBook
- Building Advanced Displays with PI ProcessBook
- Creating Basic Reports with PI DataLink
- Developing Applications with PI AF SDK
- Configuring Calculations with PI AF
- Building Asset Hierarchies with PI AF
- Configuring a Simple PI System

## VCampus Subscription

Lab Name	Manual	
PI ProcessBook: Building Displays		<a href="#">Launch Lab</a>
PI ProcessBook: Element Relative Displays		<a href="#">Launch Lab</a>
PI ProcessBook: Building AF Displays		<a href="#">Launch Lab</a>
PI DataLink: PI and Excel Times		<a href="#">Launch Lab</a>
PI DataLink: Operational Start Up		<a href="#">Launch Lab</a>
PI DataLink: Create a Simple Report		<a href="#">Launch Lab</a>

### What is covered in the YouTube Channel?

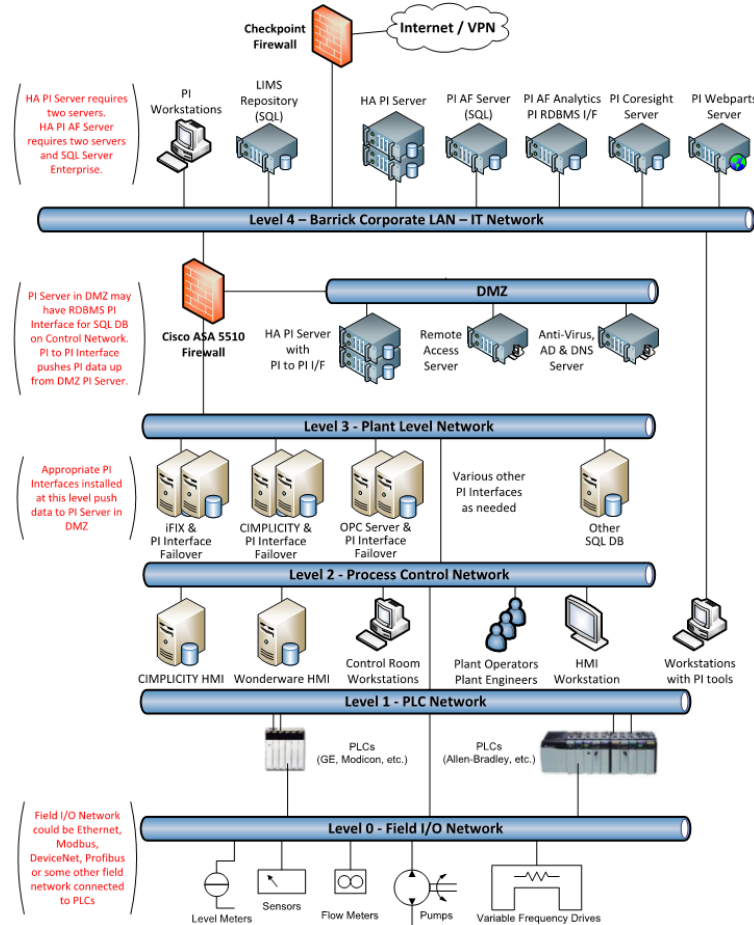
The following topics are covered in the YouTube Playlists in the OSIsoft Learning Channel:

- General Introduction
- PI ProcessBook
- PI DataLink
- PI WebParts
- PI AF
- PI System Management



# Using the EA: Infrastructure

## Barrick Gold IT/OT (Process) Network – High Availability PI Configuration



# Using the EA: Asset Framework

\\sl3itpiaf01\OSIsoftOnlineCourse - PI System Explorer (Administrator)

File Edit View Go Tools Help

Database Query Date Back Check In Refresh New Element New Attribute Search Elements

