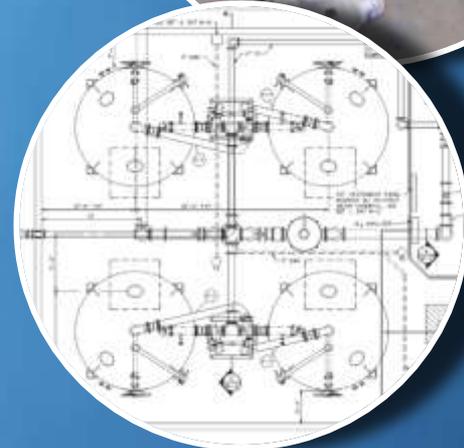


Cleaning Up Someone Else's Mess: Well Head Treatment of PCE

Presented by:
Bill Carr, Roger Greaves, PE
and Shawn Kohtz, P.E.

April 30, 2015



Overview

**Background
and Treatment
Process
Selection**

Construction

**O&M
Considerations**

Summary

Acknowledgements

- United Water Idaho
– Dan Brown, P.E.



- Confluence Engineering Group, LLC



Overview

**Background
and Treatment
Process
Selection**

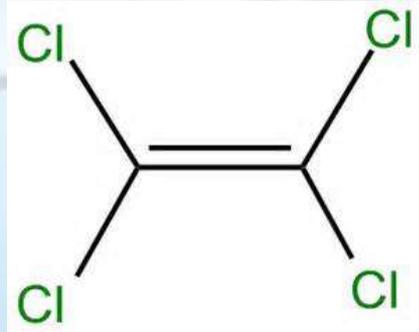
Construction

O&M
Considerations

Summary

Background

- Contaminated Potable Water Supply at Existing United Water Idaho Fisk Well
 - Well Contaminated with tetrachloroethylene (PCE)



- Well Capacity 2,000 gpm



Raw Water PCE Data

Raw Water Sample (ug/L)	Sample Date
4.6	7/9/10
6.1	9/2/10
6.6	9/2/10
6.1	9/14/10
7.0	9/14/10
7.3	9/21/10
7.8	9/21/10
7.9	9/21/10

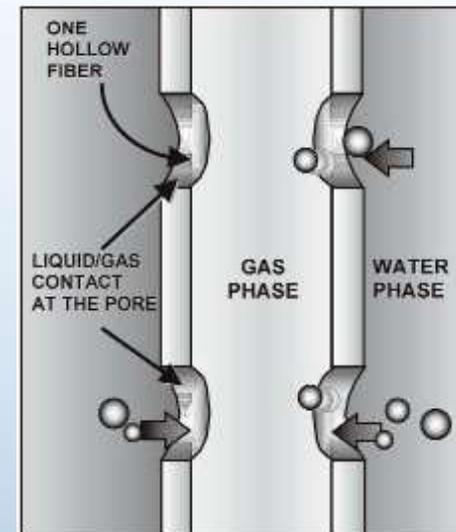
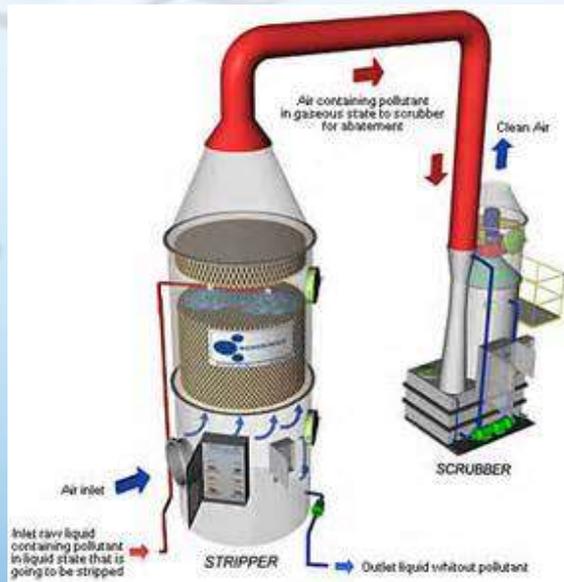
Current MCL = 5 ug/L

Treatment Process Selection

- Air Stripping (Volatilization)
- Granular Activated Carbon (Adsorption)

