

# Water Quality

IMPROVING PERFORMANCE & MAINTAINING  
COMPLIANCE THRU FILTER MAINTENANCE AND ASSET  
MANAGEMENT

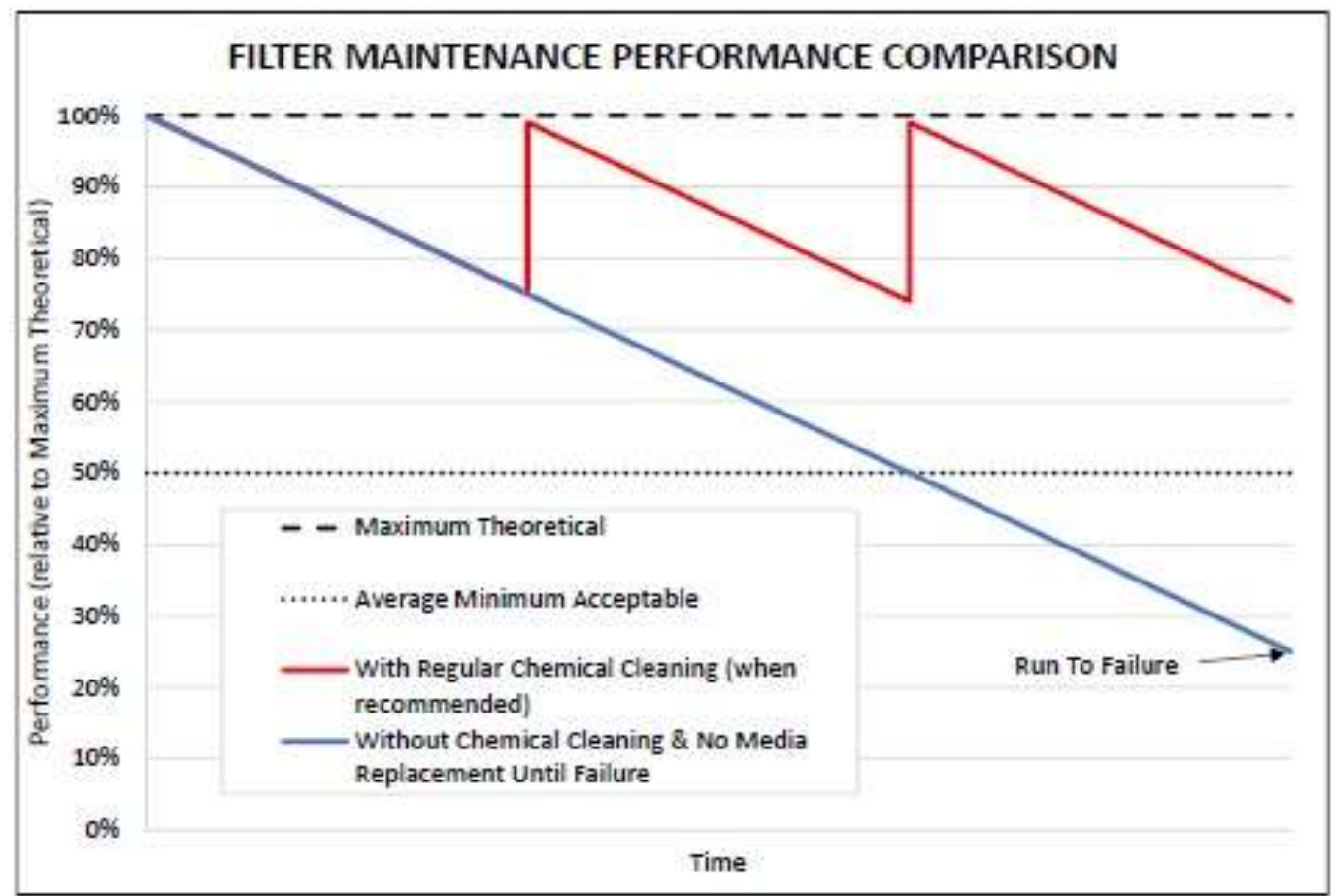
Chadd Matthewson – Product Manager



# Typical Gravity Filter



# Avoid "Run to Failure"



# Fouling & System Problems

## **FOULING DEPOSITS**

Organic or Inorganic

Bed Expansion, Channeling, Low Run Time, Poor WQ, etc.