Elements

- Elements
  - NuGreen
    - Houston
      - Cracking Process
        - Equipment
          - B-210
          - B-235
          - F-321
          - F-409
          - H-2043
          - H-230
          - K-304
          - K-556
          - P-214
          - P-456
          - P-560
        - Extruding Process
        - Milling Process
        - Little Rock
        - Tucson
        - Wichita

B-210

General Child Elements Attributes Ports Version

Filter

Name	Value
Asset Name	High Pressure
Burner	TZ-14
Fuel Gas Flow	47.8278465270996 k sft3/h
Fuel Gas Flow Tag	cdt158
Fuel Gas Volume	58.9823818845603 k scf
Fuel Ratio	1000 k sft3/h/tf
Installation Date	5/15/1985 9:00:00 PM
Make-Up Water Flow	30.1154251098633 US gal/min
Make-Up Water Tag	SINUSOIDU
Manufacturer	Borne Engineering
Model	BX-414
Plant	Houston
Process	Cracking Plant
Water	629.662995443453 US Gal/min/tf

Group by: ☐ Category ☐ Template

Name: Fuel Gas Flow

Description: Fuel Gas Flow Rate

Configuration Item: ☐

Categories: Real-Time Data

Default UOM: thousand standard cubic foot per h

Value Type: Double

Value: 47.8278465270996 k sft3/h

Data Reference: PI Point

Settings...

