



Automated Downtime Tracking

Improving System Performance through Enhanced Asset Management

Presented by Rod Howard



Automated Downtime Tracking

The Problem



226 Turbines



900 Reciprocating Engines

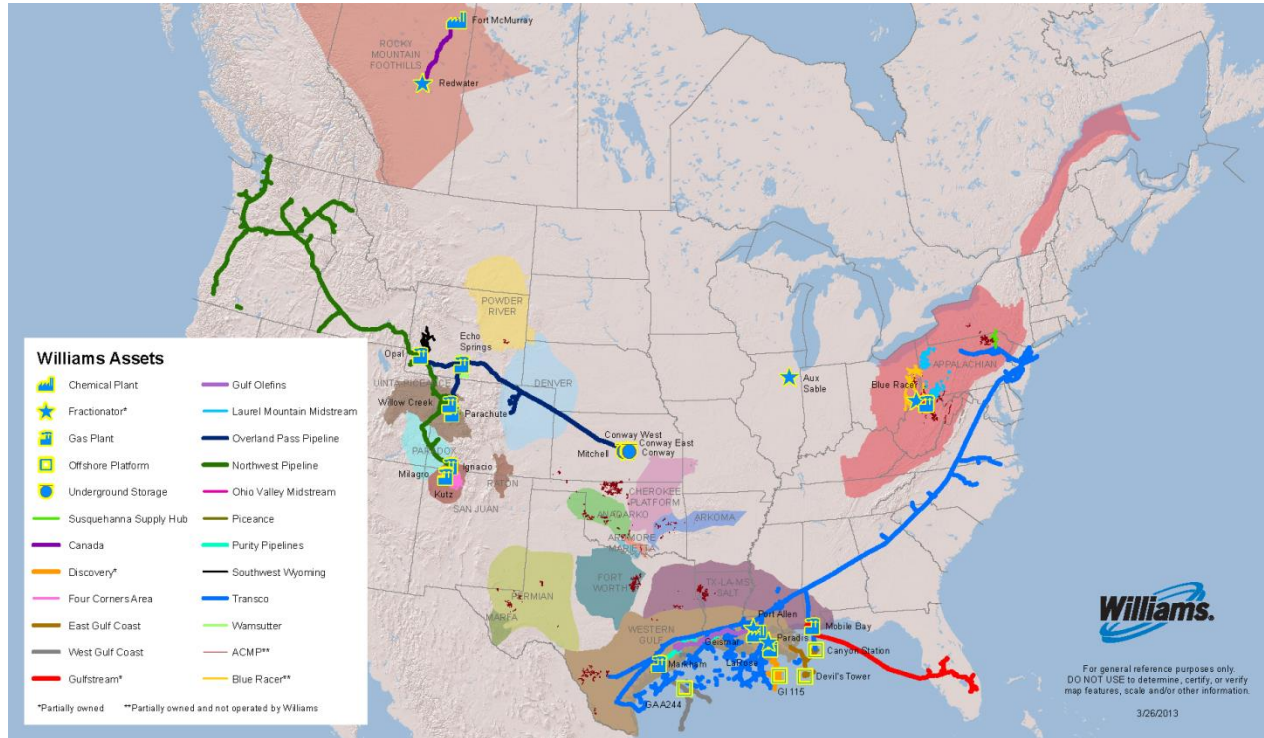
The Solution

- PI AF
- PI Event Frames
- PI OLEDB Enterprise, in conjunction with industry standard reporting systems

The Benefits

- Identify systemic problems that lead to frequent failures
- Correlate system failures with customer impacted volumes
- Reduce downtime
- Improve commercial management
- Track operational improvements in economic terms