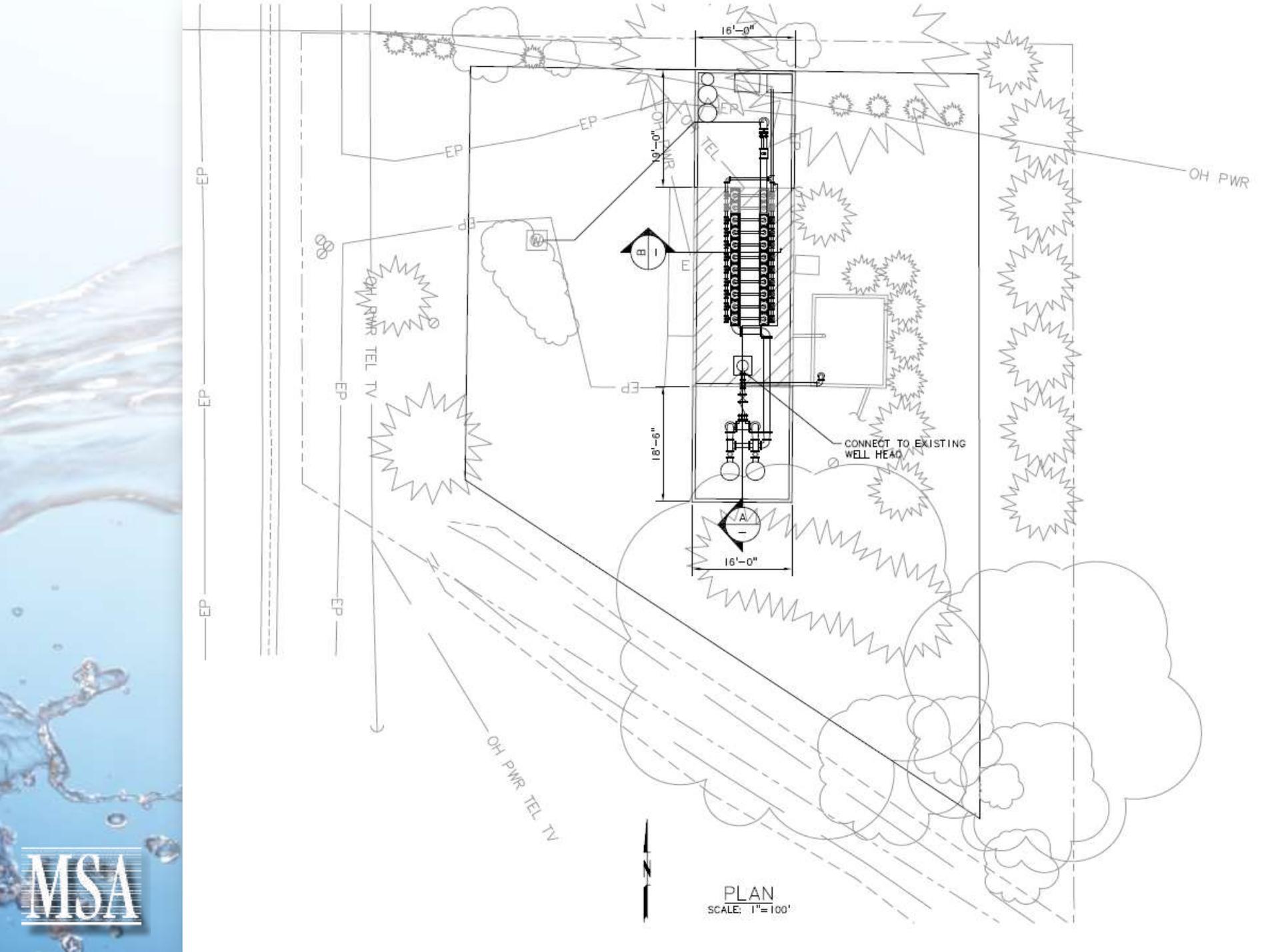
Air Stripping: Stripping Tower vs. Membranes

- Membranes not required to break head through treatment system; eliminate clearwell and booster pumping