## **SYSTEM PROBLEMS**

Temporary or Permanent

Turbidity < .3, Craters, Mounds, Blowouts, Headloss, MCL  
Exceedances, etc.



# Would You...

▶ Let your personal vehicle run to failure?



▶ Keep the same air filter in your home for a year or more?



▶ Let an insect and/or rodent problem go unchecked?



▶ Not prepare yourself for winter/summer months?



▶ Let your body run to failure?



# Then Why Would You...



- ▶ Let your water plant run to failure?
- ▶ Potable Water Plants and Water Plant Operators are among the most important aspects of American society!!!
- ▶ Responsible for supplying your customers (i.e. families, businesses) clean drinking water consistently.
- ▶ It can be thank-less, but it's your duty!







Utility Service Group

abc30 KFSN-TV FRESNO, CA

Local 30 City of Dos Palos works to fix water filtration system Friday, September 20, 2013

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**LATEST NEWS**

**MAWC Could Face Fine After Boil Water Advisory Last Month**

Kym Gable reporting  
November 22, 2013 5:51 PM

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WESTMORELAND COUNTY (KDKA) – The break in a filtration system was just the start of the problems for the Municipal Authority of Westmoreland County last month.

What followed was a four-day boil advisory due to the potential for contamination. It affected 50,000 households.

And now, the DEP says when the authority notified customers, it didn't include some important information.

Filed Under



(Photo Credit: KDKA)





# Regulations 101

- ▶ The list is numerous and growing...
  - Primary and Secondary Drinking Water Standards
    - Turbidity
    - Inorganics (Arsenic, Iron, Nitrate, etc.)
    - Organics (Coliform, Cryptosporidium, Dioxin, etc.)
    - Exotic and emerging contaminants
  - IE&LT2SWTR
    - Lower turbidity standards
    - Remove microbial contamination
    - Stricter monitoring and reporting
  - Stage 2 DBPR
  - And more





# What USG Offers in Filter Maint.

- ▶ Potable, industrial & wastewater sectors
- ▶ Goal of restoring your granular filter system to either at or near original design specifications
- ▶ Specific services:
  - Filter Media Sampling & Detailed Laboratory Analysis
  - Filter System Condition Assessment
  - Filter Rehabilitation through Chemical Cleaning,
  - Media Replacement, Underdrain Repair
  - Concrete Repair with epoxy coatings
  - Equipment install and rebuild
  - Maintenance Program to keep everything in top shape

# Filter Maintenance

## ▶ Media Analysis

- Multiple advanced *organic & inorganic tests*
  - Biomass, particulates, metals & mineral deposits
  - CaCO<sub>3</sub>, Iron and Mn fouling
- *Bench-scale chemical cleaning*
- Microscopic *pictures* document physical condition
- *Sieve analysis* to measure ES & UC of each unique media for comparison to your design specifications

## ▶ Lab Report with Customized Recommendations

- To clean
- or replace







# Example Lab Analysis Results

## Chemical Analysis of Material Removed:

| ANALYSIS                     | PERCENT BY WEIGHT |            |
|------------------------------|-------------------|------------|
|                              | Sand              | Anthracite |
| Carbonate compounds          | 35.1              | 42.1       |
| Iron oxide                   | 0.2               | 0.3        |
| Phosphate compounds          | < 0.1             | < 0.1      |
| Silica                       | < 0.1             | < 0.1      |
| Manganese dioxide            | < 0.1             | < 0.1      |
| Sulfate                      | < 0.1             | < 0.1      |
| Aluminum hydroxide           | < 0.1             | < 0.1      |
| Insoluble particulate matter | 1.6               | 1.1        |
| Moisture content             | 34.1              | 34.5       |
| Organic biomass              | 29.0              | 22.0       |
| Total                        | 100%              | 100%       |

