GRAY MATTER SYSTEMS

You Don't Know What You Don't Know

Using Analytics to Improve Maintenance/Operations

Mark Meisel – Director of Water/Wastewater Solutions

Partner
Intelligent Platforms

We solve complex data and control problems

- We increase throughput or quality for manufacturers
- We increase production and reduce costs for oil and gas producers
- We aid in compliance and better usage of assets in water and wastewater authorities

We Do Some of the Most Important Work Imaginable

We play a big part in making sure people in major cities all across North America have safe water to drink.

5 out of 6 major municipalities in Ohio trust Gray Matter Systems.

Planet Earth

Let's Challenge Assumptions!!

24,901.55 Miles

Planet Earth

How much longer will the string be?

Planet Earth

Approx

A. 12 Miles
B. 4 Inches
C. 6 Feet
D. 24,000 Feet

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Planet Earth

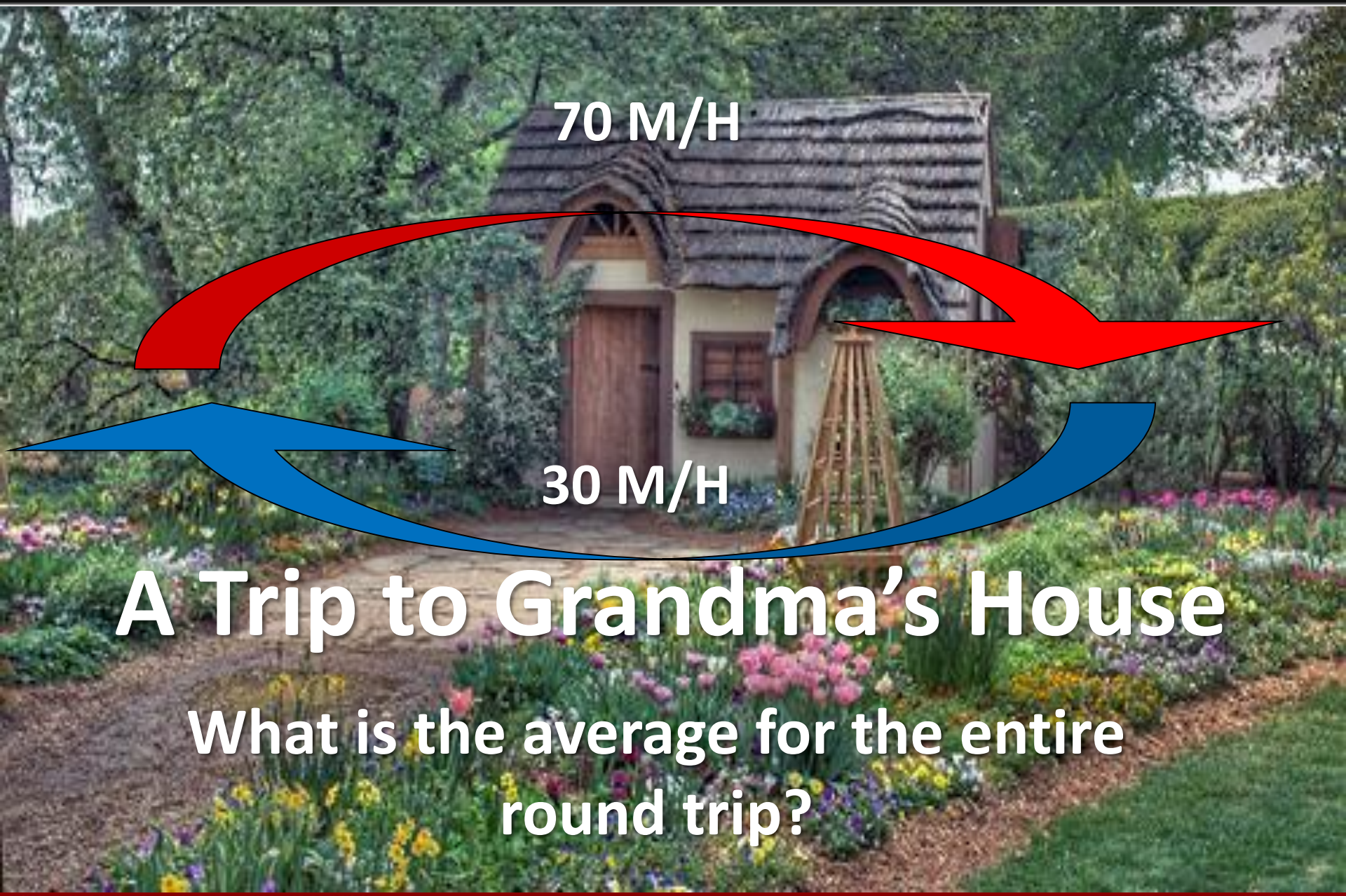
Approx.