\\pipes\CDT158

Fuel Gas Flow



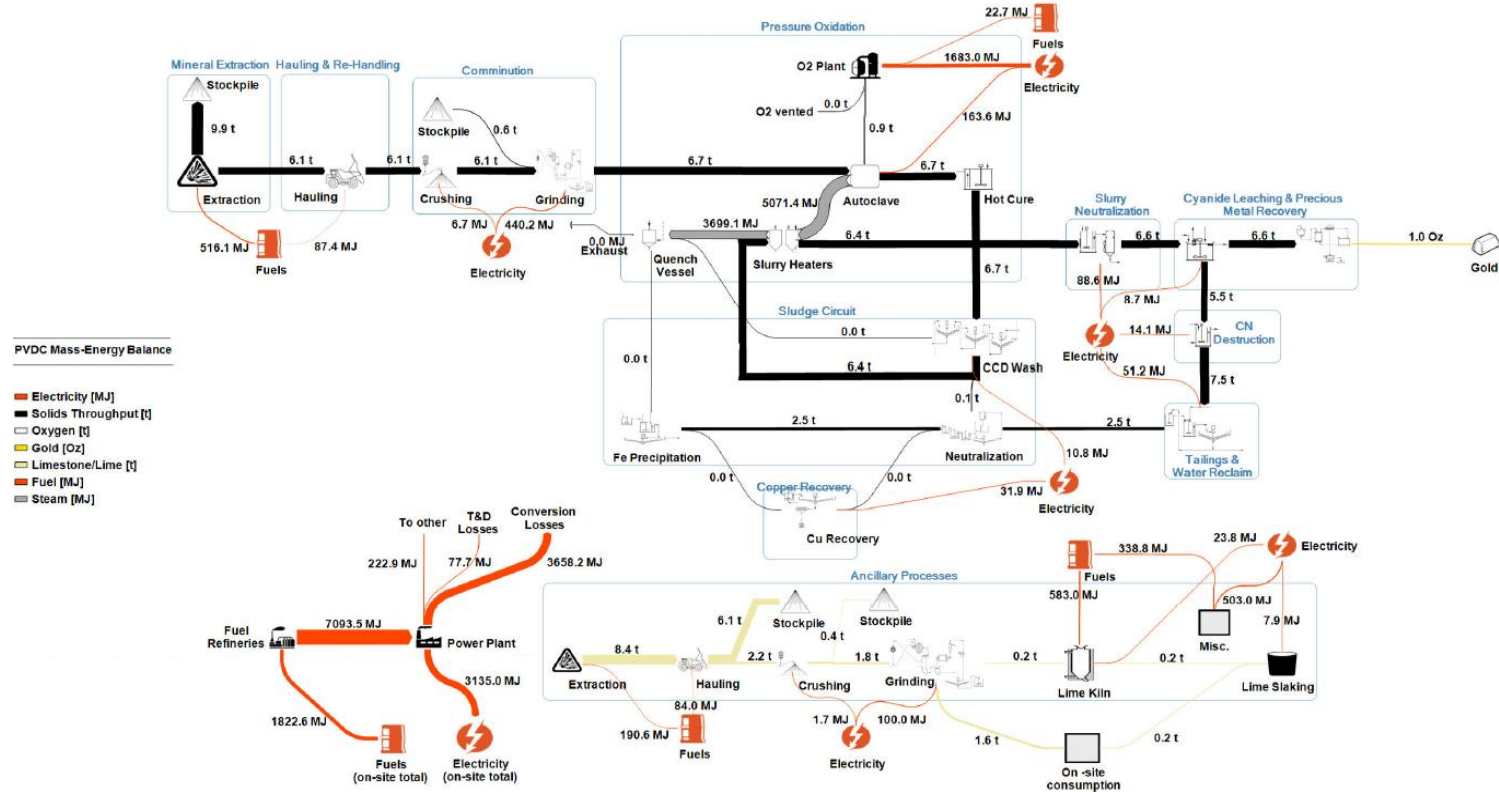
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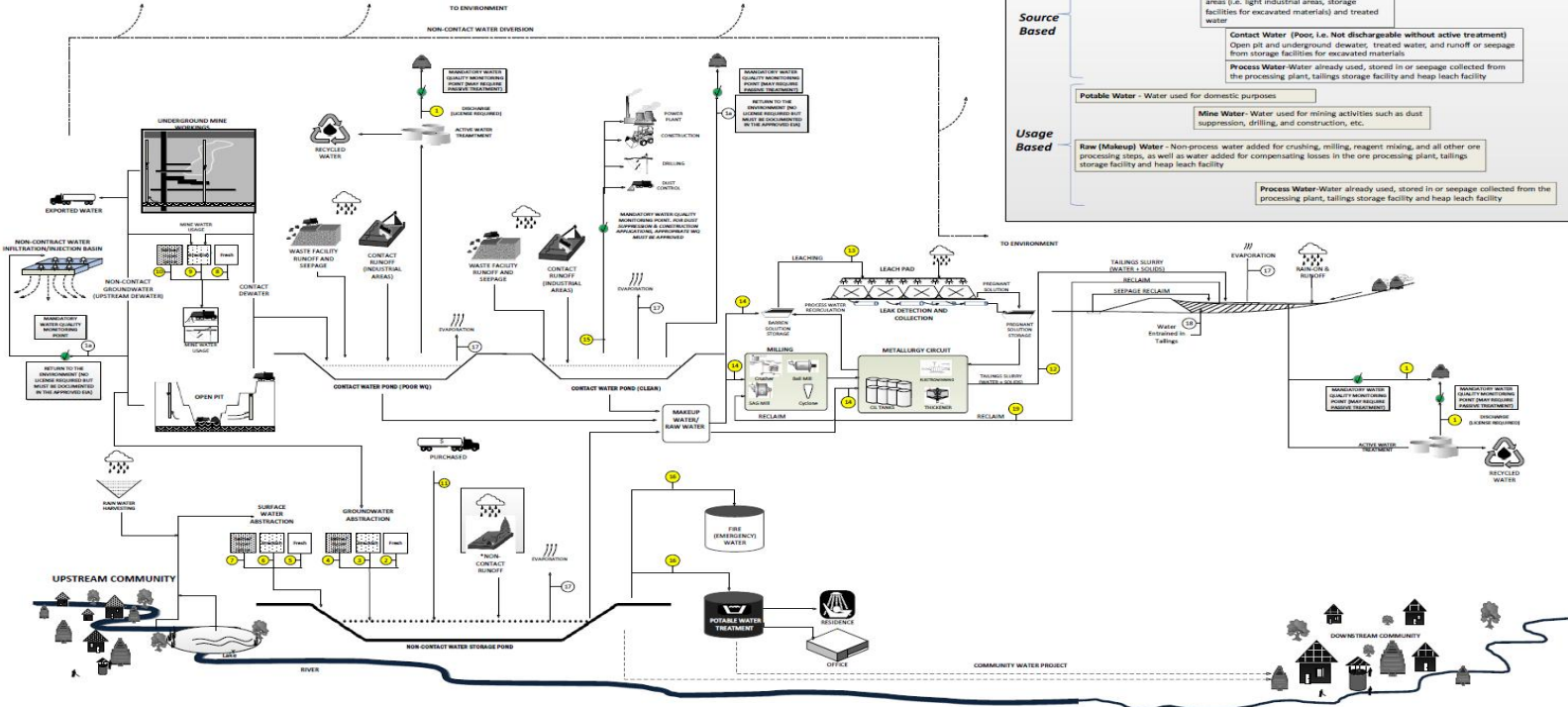
# Using the EA: Energy Optimization