## Biological Analysis:

|                                 | Sand     | Anthracite |
|---------------------------------|----------|------------|
| Plate Count (colonies/ml)       | 3        | 1          |
| Fe / Mn Oxidizing Bacteria      | Negative | Negative   |
| Sulfate Reducing Bacteria       | Negative | Negative   |
| Anaerobic Growth                | <10%     | <10%       |
| Pre Cleaning ATP (cells per ml) | 185,000  | 148,000    |

# Filter Maintenance

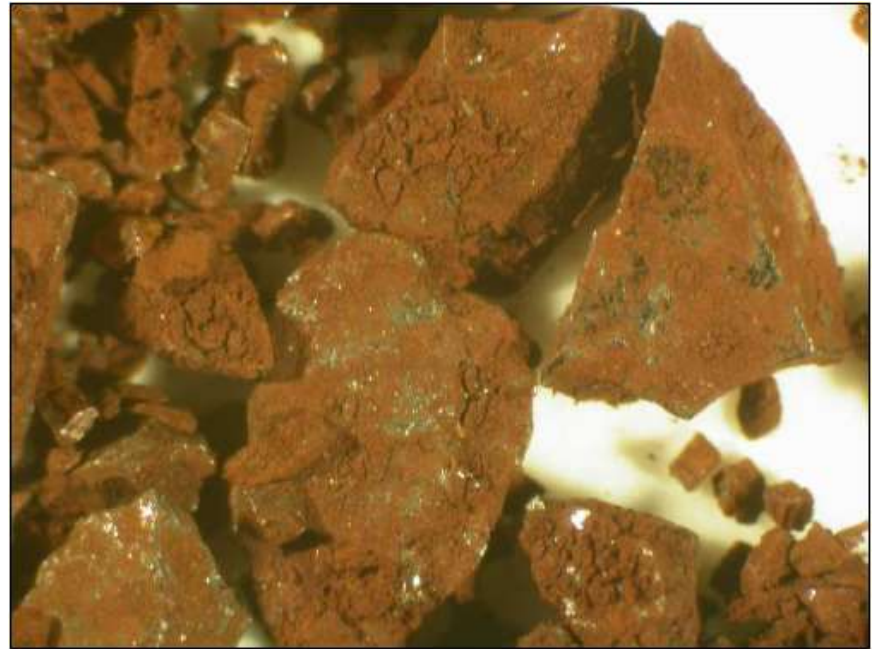
## ▶ Chemical Cleaning

- **Custom-blend** for each filter sampled
- Only **NSF-approved** products
- Chemical **injection & agitation** followed by backwashing (multiple applications if needed)
- **BW monitoring** (pH & turbidity)
- **BW neutralization** before disposal **if required**
- Check up with staff after filters back in service