A. 12 Miles
B. 4 Inches
C. 6 Feet
D. 24,000 Feet

The Math

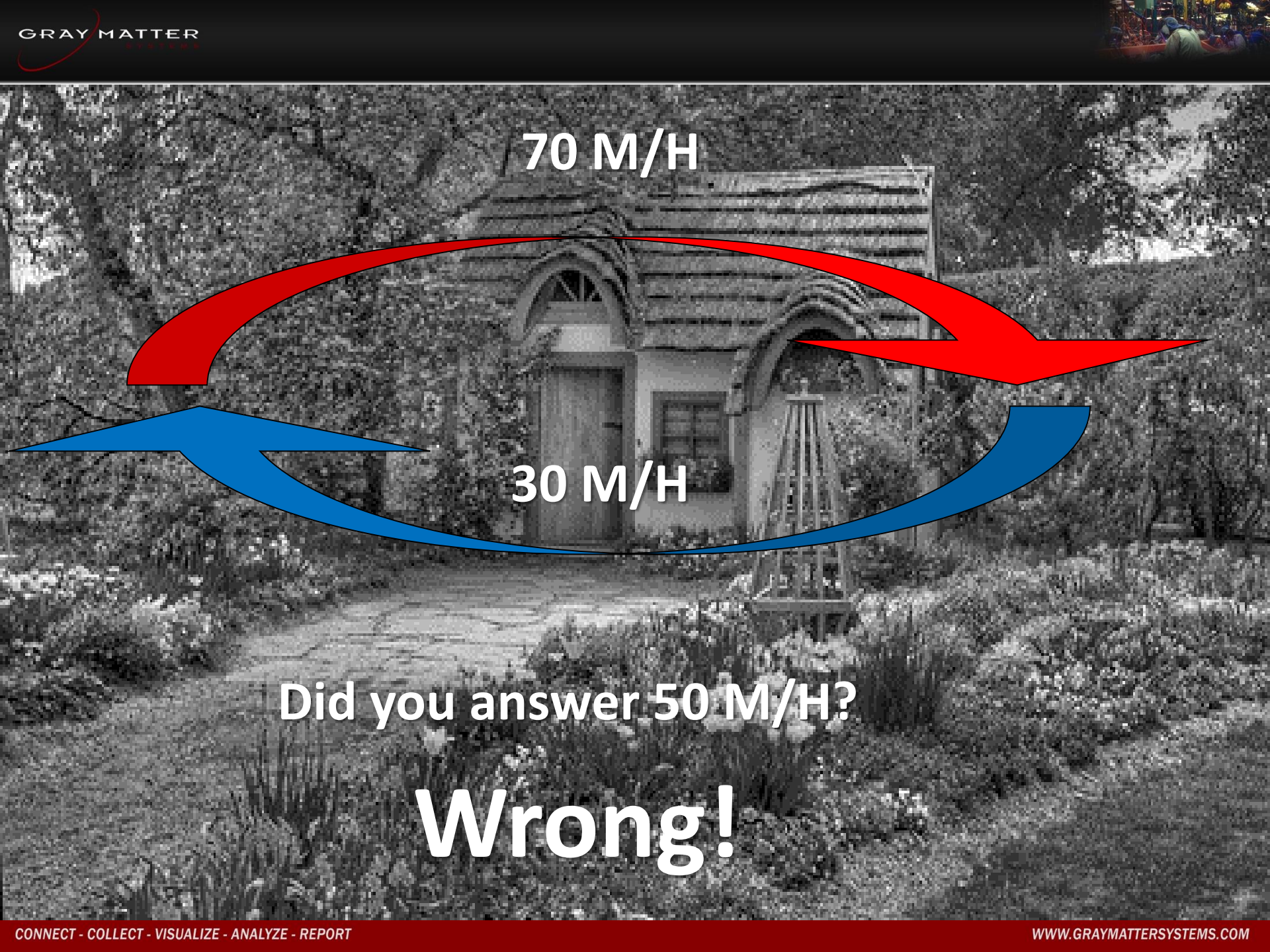
$$C=2\pi R$$

How much longer will the string be?



A Trip to Grandma's House

What is the average for the entire round trip?



Did you answer 50 M/H?

Wrong!