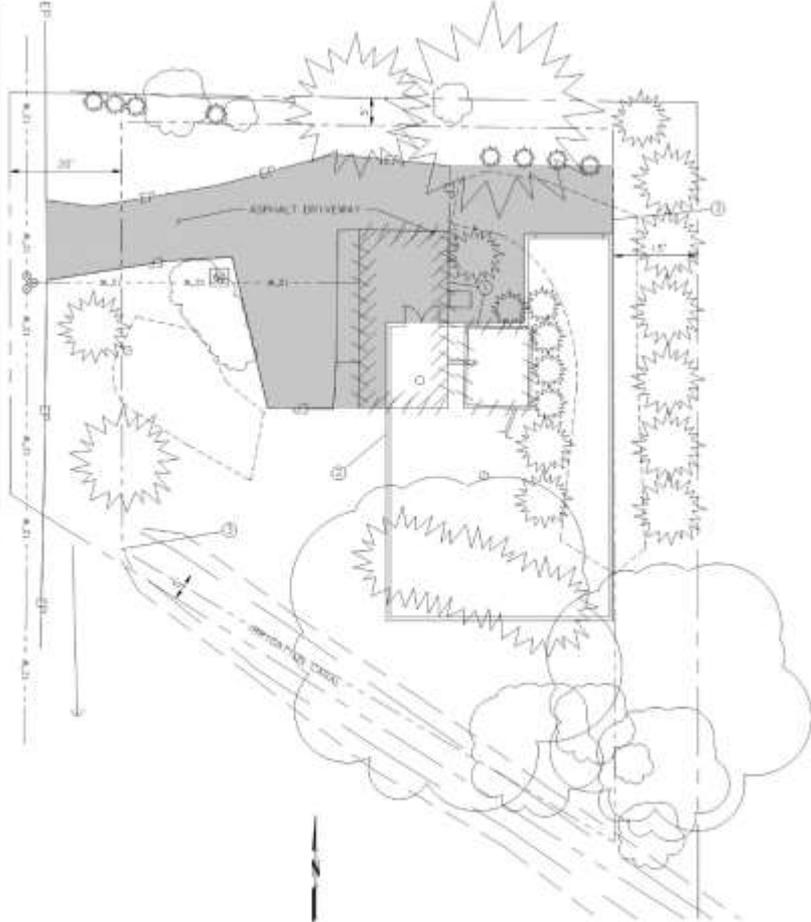


Granular Activated Carbon (GAC)

