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# Environmental Compliance at the Goldstrike Mine

Presented by **Ted Olsen-Tank**



# Agenda

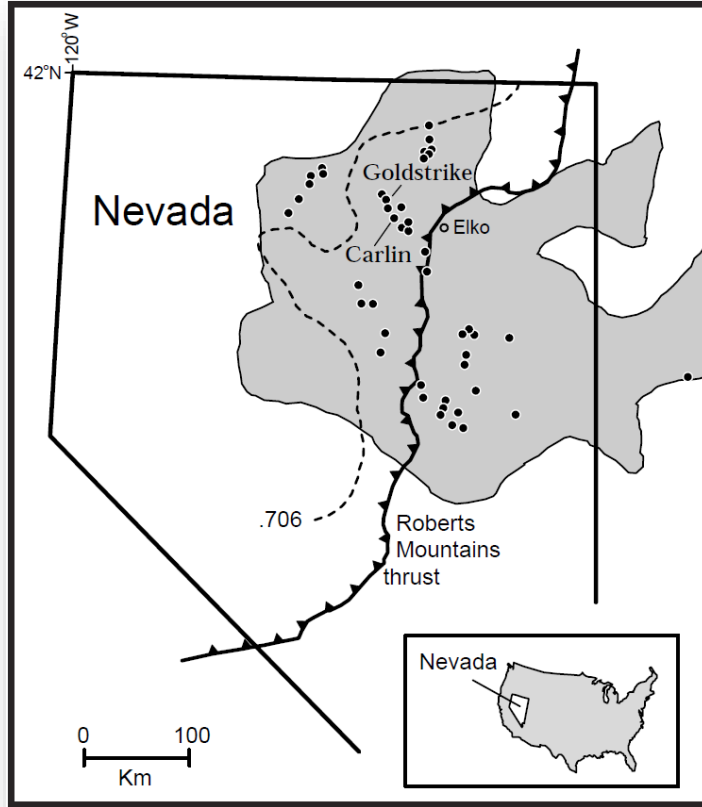
- Barrick Corporation
- Barrick Goldstrike Mine
- TCM Leach Project
- Environmental Compliance Monitoring
- Business Solutions
- PI Coresight, Asset Framework (AF), and Notifications
- Results
- Future Work

# Barrick Corporation





# Barrick Goldstrike Mine



# TCM Leach Project

Large-Scale Capital Project

1200+ Contractors and 12+ cranes on site most times during construction

Construction completed November 2014



# Total Carbonaceous Material

- ## Leaching with Thiosulfate in the presence of Resin combats Preg-Rob effect

Replaced and augmented the leach and recovery circuits





# Environmental Compliance Monitoring

## System 127 – Thiosulfate Recycle System

S	2.332.1	Thiosulfate Recycle Tank 1 (59,000 gallon capacity)
S	2.332.2	Thiosulfate Recycle Tank 2 (59,000 gallon capacity)
S	2.332.3	Thiosulfate Recycle Tank 3 (59,000 gallon capacity)
S	2.332.4	Thiosulfate Recycle Solution Tank (9,000 gallon capacity)
S	2.332.5	Regen 1 Storage Tank (10,000 gallon capacity)
S	2.332.6	Regen 2 Mixing Tank (7,000 gallon capacity)
S	2.332.7	Regen 2 Storage Tank (10,000 gallon capacity)
S	2.332.8	Regen 1 Mixing Tank (12,000 gallon capacity)

Example from  
Nevada Division of  
Environmental  
Protection (NDEP) -  
Air Quality Operating  
Permit To Construct

## Air Pollution Equipment

Exhaust gas from **S2.332.1 – S2.332.8**, combined, shall be ducted to a control system, with 100% capture, consisting of a Spray Tower Scrubber. The Spray Tower Scrubber shall operate at all times **S2.332.1 – S2.332.8**, each, are operating.

## Operating Parameters NAC 445B.305

- (1) The maximum allowable throughput rate of thiosulfate recycle solution in **S2.332.1 – S2.332.3**, combined, shall not exceed 5,460 gallons per minute (327,600 gallons per hour).