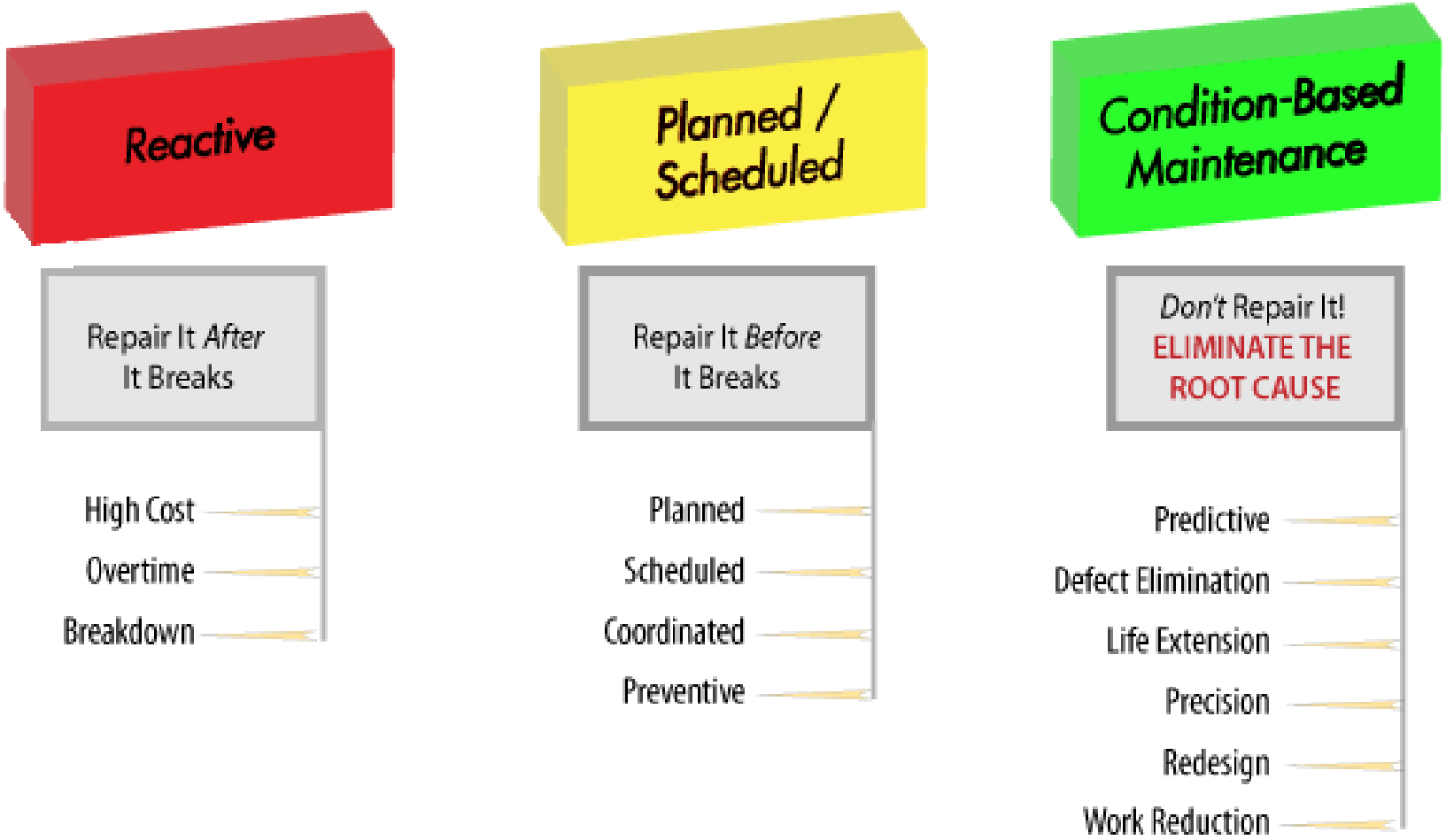
10 Hours to Go 420 Miles

A 42 M/H Average!

CONNECT - COLLECT - VISUALIZE - ANALYZE - REPORT
WWW.GRAYMATTERSYSTEMS.COM

LET'S MAKE
A DEAL

What Is Your Maintenance Regimen?



Condition Based Monitoring/Maintenance – A Simple (but useful) Example

Are alternations occurring in a duplex pump?