About Williams



Natural gas gathering, processing, and transportation company founded in 1908

4,700 Employees

Transport 14% of U.S. natural gas consumption

10,000 miles of oil and gas gathering lines

Gas processing capacity of approximately 6.6 bcf/d

1,400 miles of NGL and olefin transportation pipelines

Downtime Events

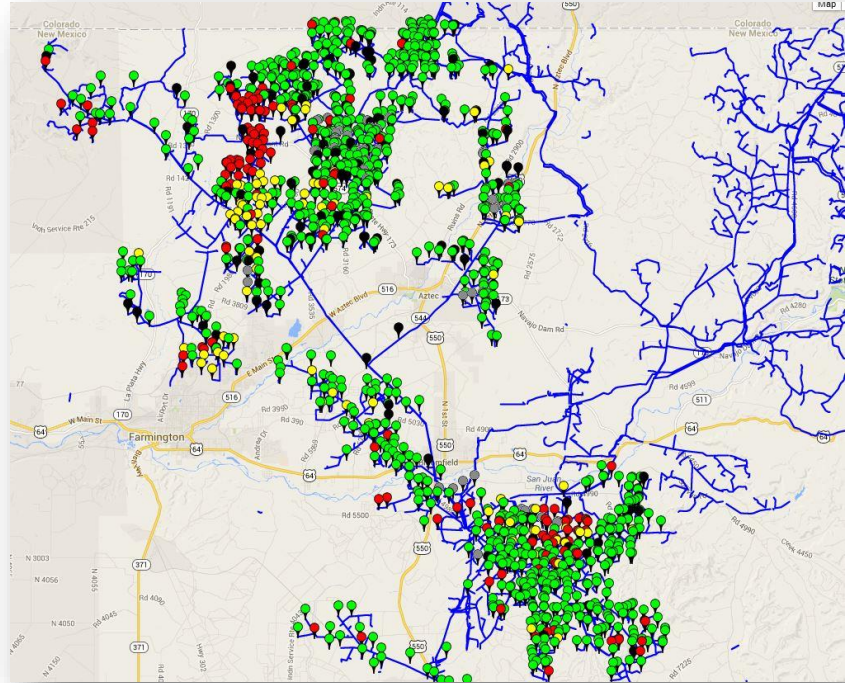
Complex Gathering Systems

all the way back to the wellhead



Complex Analysis Requirements

- *Asset redundancy not an option*
- *Downtime is expensive*
- *Reliability tracking is key*



Real-time Well Status Application powered by PI AF

PI Event Frames

1



PI Event Frames Generator Interface collects the downtime incidents

2



Automated and manual data can be associated with the event. Additional attributes in PI AF allow manual qualitative information to be added later.