# Environmental Compliance Monitoring

## Monitored Values

- Flowrate
- Temperature
- Pressure
- pH
- Fan Status

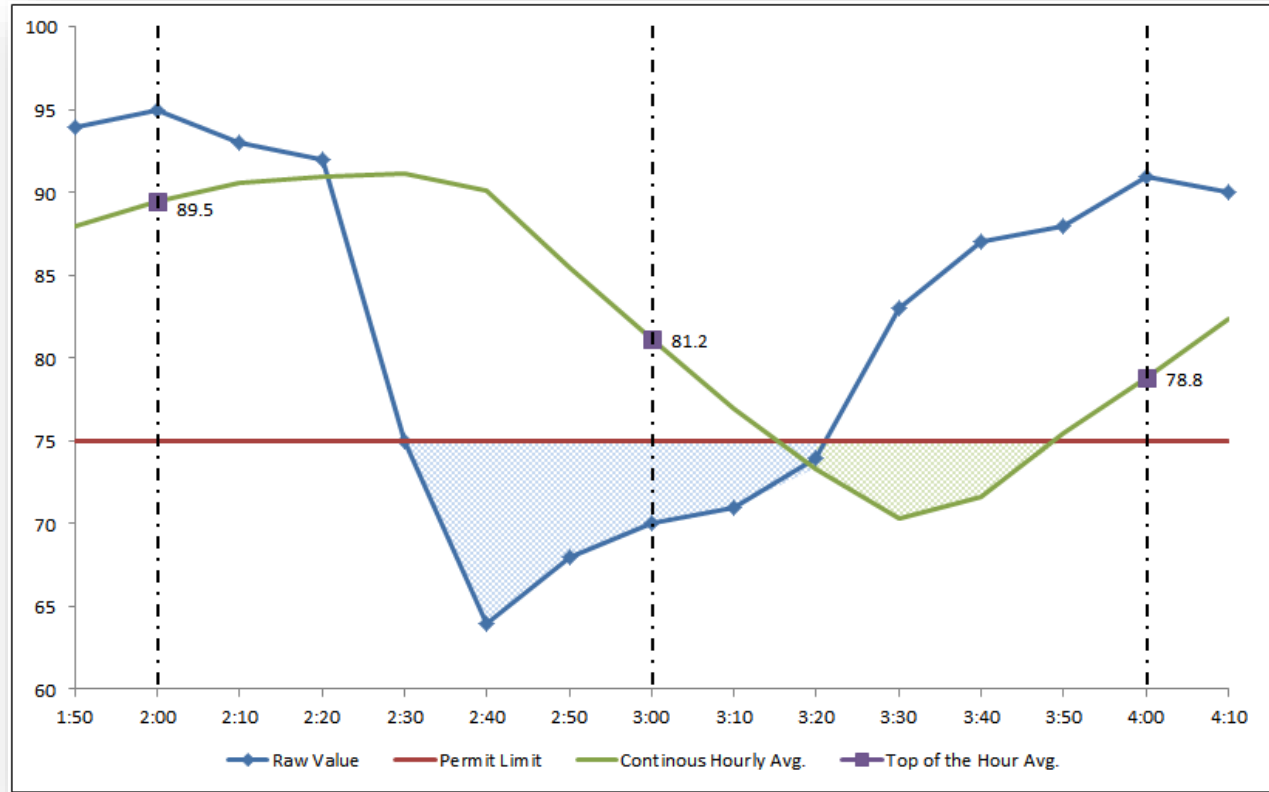


# Environmental Compliance Monitoring

Permit requires  
hourly avg. on  
the top of every  
hour

PI System's  
Continuous  
monitoring is  
more accurate

Time	Hourly Avg.
2:00 PM	89.5
3:00 PM	81.2
4:00 PM	78.8



# Environmental Compliance Monitoring

## Operations Group

- Day to day monitoring, reacting, and reporting to environmental

## Environmental Group

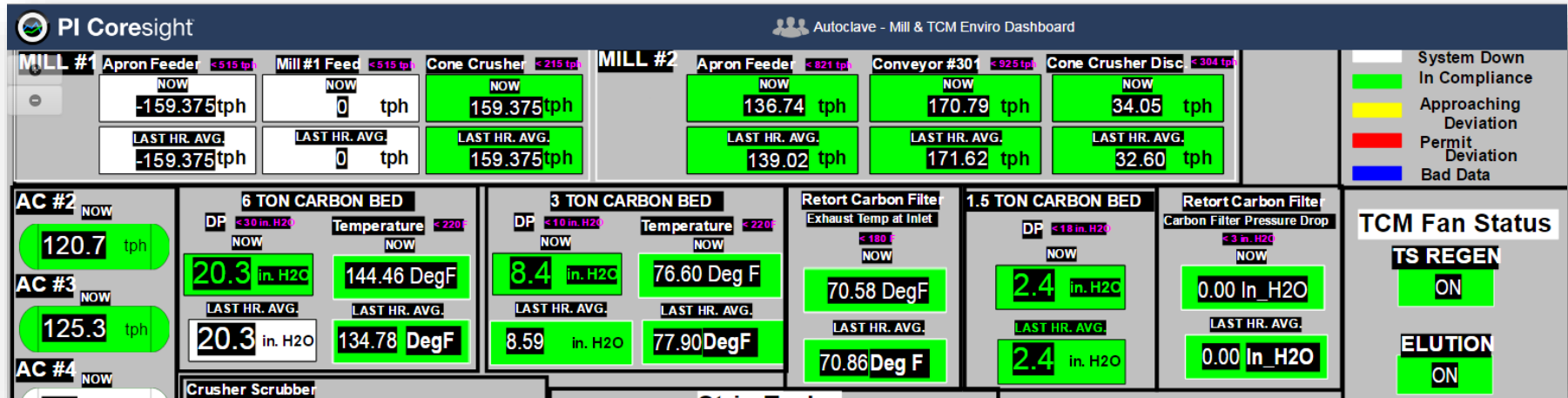
- Official recordkeeping and reporting to state and federal agencies
- Informing operations group of deviations