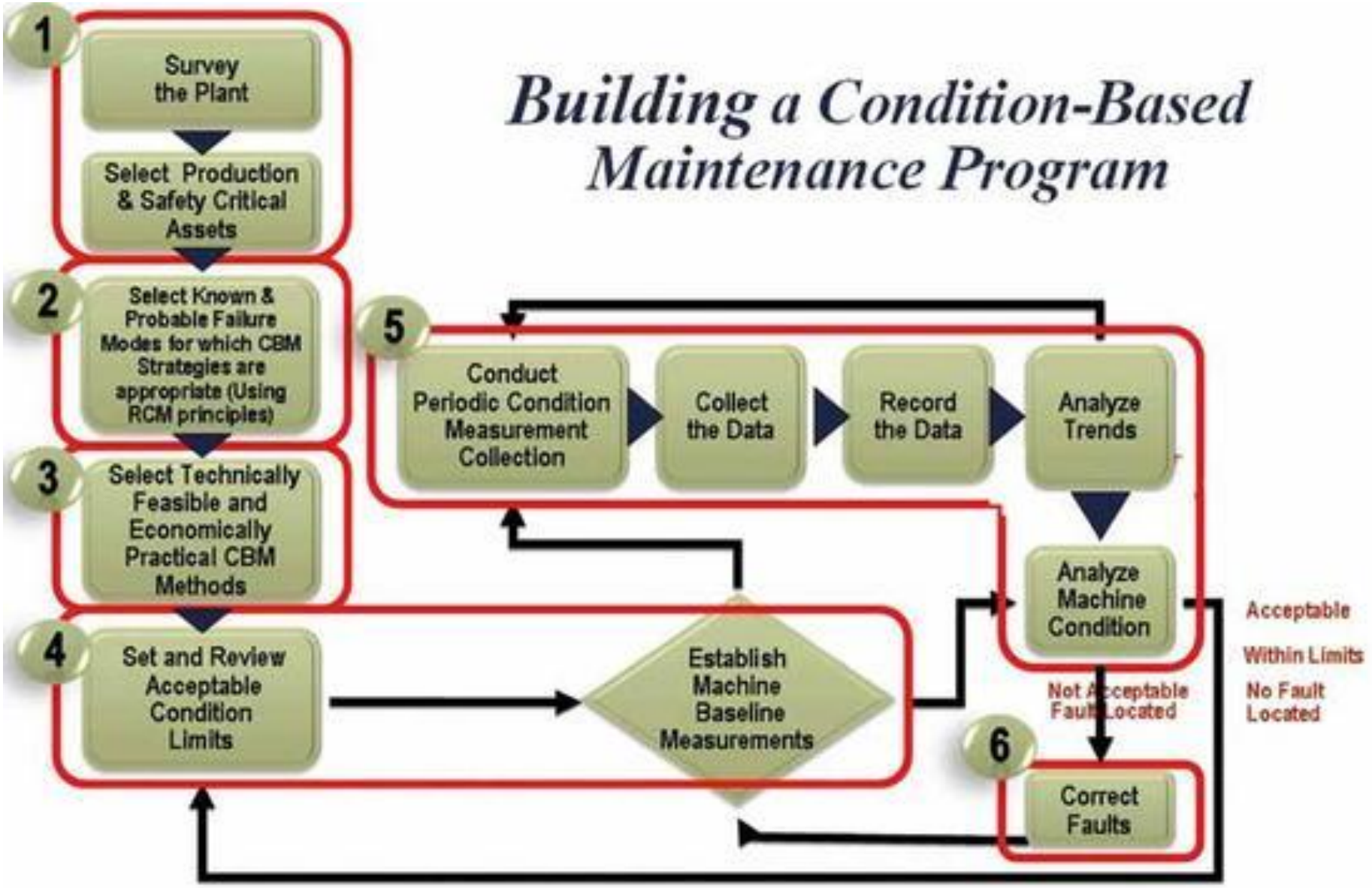
1. Monitor Running Signal via SCADA and historize
2. Use CBM Tool to determine if alternations are occurring
3. When not occurring take action
4. Have CBM Tool send email or text to notify maintenance
5. Use CBM to interact with CMMS to issue workorder