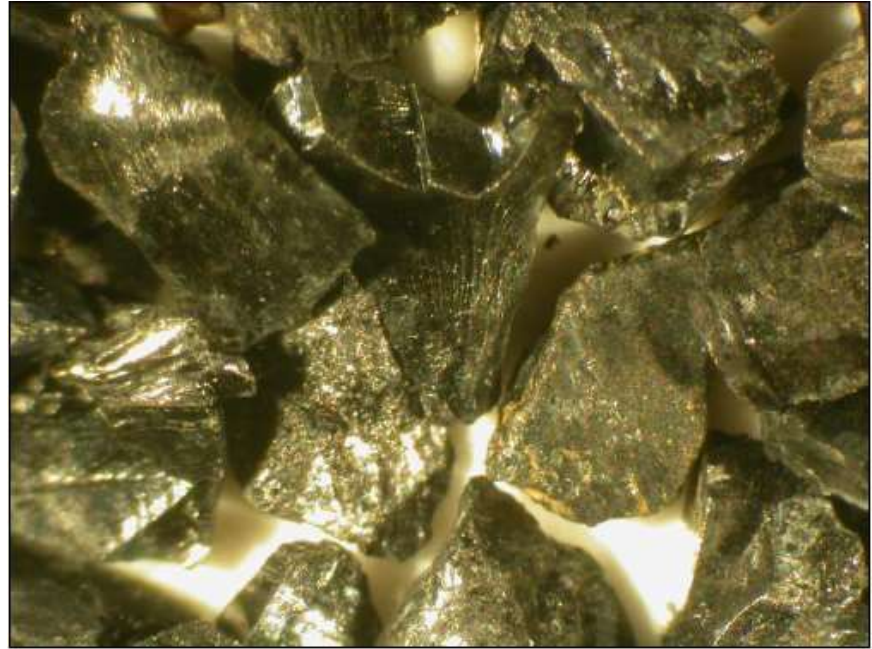


# Example Cleaning Results

Before



After



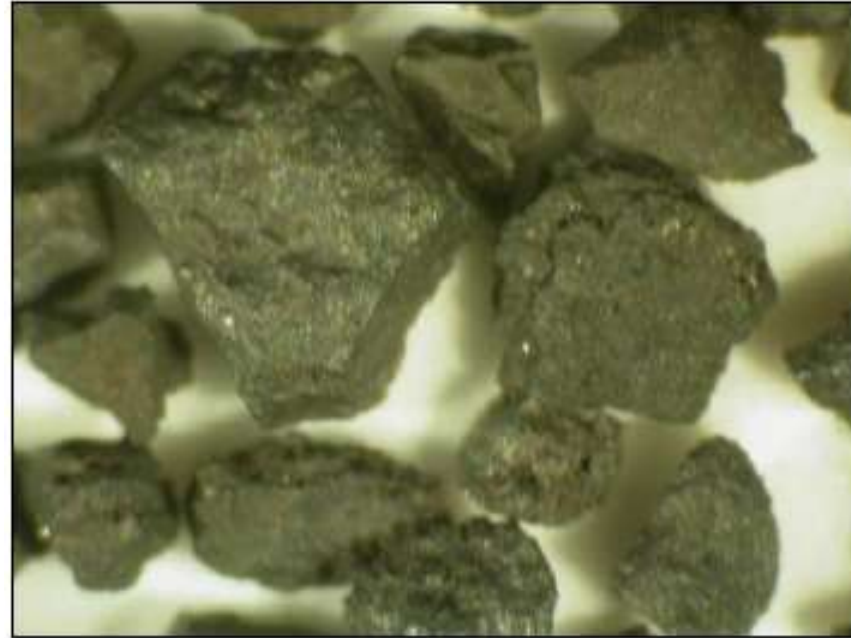


# Example Cleaning Results

Before



After



# Example Cleaning Results

Before



After



# Example Cleaning Results

Before



After







# Filter Media Replacement

- ▶ New media and materials **match plant specifications**
- ▶ Only **NSF-approved** products by AWWA guidelines
- ▶ **Turnkey service**
  - Remove and dispose old media & gravel
  - Full underdrain cleaning and inspection
  - Wall inspection and repair and/or repaint surfaces
  - Underdrain repairs and replacement
  - Filter System upgrades (e.g. media, equip.)
    - Engineering & permitting as needed
  - Order & install new media & gravel
  - Bring online & assist with disinfection and Bac-T samples