# Using the EA: Mine Water Management



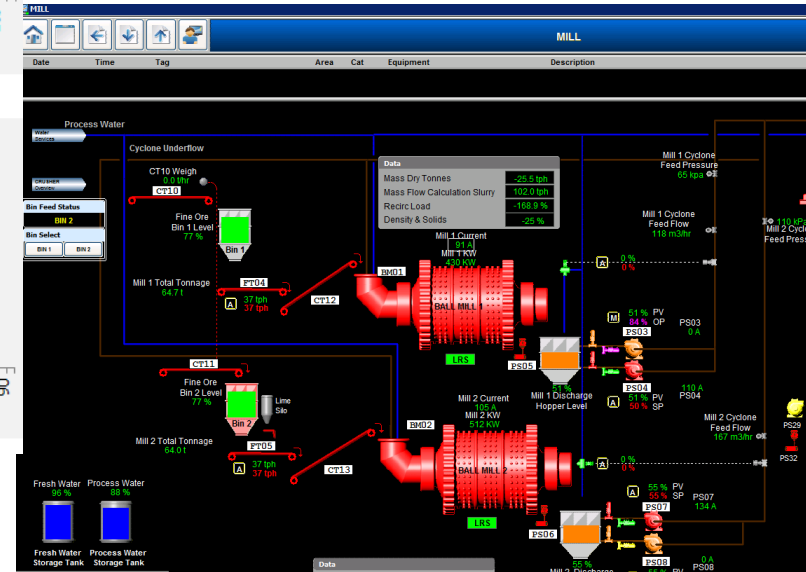
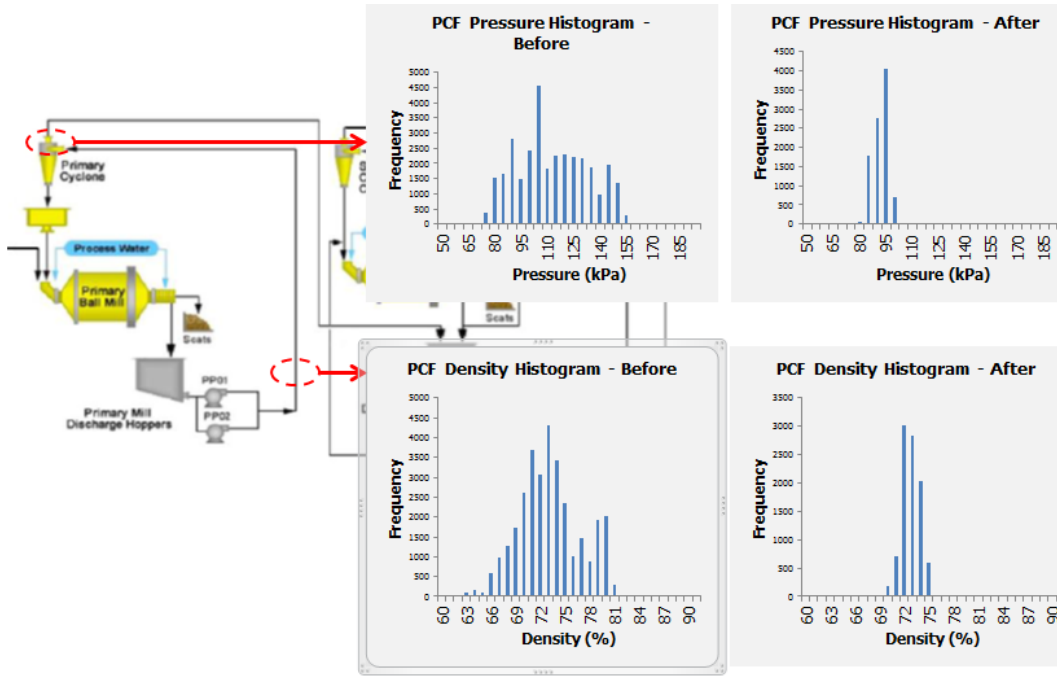
TYPICAL MINE WATER MANAGEMENT SYSTEM AND TERMINOLOGY FOR REPORTING (DRAFT FOR DISCUSSION)  
OCTOBER 25, 2013