Long lead time for information back

Operations unable to identify when deviations were occurring

# Business Solutions

PI Coresight dashboards were used in Control Rooms and operator areas





# Business Solutions

AF was used to continuously monitor compliance points  
Analysis results triggered customized Notifications

Name	Value
Compliance	0
Crew	D
Current Value	0
fan 1	Off
fan 2	On
Permit Limit	must remain ON
Permit Line Item	Fan Status
Permit Value	0
System Description	TS Regen
System Number	System 127
TimeFormat	3/26/16 16:49

Name	Backfilling
compliance	✓
Event Frame	

Name	Expression
Variable1	if 'fan 1' = "Off" and 'fan 2' = "Off" then 1 else 0

# Business Solutions

AF was used to continuously monitor compliance points  
Analysis results triggered customized Notifications

From: ☐ Service PI Global (North America)  
To: ☐ Olsen-Tank, Theodore  
Cc:  
Subject: Environmental Compliance Alert, TS Regen Fan Status, TS Regen

A potential environmental compliance deviation has occurred involving System 127: TS Regen. Some details of the event are provided below.

**System 127, TS Regen.**

Fan Status **must remain ON.**

Date and Time: **3/24/16 14:28**

Crew: A Crew

This potential deviation should be investigated further to determine its legitimacy. Further actions may be required.

The Environmental 24 hour On Call number is **775-777-4778.**

The link to the environmental reporting forms on the intranet is [here](#).

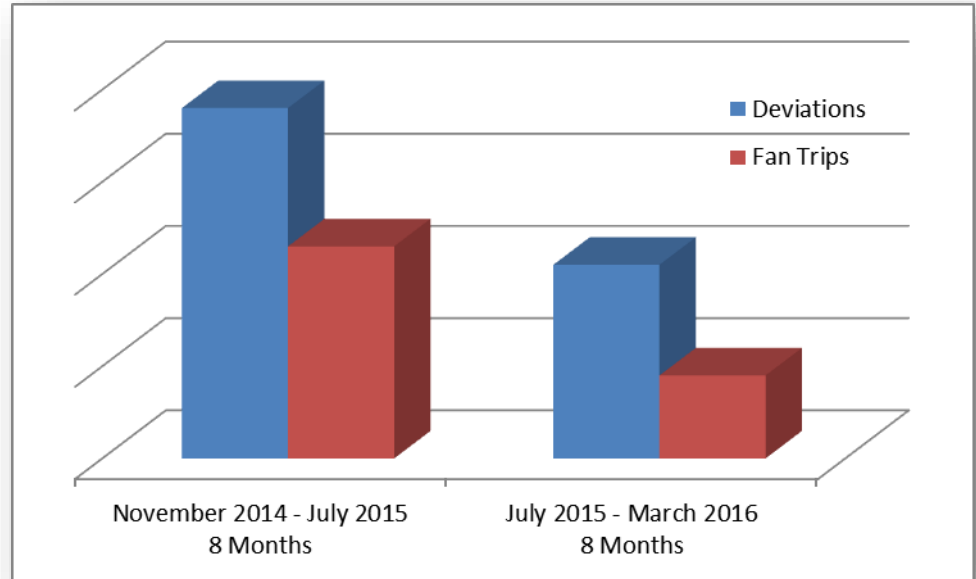
This is an automatically generated email from the TIDE Metallurgy team.  
Please do not reply to this email.

# Results

Deviations were identified immediately in real time

Feedback was given to operators and training sessions were facilitated

Comparing before to after AF implementation, the total number of Deviations decreased by **45%** and total Fan Trips decreased by **61%**



## Future Work

- Expand this work to the other permits at Goldstrike including the Title V air permit at the Roaster
- Share method with sister mines' and regional Environmental, Process, Process Control, and Information Technology Departments throughout the company
- Expand notification to SMS text messages to only target the operations crew that is on shift
- Revamp the environmental recordkeeping system by using AF analysis



# Environmental Compliance Monitoring at the Goldstrike Mine

## COMPANY and GOAL

Barrick Goldstrike Mine produces roughly 1.2M ounces of gold annually, and needs to comply with strict environmental operating permits.



## CHALLENGE

Deviations were not being identified by operators and thus were not being reported

- Operators were required to learn how to operate and maintain many new pieces of equipment in a new and complex large-scale capital project that was installed.

## SOLUTION

Environmental monitoring points connected to a PI System with real-time data displayed on dashboards and being analyzed via AF.

- AF analysis along with Notifications were used to identify deviations and email responsible parties

## RESULTS

Total number of environmental deviations decreased by 45%  
Total fan trips reduced 61%

- Reduced the time to identify, react, and correct deviations
- Increased reporting standards
- Ensured License to Operate

## Contact Information

**Ted Olsen-Tank**

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Metallurgist

Barrick Goldstrike Mines, Inc.



감사합니다

谢谢

Danke

Merci

Gracias

Thank You

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Спасибо

Obrigado

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

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