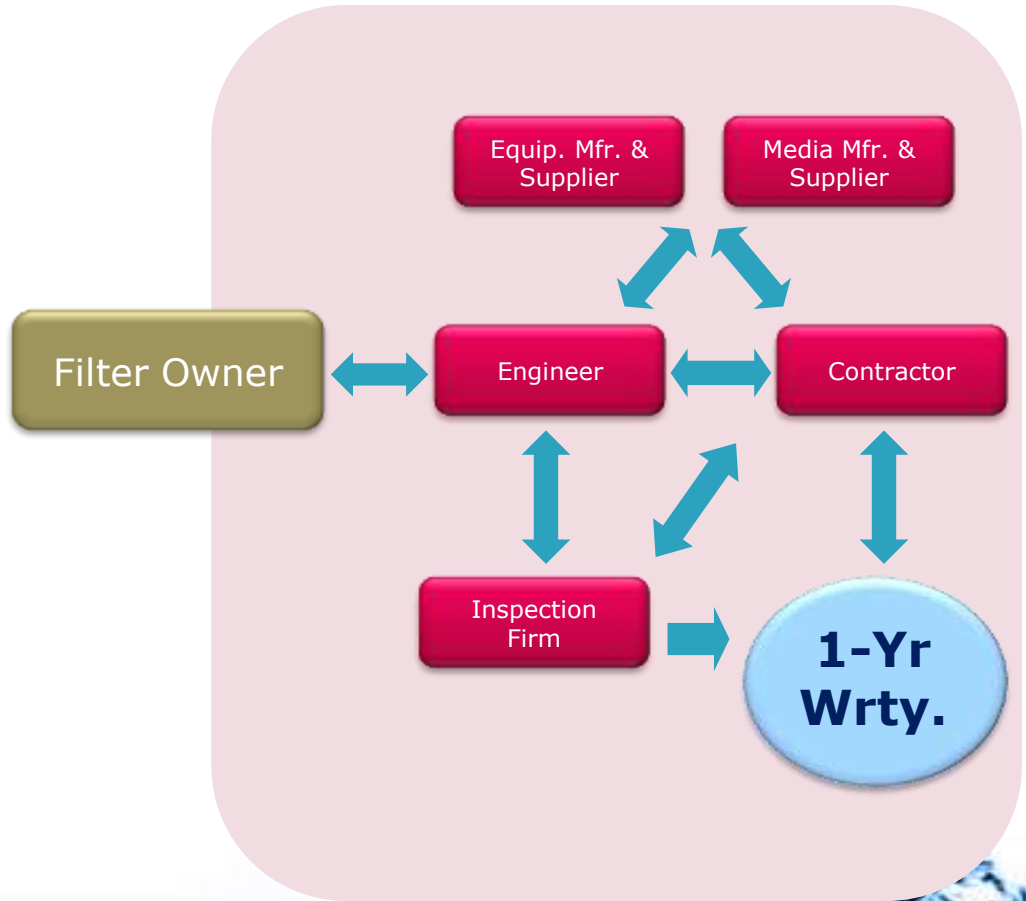
# Filter Maintenance Program (MP)

- ▶ Initial Condition Assessment of your granular filtration system
- ▶ Schedule filter rehab and maintenance work over the chosen MP period
- ▶ Annual Condition Assessments throughout MP
- ▶ Asset Management tool spreads and predicts cost