10/25/2013

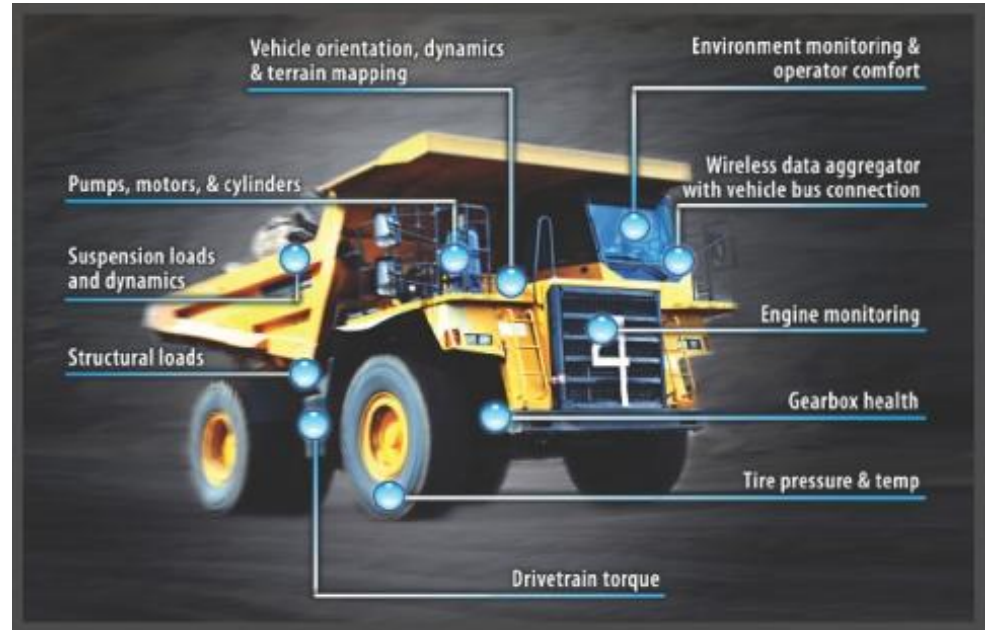
Typical Mine Water Management Flow logic and terminology (draft) mls.vsd

