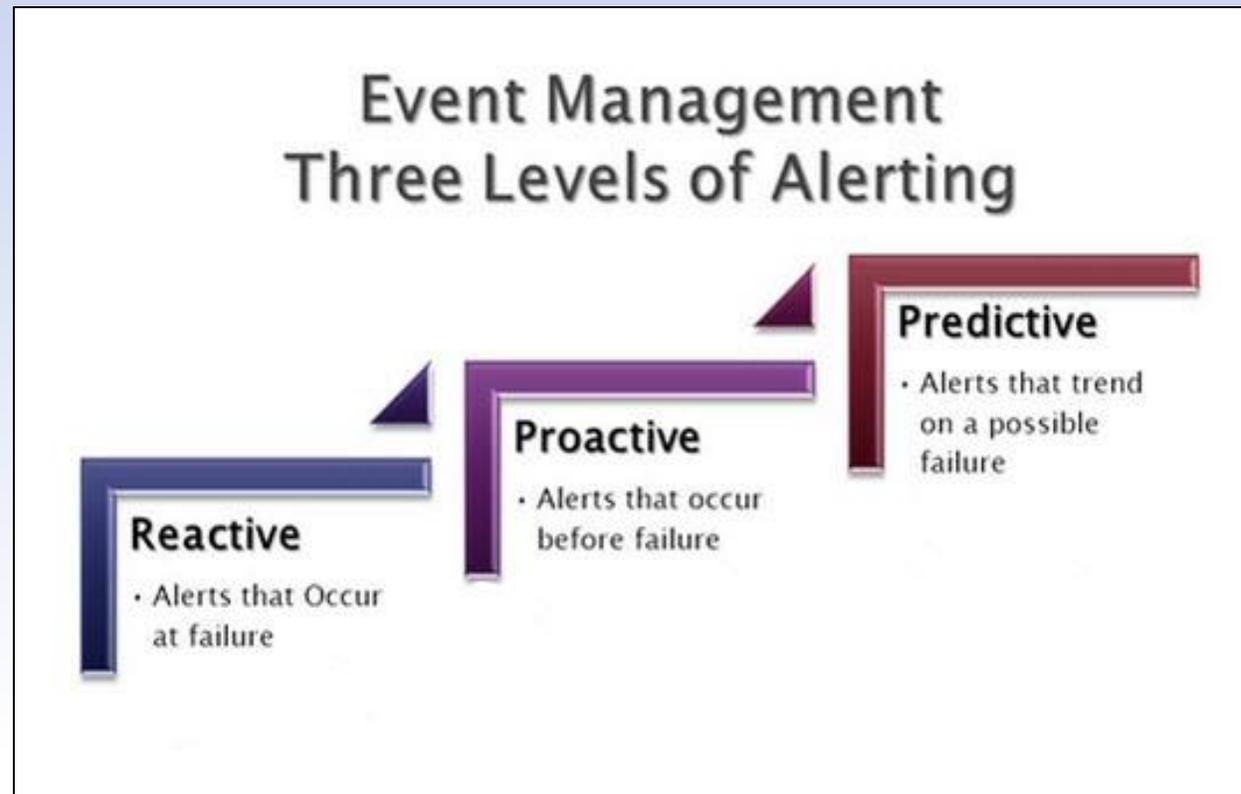


Automation of Proactive Risk Management in Facilities with Waste Streams, Water Treatment, and Analytical Laboratories



Agenda – Automation of Proactive Risk Management

- Effects of discharge exceedance, pollution leaks, and pollution disasters
 - Life & Health
 - Environmental Violations – Monetary
 - Impact of Negative PR and Company Reputation
- Key elements to avert negative public relations and crisis management
- Automation themes to shift from crisis mode to proactive mode
- Automation solution model to minimize risk, problems, and disasters
- Key automated notification alerts
- Quality control with analytical results
- Building early notification control centers - one step at a time
- Conclusion

Effects of Discharge Exceedance, Pollution Leaks, and Pollution Disasters – Links to Life and Health

Before



After



On December 22, 1.1 billion gallons of coal ash sludge smothered 300 acres in East Tennessee.