Condition Based Monitoring/Maintenance – Another Simple (but useful) Example

Does My Pump Need Maintenance?

1. Monitor Flow vs. Motor Current via SCADA and historize
2. Use CBM Tool to determine if pump is performing correctly
3. When Flow is Decreasing, but Motor Current is increasing…
4. Have CBM Tool send email or text to notify maintenance
5. Use CBM to interact with CMMS to issue workorder

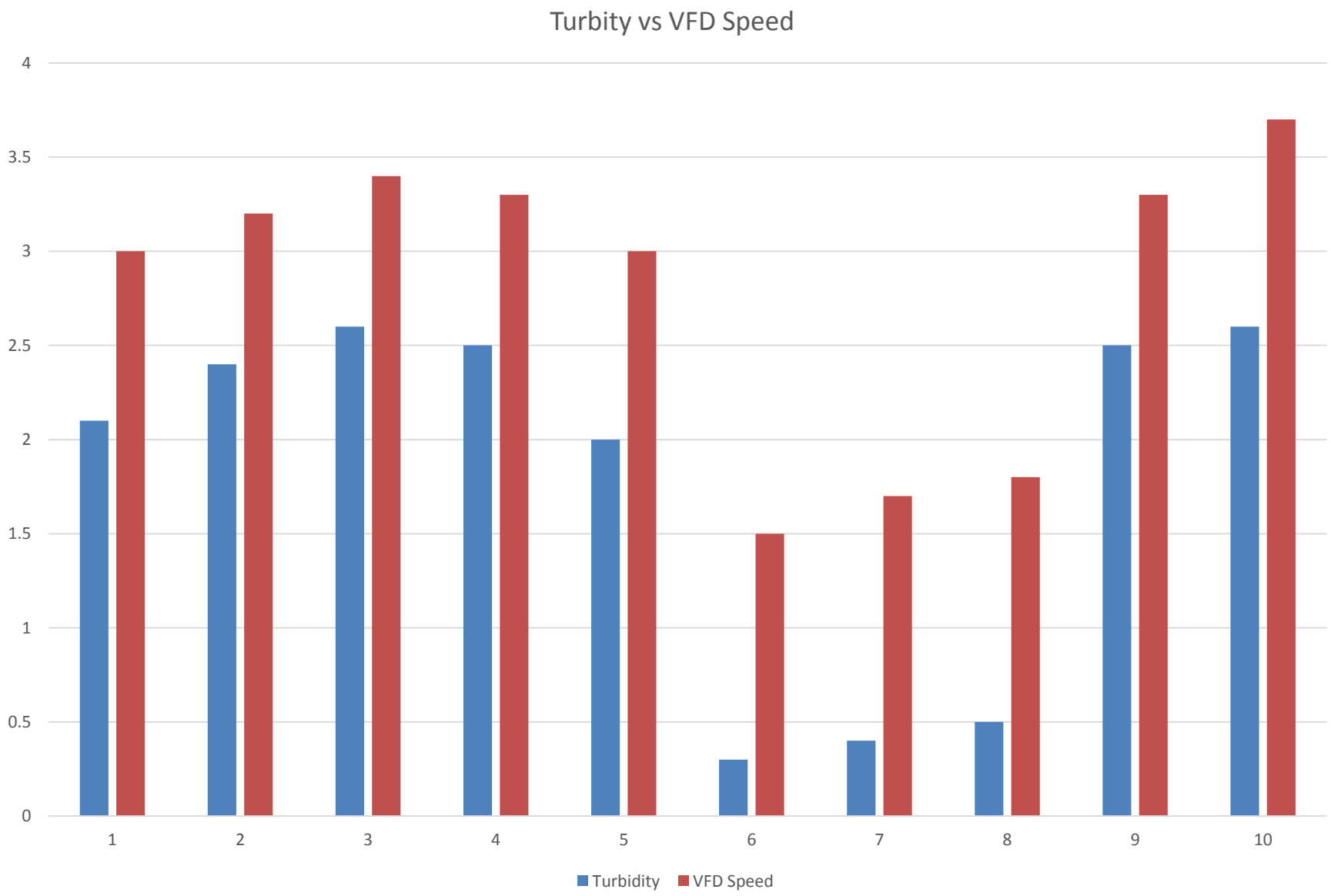
Building a Condition-Based Maintenance Program