# Using the EA: Process Optimization



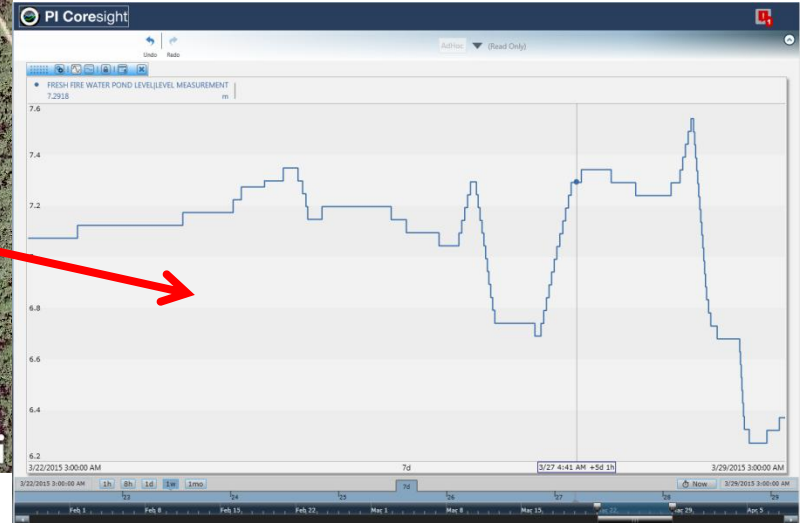
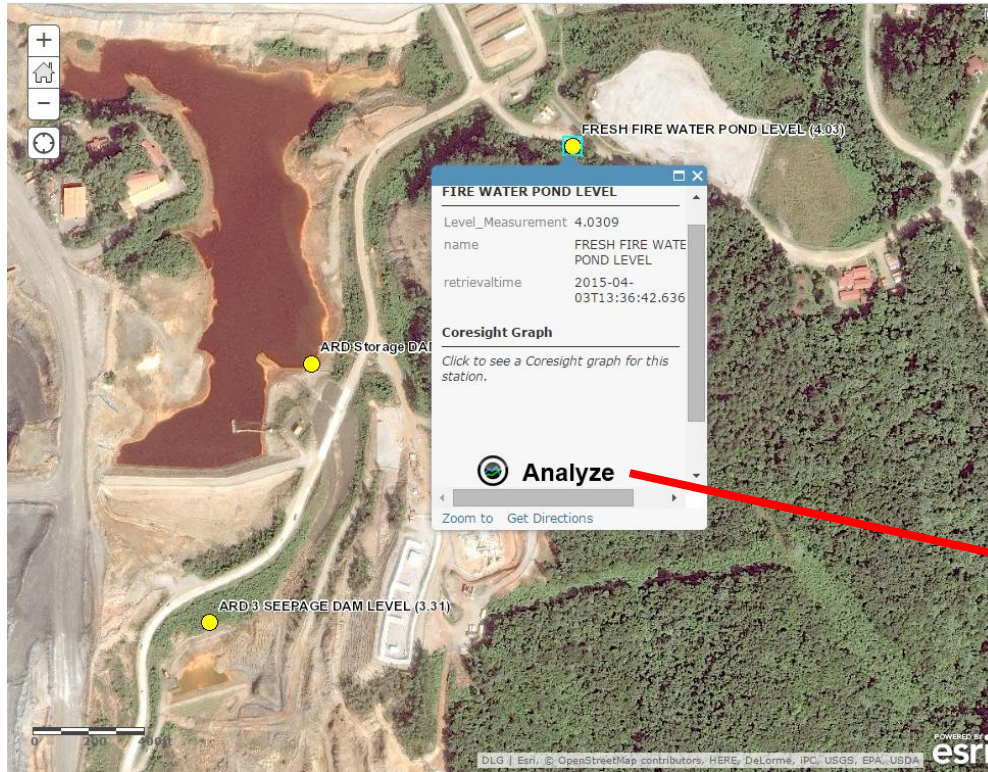
# Using the EA: Condition Based Maintenance (CBM)

“If it ain’t broke, don’t fix it”