Effects of Discharge Exceedance, Pollution Leaks, and Pollution Disasters – Environmental Violation Fines – Monetary (> 86 Billion in Fines since 2000)

Top 10 Companies for Environmental Violation Fines since 2000:

	Company Category	Total Penalty \$	Number of Violations
1)	Oil and Gas Company	26 Billion	125
2)	Motor Vehicle Company	19 Billion	6
3)	Oil and Gas Company	5.1 Billion	64
4)	Energy Generation	4.6 Billion	20
5)	Energy Generation	1.6 Billion	37
6)	Oil Field Services	1.4 Billion	3
7)	Oil and Gas Company	1.3 Billion	215
8)	Energy Generation	1.2 Billion	65
9)	Energy Generation	1.1 Billion	25
10)	Energy Generation	1.0 Billion	263

Impact of negative PR on the company, investors, and employees

Negative News Effect

General

Loss of Trust
 Litigation Target
 Brand
 Brand Awareness
 Brand Association



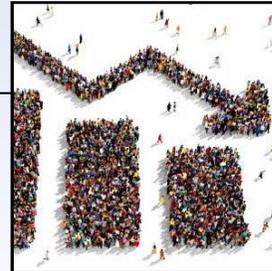
Financial

< Net Sales
 < Cash
 < Cash Flow
 < Profitability
 > Debt



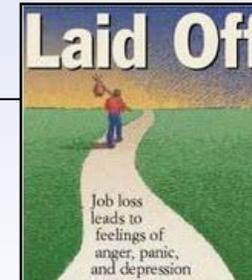
Investor

< Existing Investment
 < Future Investment
 < Cash on Hand
 < Capital



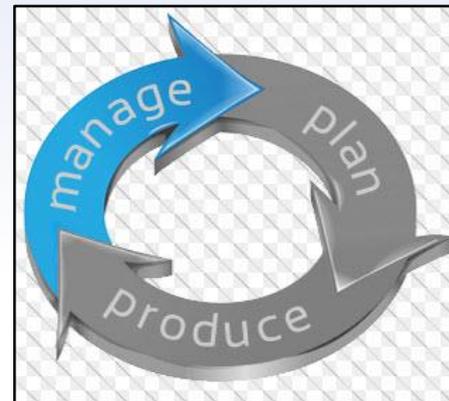
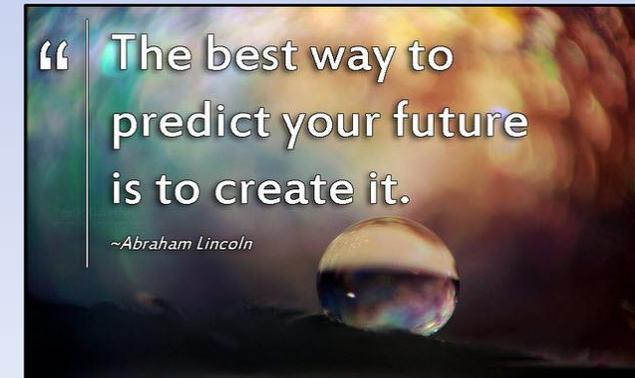
Employees

Loss of Employment
 < Retirement Fund
 Loss of Career



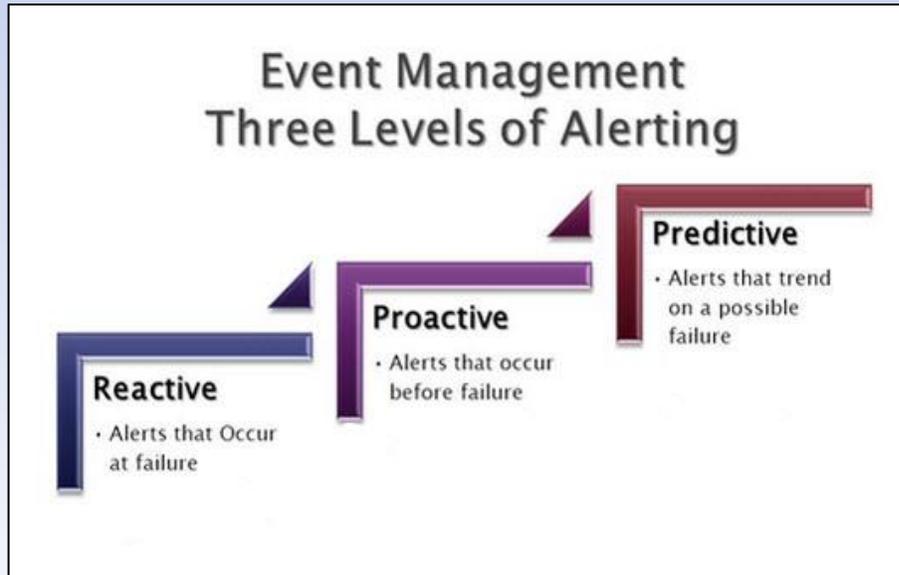
Key elements to avert negative public relations and crisis management