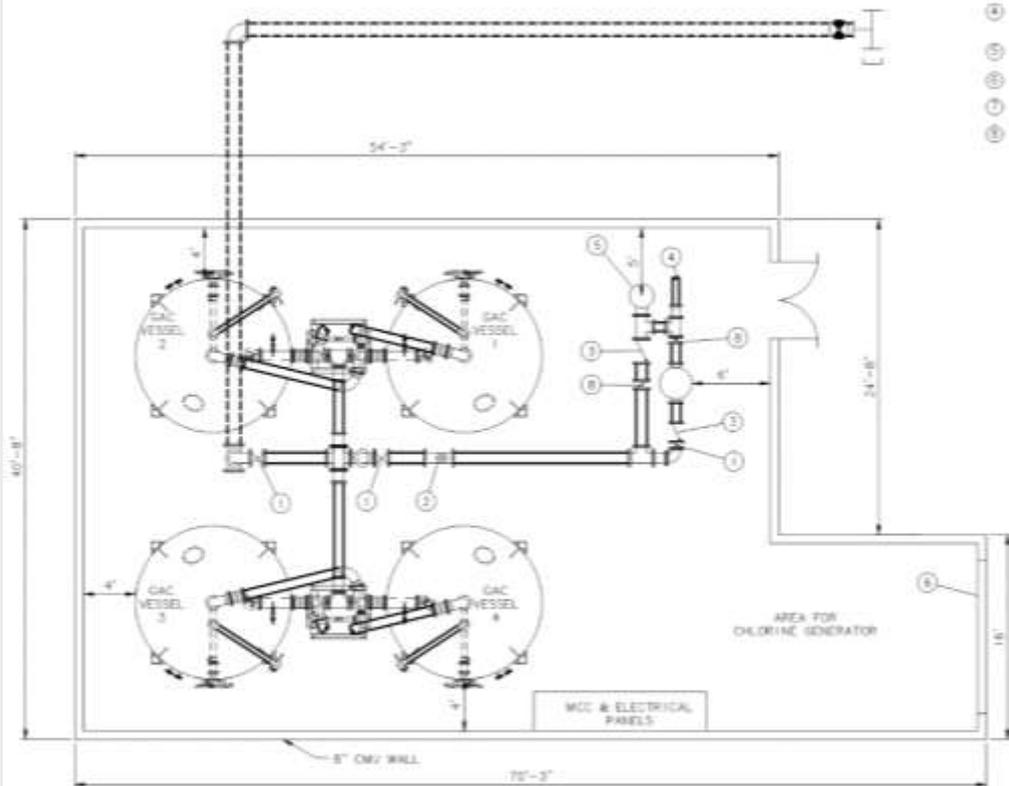




N. FISK ST



FISK WELL
SCALE 1" = 10'-0"



FISK WELL PLAN
SCALE 1" = 5'-0"



MSA

Cost Comparison to Treat Below Current MCL

Item	Membrane Contactors	GAC
Capital Costs	\$1,461,000	\$2,076,000
Capital Replacement Costs (NPV)	\$472,000	\$415,000
Annual O&M Costs	\$34,000	\$4,000

Cost Comparison to Treat Below Future MCL

Item	Membrane Contactors	GAC
Capital Costs	\$2,614,000	\$2,076,000
Capital Replacement Costs (NPV)	>\$472,000	\$415,000
Annual Additional O&M Costs	>\$34,000	\$4,000