Rapid Process Troubleshooting

WTP Filter Gallery

- 26 Filters
- Intake from Lake – VFD Controlled Pump
- Common Manifold (Header)
- Intermittent Extreme High Turbidity On Only One Filter
- Hired Divers to inspect – expensive – problem not found
- Replaced media – expensive – problem not solved
- Problem Existed for Two Years
- Turned to Data Analysis to troubleshoot
- Problem Identified in 15 Minutes
- Found Relationship Between Turbidity and VFD Speed
- Pipe Section From Manifold To Filter Was Scaly/Rusty (resonance)
- Interim Solution – Reprogram VFD to not run at “bad” speed range
- Ultimate Solution – Replace Pipe Section at planned Filter Rehab
- Final Step – Normal up VFD program


Turbity vs VFD Speed
4
3.5
3
2.5
2
1.5
1
0.5
0
1
2
3
4
5
6
7
8
9
10
Turbidity
VFD Speed

- The Stanley Kubrick Film 2001: A Space Odyssey - 1968
- HAL9000 Computer predicted failure of the AE35 unit - < 24 Hours
- HAL lied, but that's the premise of the next story 2010
- Computer Driven Predictive Analysis Was not possible in 1968
- Moon Shot used less computing power than a smart phone
- This is possible/practical in 2016
- Can be used to predict failures before they occur
- Can be used to set operational parameters based on history and real time factors

