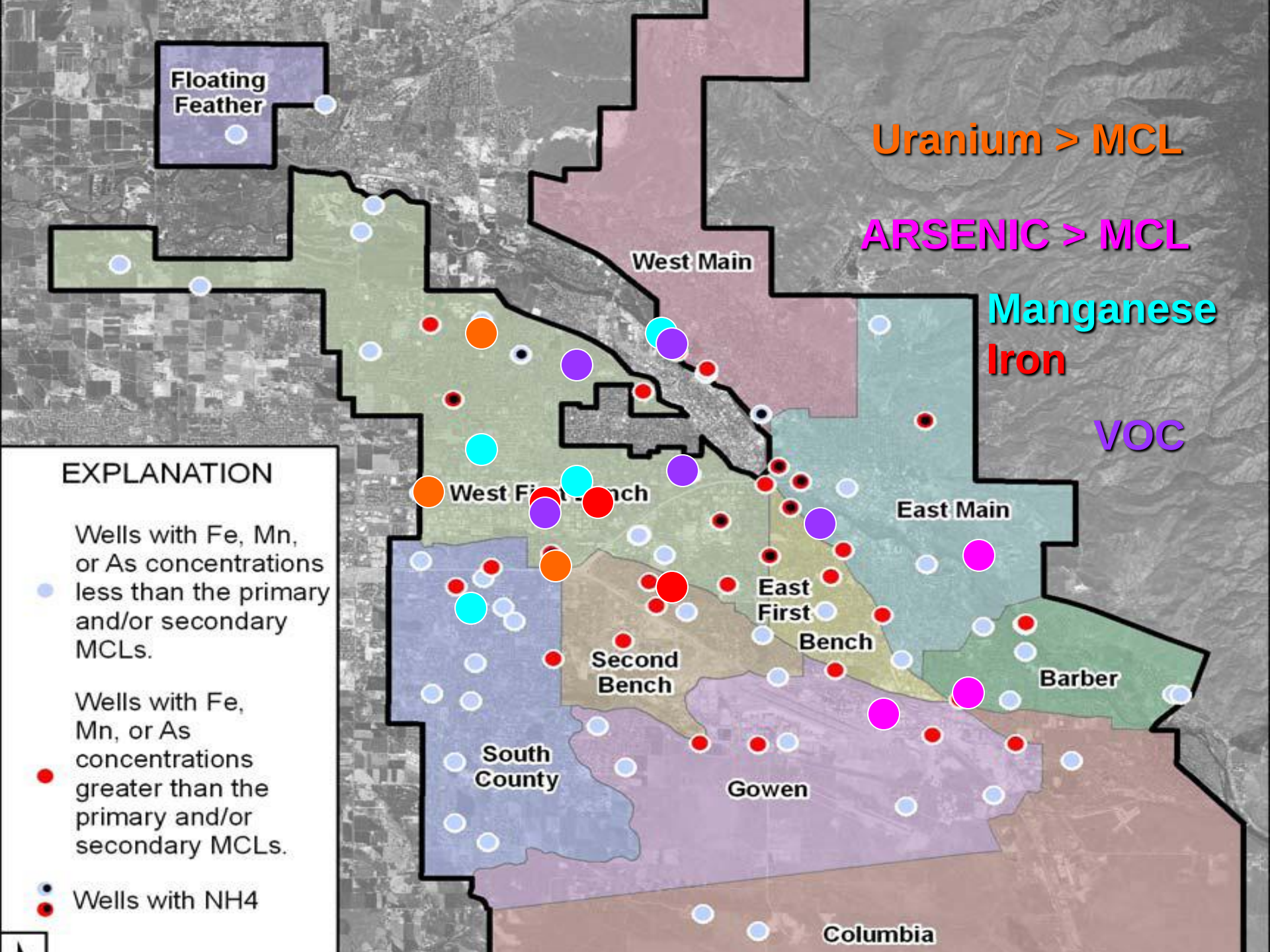
WELL HEAD TREATMENT

Bob Lawrence

MAY 6, 2011


Floating Feather
West Main
West First Bench
East Main
East First Bench
Second Bench
Barber
South County
Gowen
Columbia
Uranium > MCL
ARSENIC > MCL
Manganese
Iron
VOC
EXPLANATION
Wells with Fe, Mn, or As concentrations less than the primary and/or secondary MCLs.
Wells with Fe, Mn, or As concentrations greater than the primary and/or secondary MCLs.
Wells with NH4