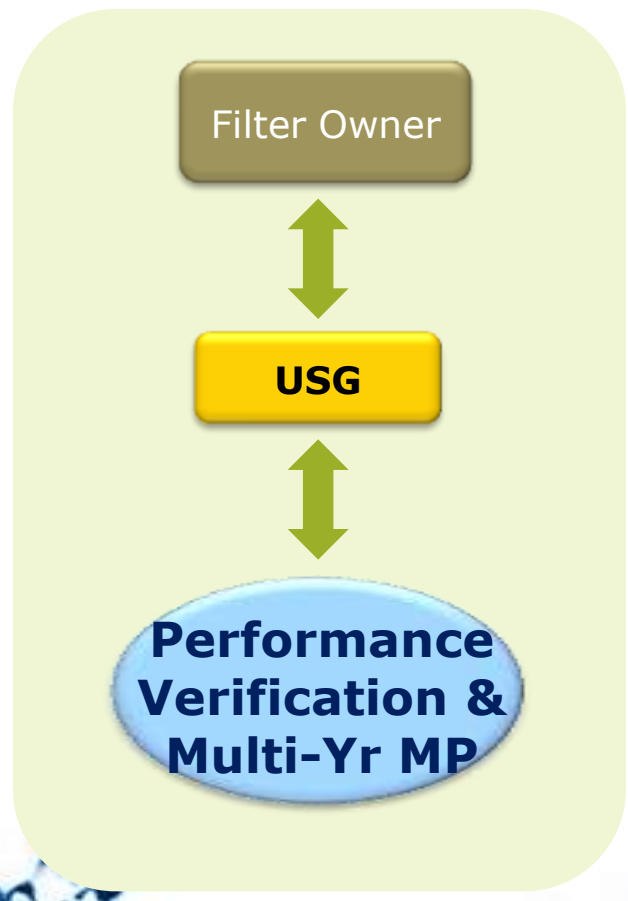


# USG Business Model

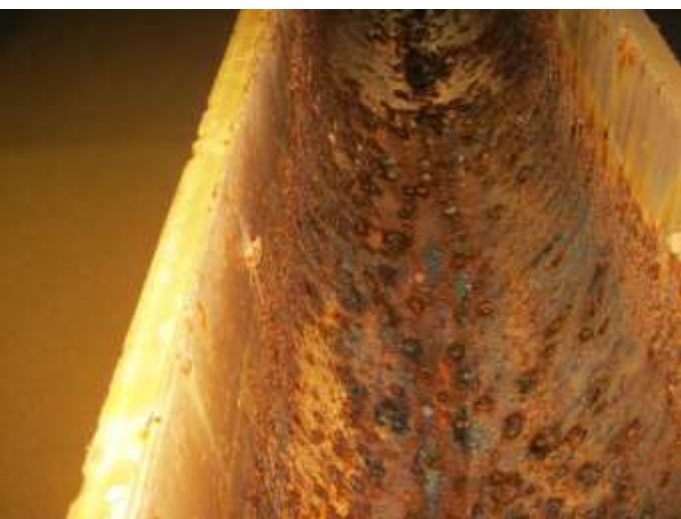
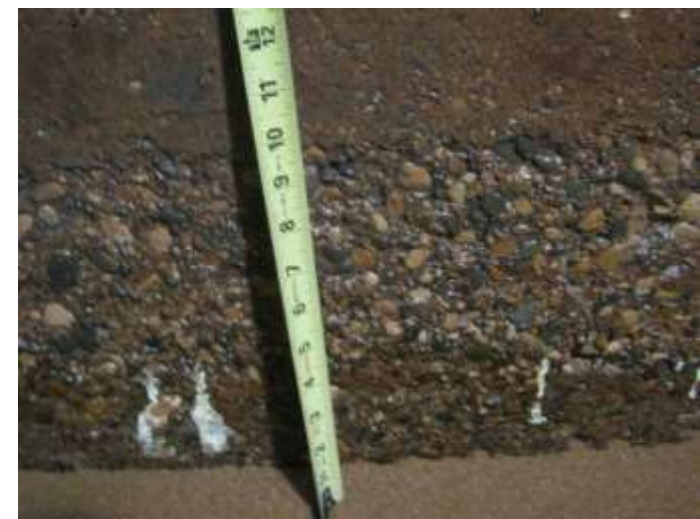
### Traditional Business Model