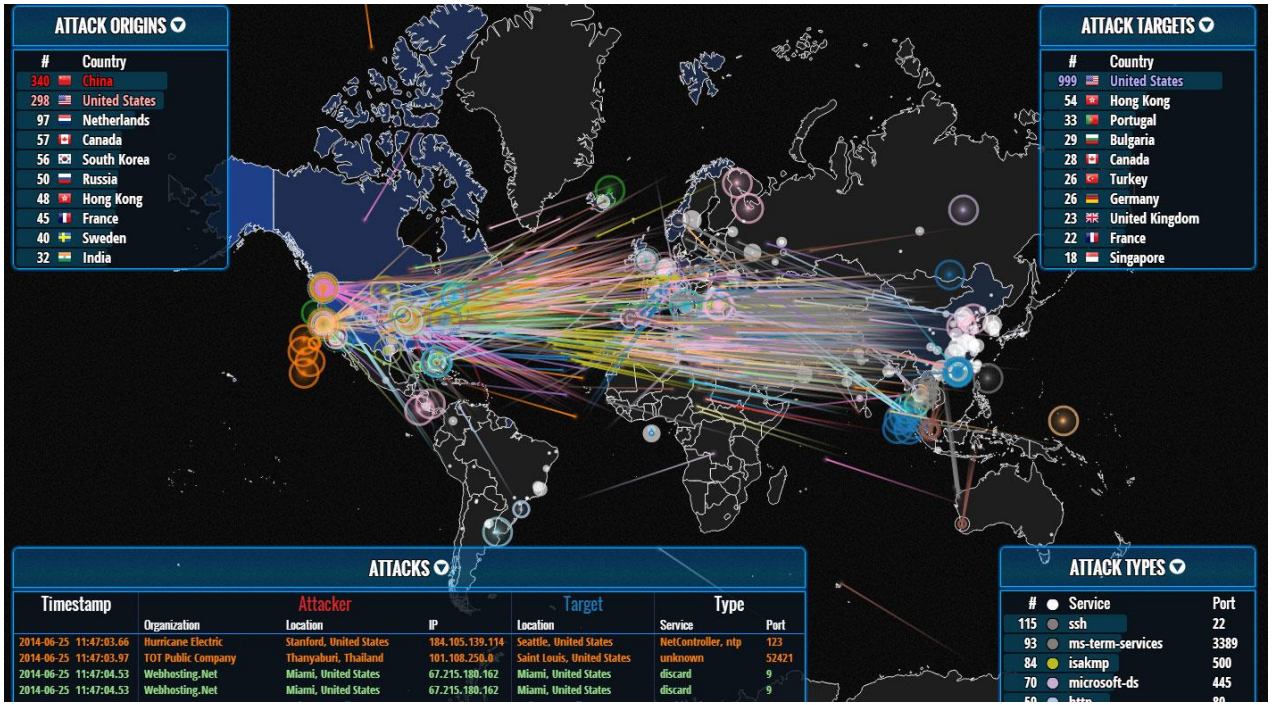
METROPOLITAN SEWER DISTRICT of greater CINCINNATI