Treatment Methods

Chlorine

Phosphate addition at 17 Wells

Blending With Other Sources 2 Wells

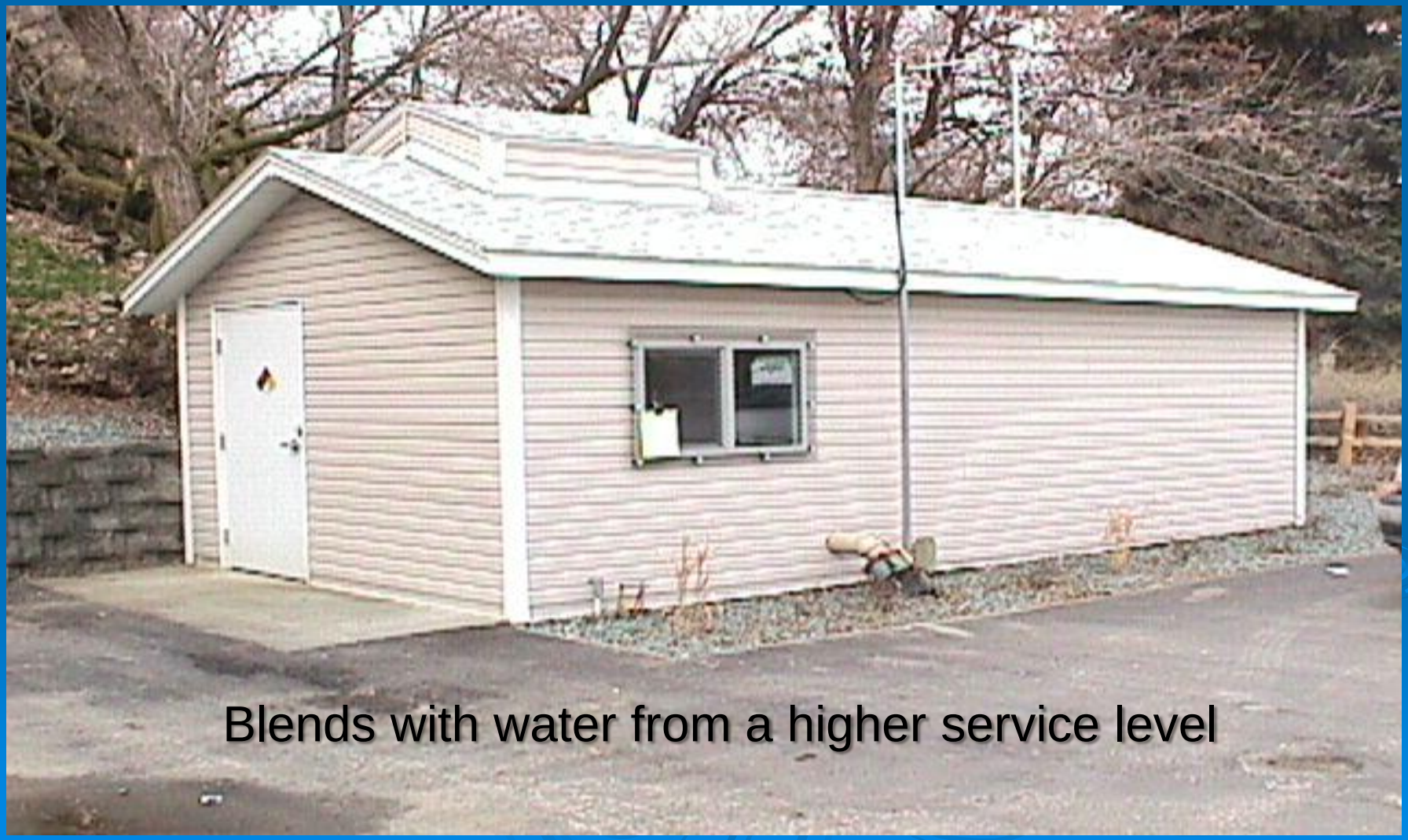
Aquifer Storage & Recover (ASR) at 8 Wells