Operations Group Involvement in Design Process

Planning

Preliminary Engineering Report
Fisk Well VOC Removal System

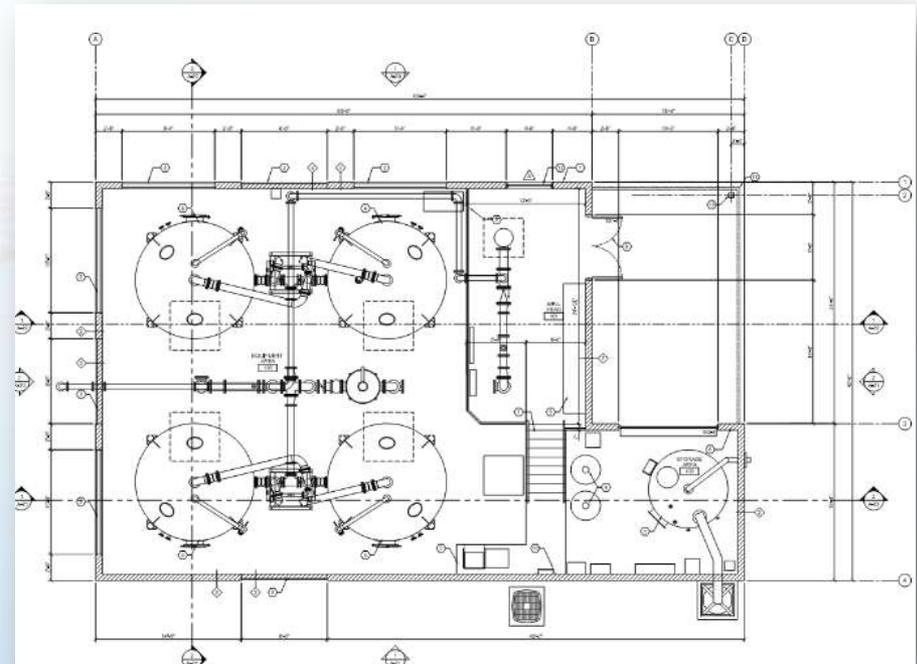


MSA
Meyer, Smith & Associates, Inc.
Engineers/Planners

United Water Idaho

March 10, 2014

Review of Plans and Specifications



Overview

Background
and Treatment
Process
Selection

Construction

O&M
Considerations

Summary



1770

POLICE

NO TRESPASSING



Construction





MSA





MSA













MSA





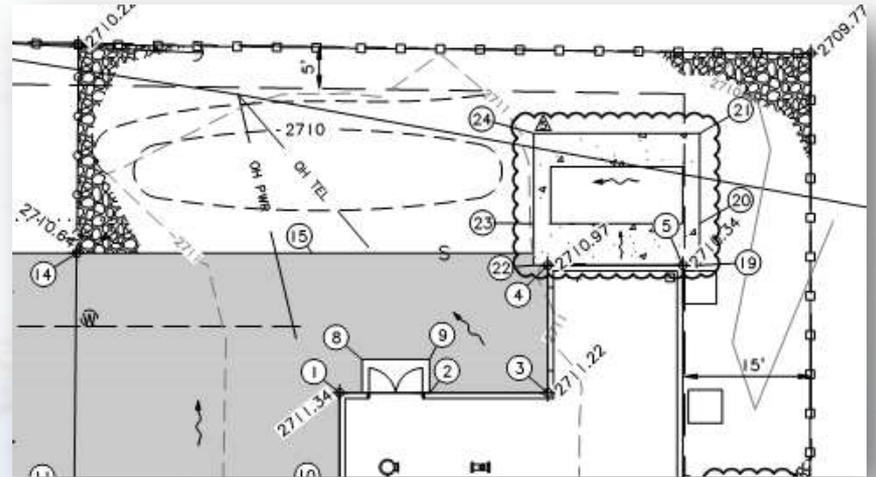
Construction Challenges

- GAC initial backwash



Construction Challenges

- Building Permit
 - Revised generator plans to expedite original building permit
 - Applied for generator permit at a later date



Overview

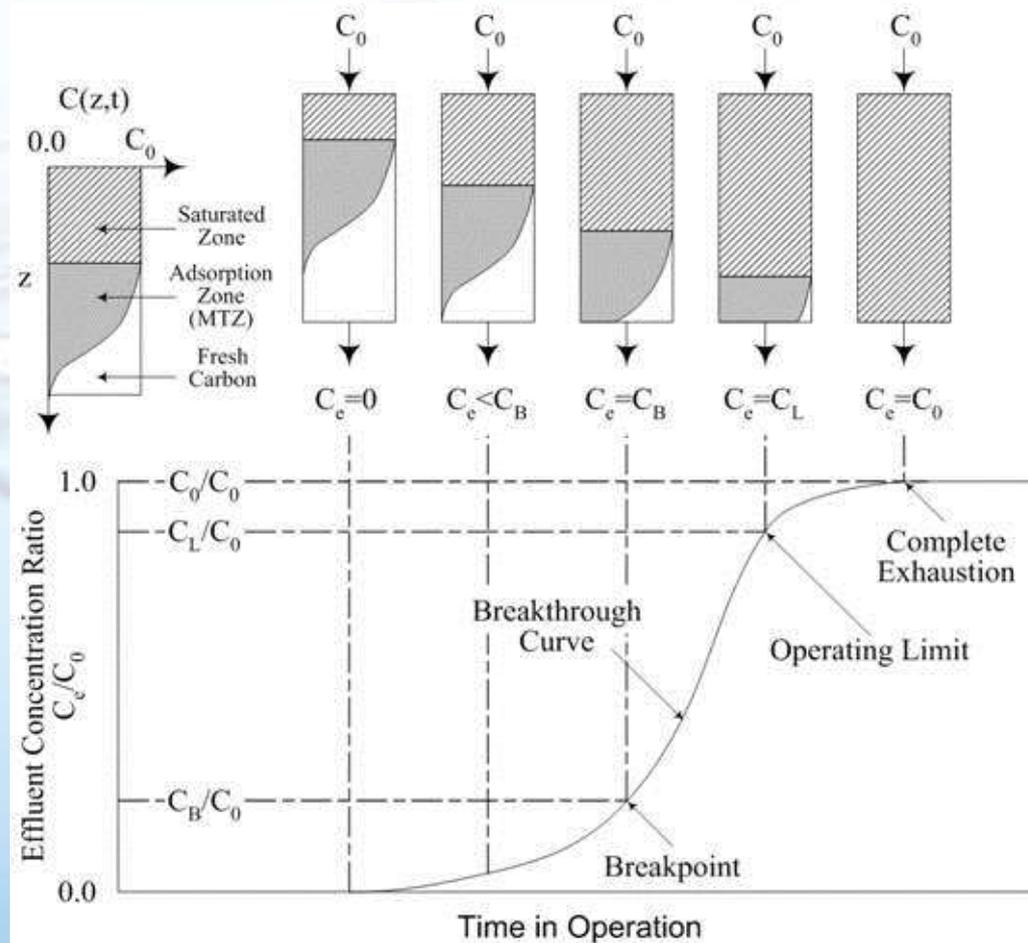
Background
and Treatment
Process
Selection