3



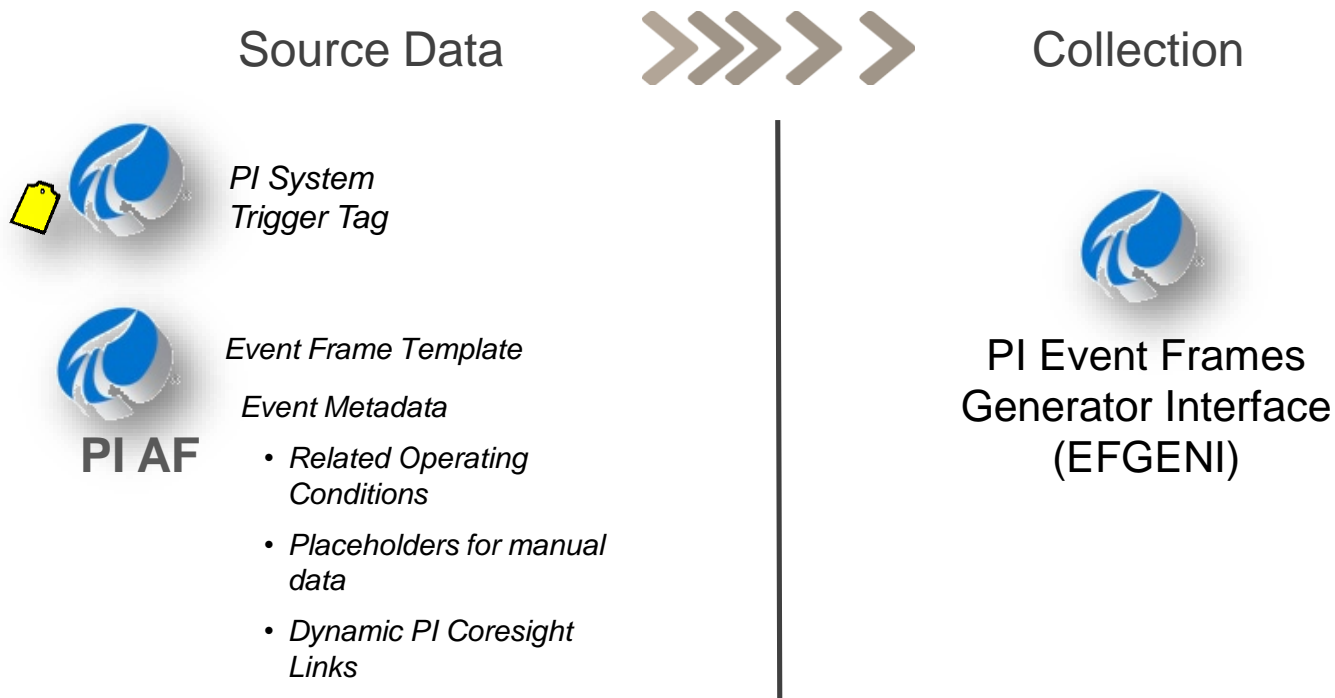
The Tools

PI Event Frames
PI AF SDK
PI OLEDB Enterprise
Microsoft BI

Data analysis using PI OLEDB Enterprise as a data source

- *Excel for analysis and adhoc reporting*
- *MS Powerview for KPIs*
- *MS SSRS for scheduled static reports*

Downtime Data Collection



Downtime Data Editing

- Custom Event Frame editor
 - PI AF View Control component (PI AF SDK)
 - Replaces PI System Explorer
- Why Edit?
 - Combine automated data with manual
 - Delete events that may be the result of instrument or communications failures
 - Add manual events that may not have been captured

Select Equipment ▾
Selected Equipment: ASA Central Teel

Start Time: 10-Dec-2013 11:42:50 AM ▾ End Time: 20-Dec-2013 11:42:50 AM ▾ Minimum Duration 10 minutes ▾ Show Reviewed ▾ Show Unreviewed ▾ Search

Group by ▾ Category ▾ Template ▾

Name	12/10/2013 10:09:00 - [10:01:11:00]	12/20/2013 11:20:00	Start Time	End Time	Scheduled	Duration	Coverage Link	Cause Category	Downtime Code
Teel ENG002			12/10/2013 10:09:00 AM	12/10/2013 4:04:00 PM	No	5:55	http://ems.ato02.coresight.8/Displays/a		
Teel ENG002			12/10/2013 4:12:00 PM	12/11/2013 9:33:00 AM	No	29:21	http://ems.ato02.coresight.8/Displays/a		
Teel ENG001			12/11/2013 7:23:00 AM	12/11/2013 7:55:00 AM	No	0:32	http://ems.ato02.coresight.8/Displays/a		
Teel ENG004			12/11/2013 7:25:00 AM	12/11/2013 4:25:00 AM	No	9:0	http://ems.ato02.coresight.8/Displays/a		
Teel ENG002			12/11/2013 9:34:00 PM	12/11/2013 11:07:00 PM	No	1:33	http://ems.ato02.coresight.8/Displays/a		
Teel ENG004			12/14/2013 3:31:00 PM	12/14/2013 8:26:00 PM	No	4:55	http://ems.ato02.coresight.8/Displays/a		
Teel ENG004			12/14/2013 8:39:00 PM	12/14/2013 9:23:00 PM	No	0:44	http://ems.ato02.coresight.8/Displays/a		
Teel ENG001			12/15/2013 6:31:00 PM	12/15/2013 7:29:00 PM	No	0:58	http://ems.ato02.coresight.8/Displays/a		
Teel ENG002			12/16/2013 8:37:00 PM	12/16/2013 9:18:00 PM	No	0:41	http://ems.ato02.coresight.8/Displays/a		
Teel ENG002			12/17/2013 5:25:00 AM	12/17/2013 1:19:00 AM	No	1:54	http://ems.ato02.coresight.8/Displays/a		
Teel ENG002			12/17/2013 7:31:00 AM	12/17/2013 7:55:00 AM	No	0:24	http://ems.ato02.coresight.8/Displays/a		
Teel ENG002			12/17/2013 7:56:00 AM	12/17/2013 8:22:00 AM	No	0:26	http://ems.ato02.coresight.8/Displays/a		
Teel ENG002			12/17/2013 8:41:00 AM	12/17/2013 1:10:00 PM	No	4:29	http://ems.ato02.coresight.8/Displays/a		
Teel ENG004			12/17/2013 1:32:00 PM	12/17/2013 2:29:00 PM	No	0:57	http://ems.ato02.coresight.8/Displays/a		
Teel ENG002			12/18/2013 9:46:00 AM	12/18/2013 10:08:00 PM	No	0:14	http://ems.ato02.coresight.8/Displays/a		
Teel ENG002			12/18/2013 10:13:00 PM	12/18/2013 11:27:00 PM	No	1:14	http://ems.ato02.coresight.8/Displays/a		
Teel ENG001			12/19/2013 9:22:00 AM	12/19/2013 11:25:00 PM	No	14:3	http://ems.ato02.coresight.8/Displays/a		
Teel ENG002			12/19/2013 9:24:00 AM	12/20/2013 12:01:00 AM	No	14:37	http://ems.ato02.coresight.8/Displays/a		
Teel ENG004			12/19/2013 9:25:00 AM	12/19/2013 11:48:00 PM	No	14:24	http://ems.ato02.coresight.8/Displays/a		
Teel ENG002			12/20/2013 12:16:00 AM	12/20/2013 6:58:00 AM	No	6:42	http://ems.ato02.coresight.8/Displays/a		
Teel ENG004			12/20/2013 5:50:00 AM	12/20/2013 10:09:00 AM	No	4:19	http://ems.ato02.coresight.8/Displays/a		
Teel ENG002			12/20/2013 7:07:00 AM	12/20/2013 11:20:00 AM	No	4:13	http://ems.ato02.coresight.8/Displays/a		