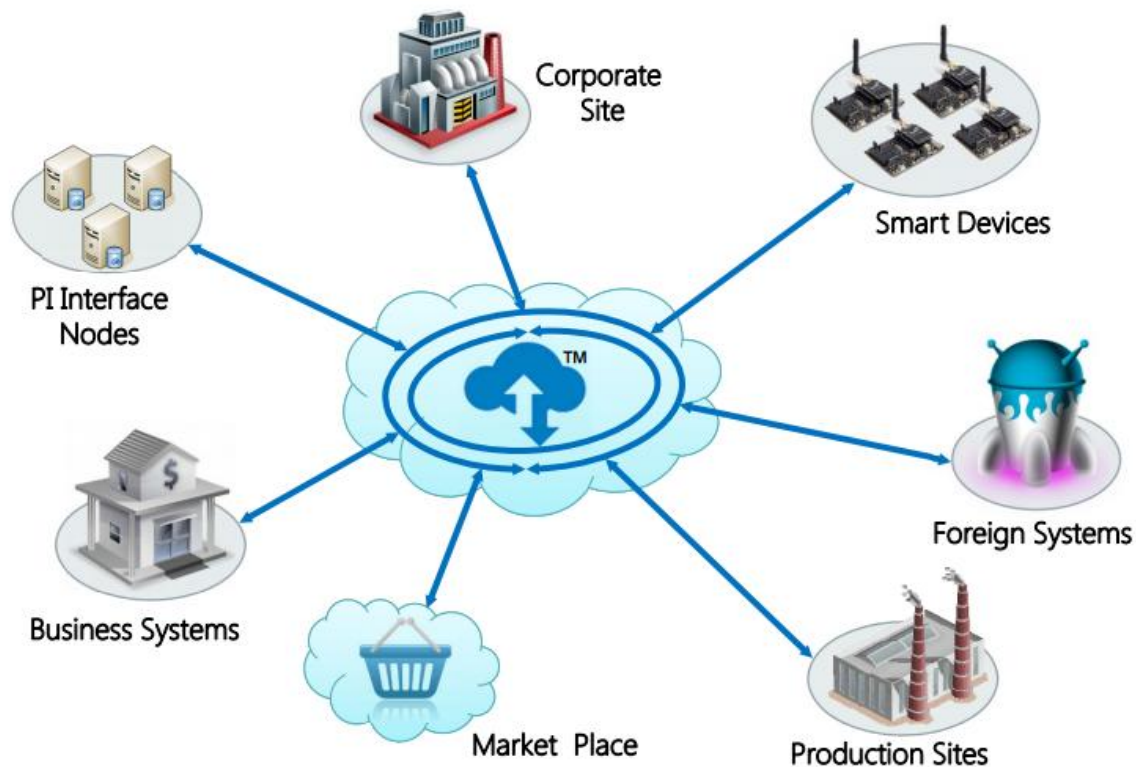




# Using the EA: PI Integrator for Esri ArcGIS



# Using the EA: PI Cloud Connect



# Using the EA: The Future...



# An EA For Barrick Gold The Timing Was Right

“With Data, You Are **NOT** Just  
Another Person With An Opinion.”

“If You **Do** Measure It,  
You **Can** Manage It.”



## Business Challenges

- A. Request a significant capital expenditure for an EA in a time of strict fiscal austerity
- B. Meet the challenge of Operational Excellence.
- C. Need to develop Asset Framework templates for Energy, Water, and Plant operations.

## Solution(s)

- A. Justify the EA convincingly.
- B. Concentrate initial efforts where the payoff is greatest – Energy and Water.
- C. Maximize Training and the use of CoE and OSIsoft Mining Industry Experts.

## Results and Benefits

- A. An EA for Barrick.
- B. Significant savings in Energy costs, better water management and reporting.
- C. Consistent approach to Energy and Water management.

# Iain Allen

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Barrick Gold Corporation







# THANK YOU

With Data, You Are NOT Just Another Person With An Opinion!