Construction

**O&M
Considerations**

Summary

How GAC Works

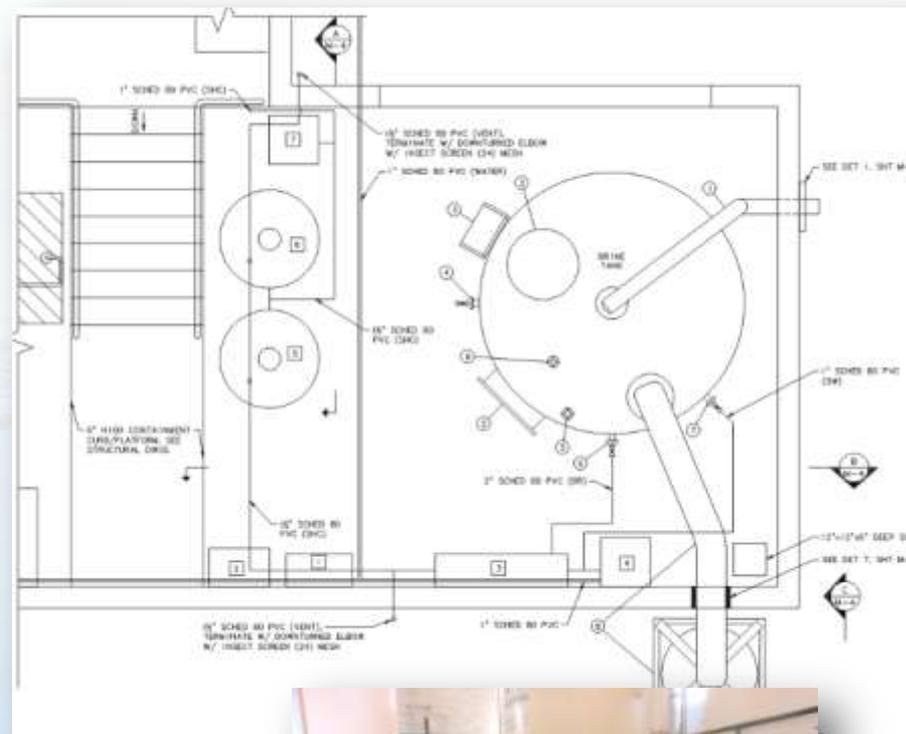


GAC Operations and Maintenance

- Monitoring PCE breakthrough
 - Routine sampling program
- Core sampling GAC media for condition and permeability

Other O&M Considerations

- Hypochlorite Generation
 - Standard Operating Procedures
 - Bulk salt delivery
 - Chlorine dosing and location
 - Control of salt dust
- Bag Filters
 - Clean at interval indicated by experience
 - Maintain and replace bags as needed



Other O&M Considerations

- Preventative maintenance schedules
 - Read O&M manuals, enter maintenance schedules into a CMMS (or other system) and use for tracking, scheduling and recording all maintenance
 - Train personnel on operation & maintenance procedures
- Instrument calibration
 - Schedule all required calibrations of instruments. Use manufacturer's recommended intervals until history has been developed.
- Auxiliary power generation
 - Weekly operation and power transfer, annual load test, quarterly and annual engine maintenance

Overview

Background
and Treatment
Process
Selection

Construction

O&M
Considerations

Summary

Take Home Messages

- Carefully consider target treatment levels when selecting a treatment system
 - What is the contaminant
 - Understand not just the current MCL but any proposed EPA changes to the MCL
- Understand principles of operation and trade-offs between various treatment technologies
- Understand O&M considerations before selecting a treatment technology