Downtime Analysis and Reporting



- Use standardized reporting tools
- Scalable
- Common metrics across enterprise
- Merge data into other asset systems



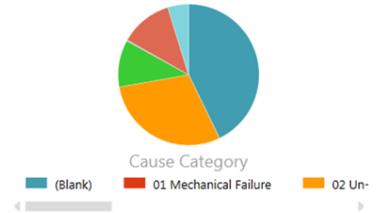
RMC Downtime Statistics

Area

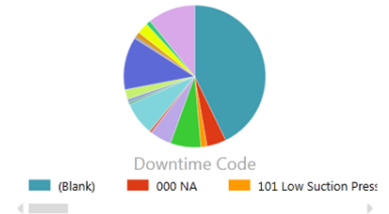
- Vici District
- Meeker
- Ramona

Name	Duration (Hours)
Bigtown Unit 3	129.4
Ft. Sims	81.3
Dinsmore 12	118.1
Creekmore	17.0
Cragg CG-22	0.8
Smith Station	3.6
Berengraff CD-0031	6.7
Camargo	39.7
Tyler City	92.4
Leedey	173.0

Duration (Hours) by Cause Category



Duration (Hours) by Downtime Code



Benefits

- Reduction in manual data gathering and reporting processes
- Improved accuracy and consistency
- Technology helping to drive standardization and formalization of the way we characterize downtime events
- Early identification of systemic reliability issues



Automated Downtime Tracking

Improving System Performance through Enhanced Asset Management

“Automating the downtime events gives our operators and technical staff more time to analyze the events versus spending their time collecting and inputting data.”

Mark Nealis

Williams Companies

A screenshot of the Automated Downtime Tracking software interface. The interface shows a list of events with columns for Name, Start Time, End Time, Scheduled, Duration, and a link to the event details. The events are listed in a table format, with each row representing a specific downtime event. The table includes a 'Name' column, a 'Start Time' column, an 'End Time' column, a 'Scheduled' column, a 'Duration' column, and a 'Link' column. The events are listed in chronological order, with the most recent event at the top. The interface also includes a search bar and a filter dropdown menu.

Business Challenge

- A large number of field assets operating under complex conditions
- Diverse operating units with no common systems for tracking and classifying downtime events
- Extensive manual data analysis and reporting mechanisms

Solution

- PI Event Frames for automatically recording downtime events
- A light client tool using components from the PI System Explorer library for supplementing automated events with qualitative data in the field
- Integrated use of Microsoft BI for reporting

Results and Benefits

- Pilot program being deployed in Northeast Operating Area
- Ability to better analyze and identify common causes of downtime incidents
- Better communication with customers regarding their volumes

Rod Howard

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Asset Performance and Benchmarking
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