### USG Business Model

















# Heavy Mud Accumulation on Interior Wall (downward view)





# Example of Concrete Wall Corrosion in Need of Repair







| Component                 | Percent of Total Mass |
|---------------------------|-----------------------|
| Organic biomass, moisture | 21.5                  |
| Insoluble material        | 66.7                  |
| Dissolvable mass          | 11.8                  |
| Total                     | 100 %                 |

| Component           | Percent by Weight of Dissolvable Mass |
|---------------------|---------------------------------------|
| Calcium carbonate   | <0.1                                  |
| Iron oxide          | 97.9                                  |
| Manganese dioxide   | <0.1                                  |
| Sulfate             | 0.4                                   |
| Silica              | 1.3                                   |
| Phosphate compounds | 0.4                                   |
| Total               | 100.0%                                |

|                                 |          |
|---------------------------------|----------|
| Plate Count (colonies/ml)       | 33       |
| Fe / Mn Oxidizing Bacteria      | Negative |
| Sulfate Reducing Bacteria       | <10%     |
| Anaerobic Growth                | Negative |
| Pre Cleaning ATP (cells per ml) | 228,000  |

YOUR WATER TREATMENT PLANT  
FILTER CONDITION ASSESMENT  
SUMMARY REPORT  
2014



Table of Contents

|    |  |    |
|----|--|----|
| A. | Purpose .....                                  | 1  |
| B. | Executive Summary .....                        | 1  |
| C. | Condition Assessment Activities .....          | 3  |
| D. | Condition Assessment Findings .....            | 3  |
|    | 1. Filter 1 .....                              | 3  |
|    | 2. Filter 2 .....                              | 6  |
|    | 3. Filter 3 .....                              | 8  |
|    | 4. Filter 4 .....                              | 9  |
|    | 5. Filter 5 .....                              | 10 |
|    | 6. Filter 6 .....                              | 11 |
|    | 7. Filter 11 .....                             | 13 |
|    | 8. Filter 12 .....                             | 14 |
|    | 9. Filter 13 .....                             | 18 |
|    | 10. Filter 14 .....                            | 19 |
|    | 11. Filter 15 .....                            | 22 |
|    | 12. Filter 16 .....                            | 26 |
| E. | Condition Assessment Conclusions .....         | 27 |
| F. | Rehabilitation Recommendations .....           | 28 |
| G. | Proposed Scope of Work .....                   | 30 |
| H. | Appendix 1 – Condition Assessment Report ..... | 32 |

# All Reports are not created Equal!

NON-USG REPORT

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|                                       |    |
|---------------------------------------|----|
| <b>Table of Contents</b>              |    |
| Executive Summary .....               | 3  |
| The Science of Filtration Media ..... | 4  |
| Testing Methodology.....              | 5  |
| Sample Preparation: .....             | 5  |
| Pre-treatment Inspection: .....       | 5  |
| Chemical Treatment: .....             | 5  |
| Data Analysis: .....                  | 5  |
| Filter Information .....              | 6  |
| Summary of Filter Information .....   | 6  |
| Results and Observations .....        | 7  |
| Chemical Treatment: .....             | 7  |
| Dry Weight Loss: .....                | 8  |
| Media Image Analysis .....            | 9  |
| Summary and Conclusion .....          | 11 |
| Appendix 1 - Original SIS.....        | 12 |

NO SIEVE ANALYSIS / INFO. ▼

NO BIOLOGICAL ANALYSIS DONE ▼



## USG Filter Maintenance Program – Differentiator

- ▶ Single Source Responsibility
- ▶ Predictable Budgeting
- ▶ Spread Rehabilitation Costs
- ▶ Unique Approach and Technology
  - Customized blend of chemicals
  - Media upgrades to target specific contaminants
- ▶ More Effective Solution based upon condition assessment
  - More detailed media analysis compared to competitors
  - Not always just a remove and replace approach



# Media Removal/Underdrain Inspection





# Blast/Coat Phase





# Pipe Gallery/Heating



# Floor Tile/HVAC





# Steam Heater Replacement





# Coating Finish



## USG Filter Maintenance Program – Benefits

- ▶ Restores and Improve Filter Performance
- ▶ Extend Filter Asset Life
- ▶ Responsible Asset Management through Condition Assessments
- ▶ Customized rehab to owners needs/wants/desires
- ▶ MP spreads filter rehabilitation costs
- ▶ Provides predictable fiscal budgeting
- ▶ Single Source Responsibility = USG