- Anticipation and Proactive Management
- Effective use of information to analyze, understand, and plan
- Systematically monitor, reinforce, and verify effective program execution
- Prevent upset conditions from becoming catastrophic events

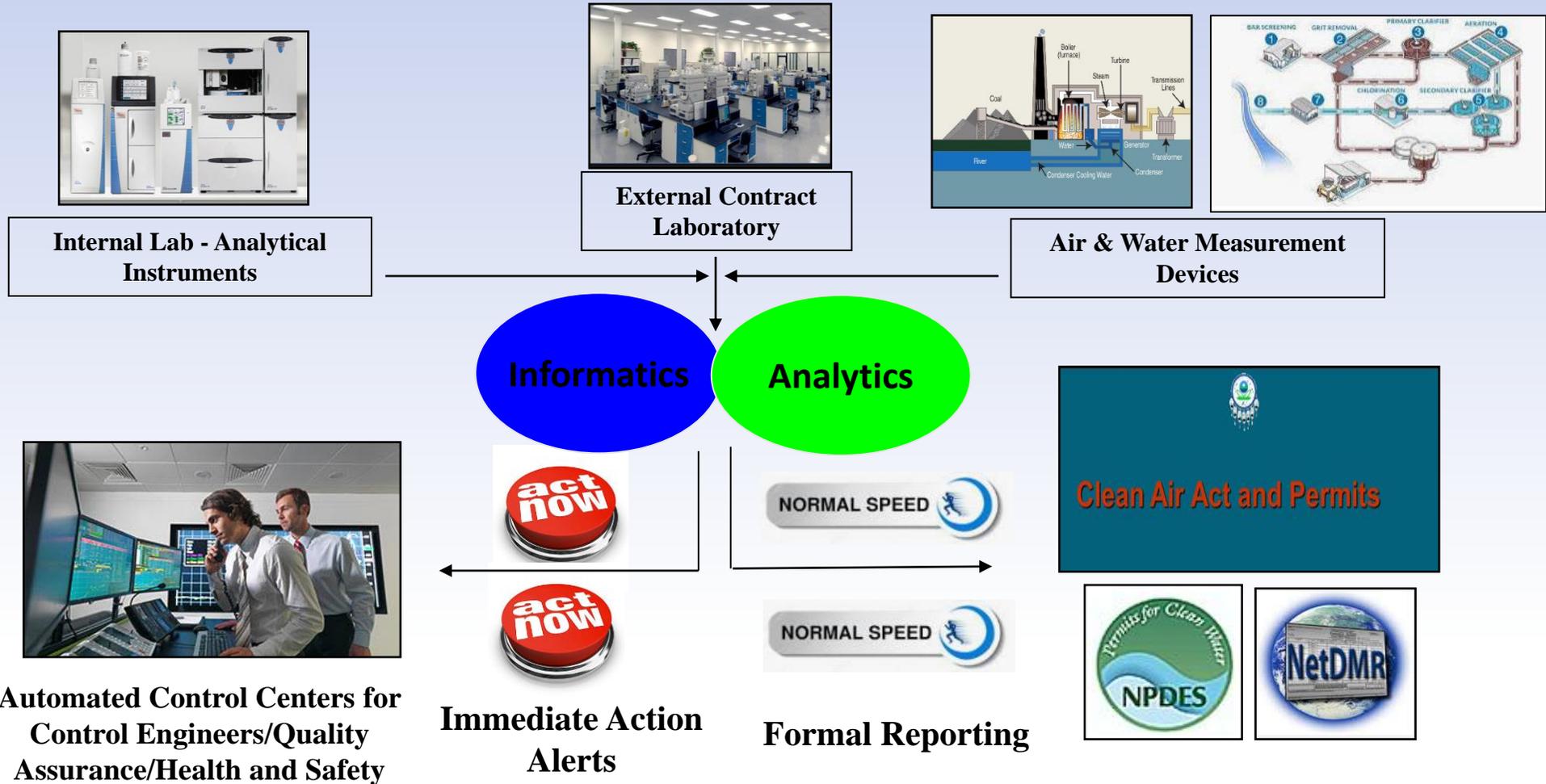


Automation themes to shift from crisis mode to proactive mode

- Knowledge and speed to knowledge
- Ability to anticipate
- An automated notification system
- An automated execution plan if called into action
- Use of data to analyze, understand, and plan for improvement
- Make it easy so it becomes part of the culture



Automation solution model to minimize risk, problems, and disasters *Combination of Edge Computing (like autonomous vehicles) and the Industrial Internet of Things*



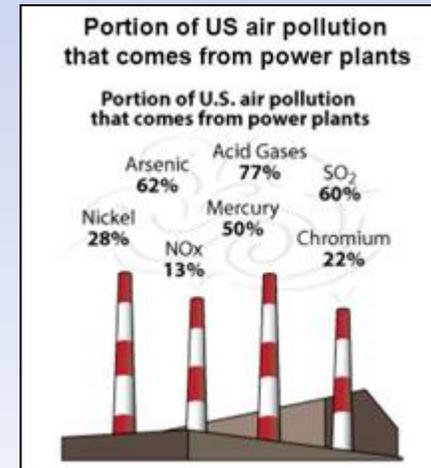
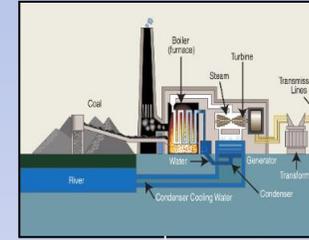
Key Automated Notification Alerts