THE CITY OF COLUMBUS
ANDREW J. GINTHER, MAYOR

Predictive Analysis

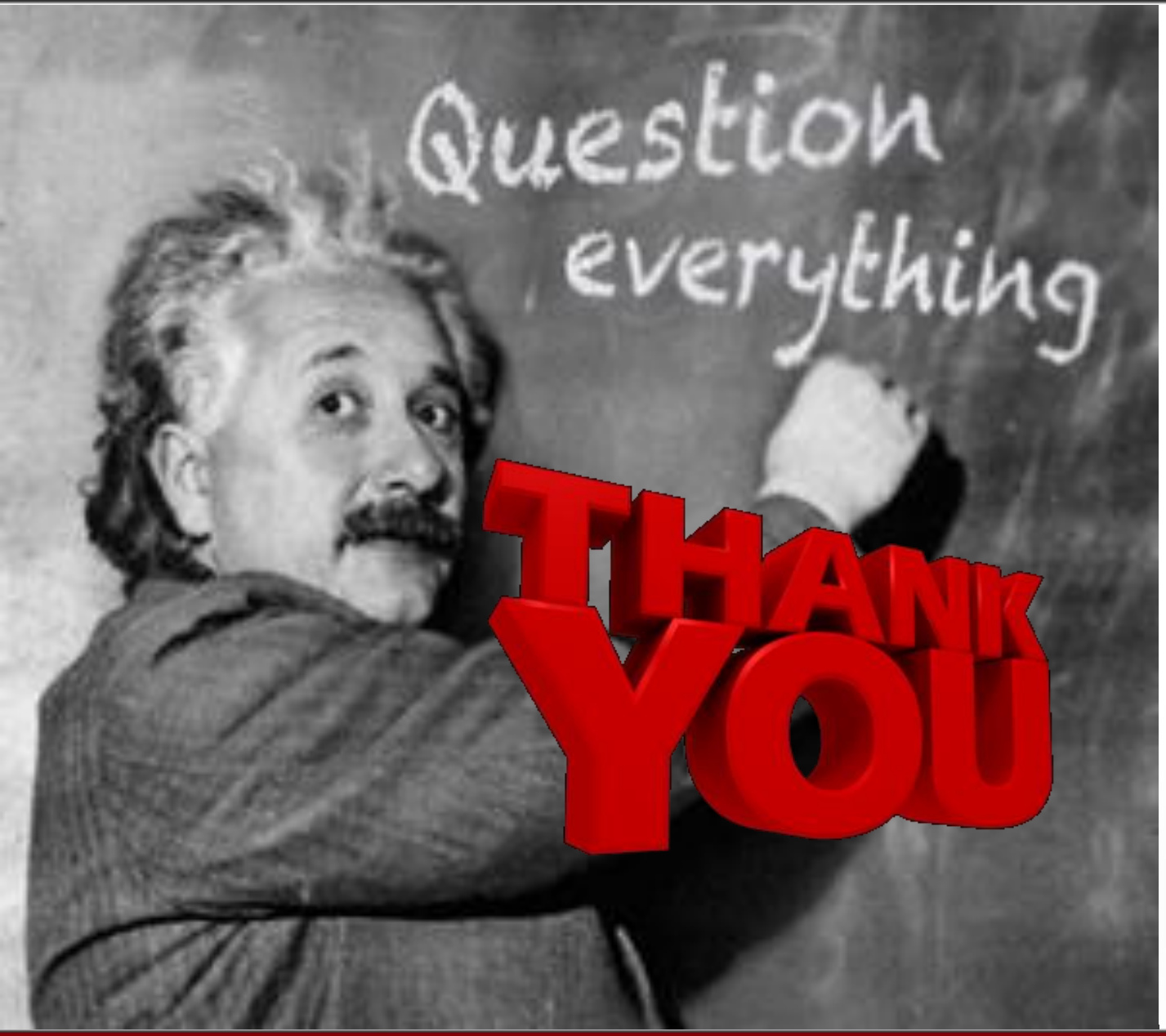
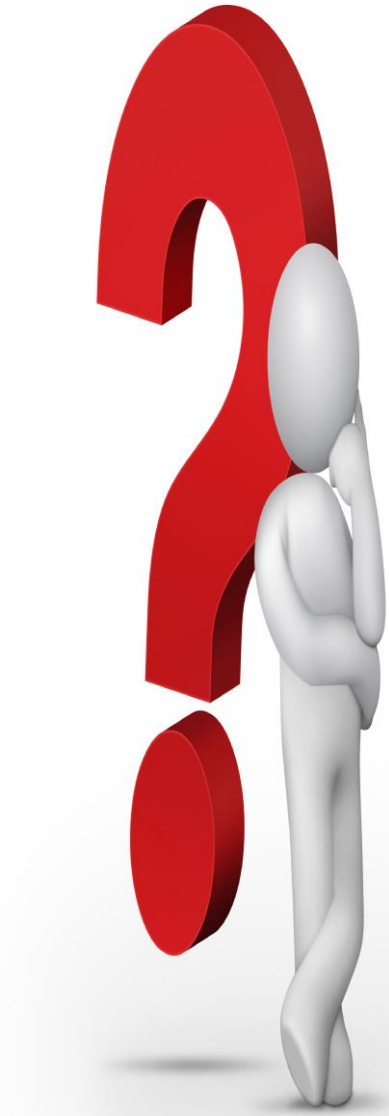
We Do Some of the Most Important Work Imaginable

We protect businesses, corporations, oil fields, and utilities from cyber attack.



We Do Some of the Most Important Work Imaginable

We work some of the largest utilities and manufacturers in the world. We make sure the food at your local grocery store is safe to eat, water is safe to drink and your car is safe to drive.


Question
everything
THANK
YOU