- Permit Limit Exceedance
- Site Anomalies
- Regulatory Limit Exceedance
- QC/QA Issues
- Other internal study alerts
(dynamic)



Building Early Notification Control Centers - One Step at a Time

- Pick a critical device, instrument, or analysis to automate
- Determine alerts
- Determine quality control
- Put in real time
- Transfer results to air and water Permits
- Becomes template for next critical device, instrument, or analysis to automate



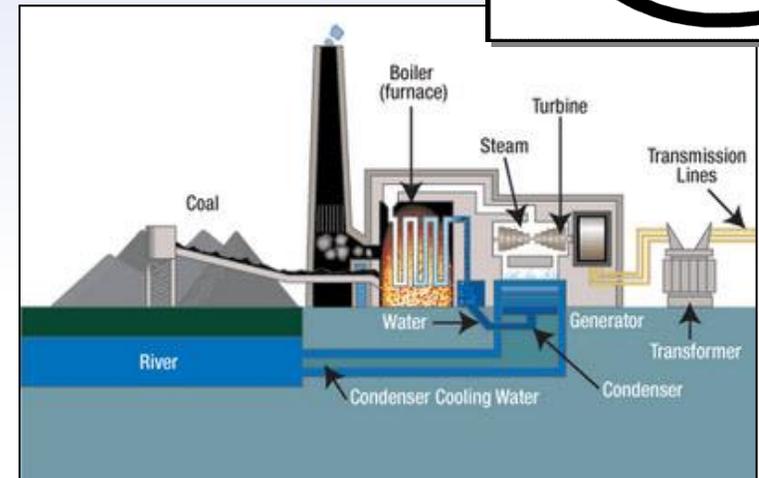
Pick one measurement, device, or instrument to automate



Conclusion

Analytical Result Automation for Proactive Risk Management is essential for:

- Averting catastrophic environmental events
- Averting crisis management
- Being great stewards of the environment and reinforcing the company's great reputation and brand



Thank you!

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