Manganese greensand Filtration at 3 Wells

Granular Activated **Carbon (GAC) 2 Wells**

Membrane Applications - Gas Transfer and VOC

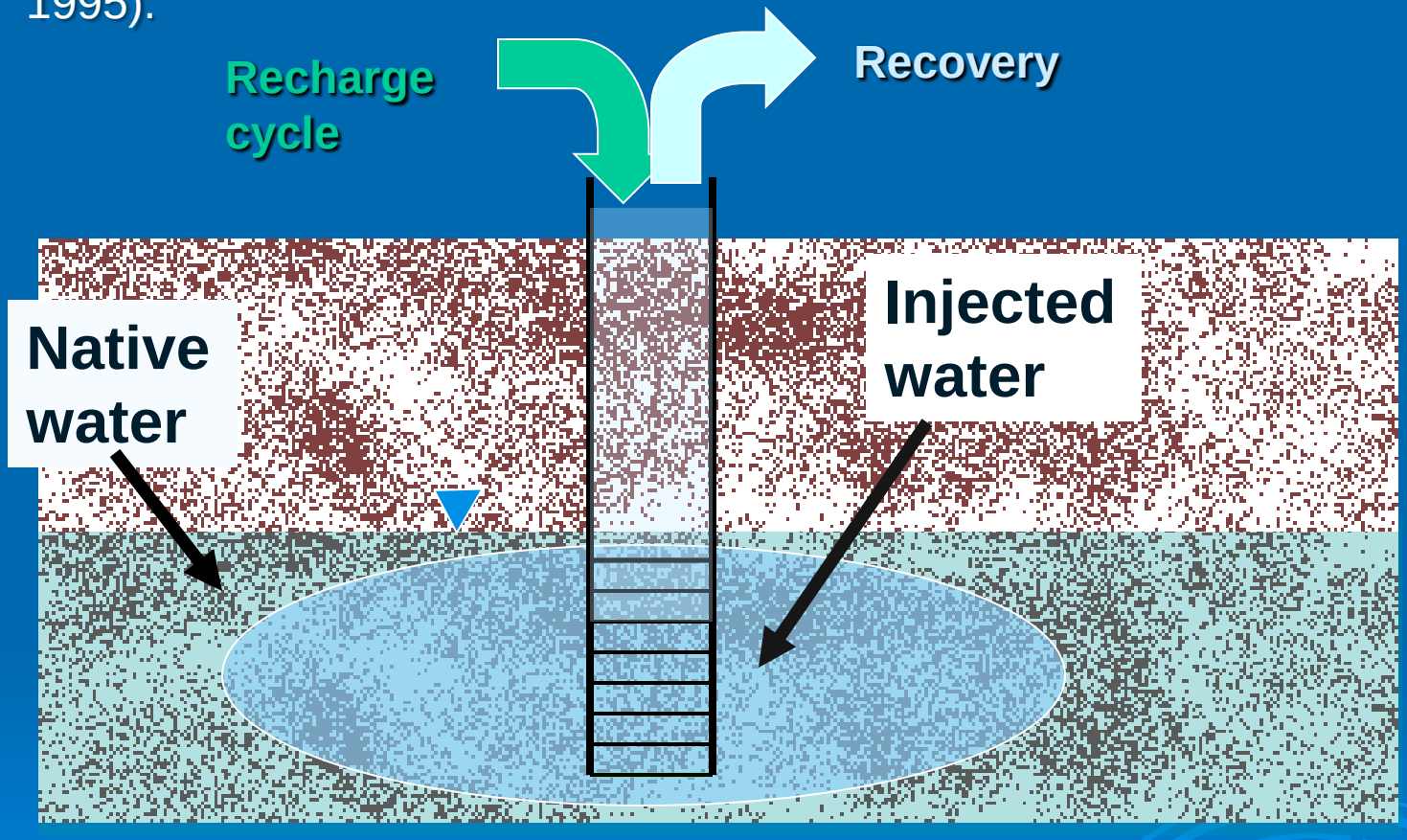
Blending Cliffside Well

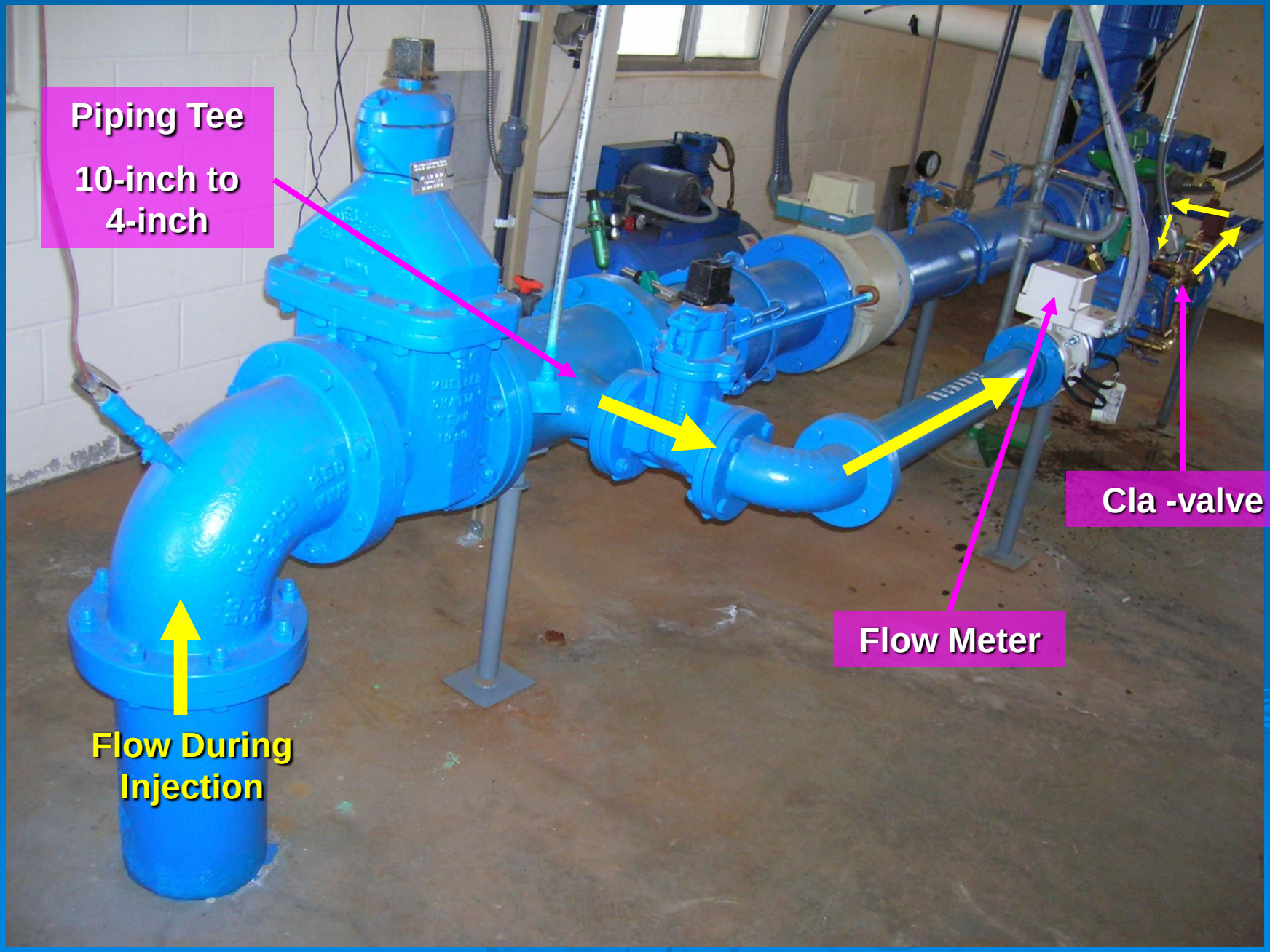


3/4"-2503
COP-65
1"-
PE-2004
1"-2425
PE-02
28'
3/4"-2422
PE-91
3/4"-2420
PE-91
STP-58
1625
135
143
168
167
166
209-PSI
75
12"PVC-97
97D604
12"CI-49
1015-2
102
132
3/4"-SAMPLE
STATION
PE-2007
12"CI-49
144
145-F
BORE
MARTHA
2"PVC-97
97D604
12"PVC-97
8"PVC-FLUSH
97-026

Aquifer Storage & Recover (ASR)

ASR: Storage of water in a suitable aquifer through a well during times when water is available, and recovery of the water through the same well during times when it is needed (Payne, 1995).

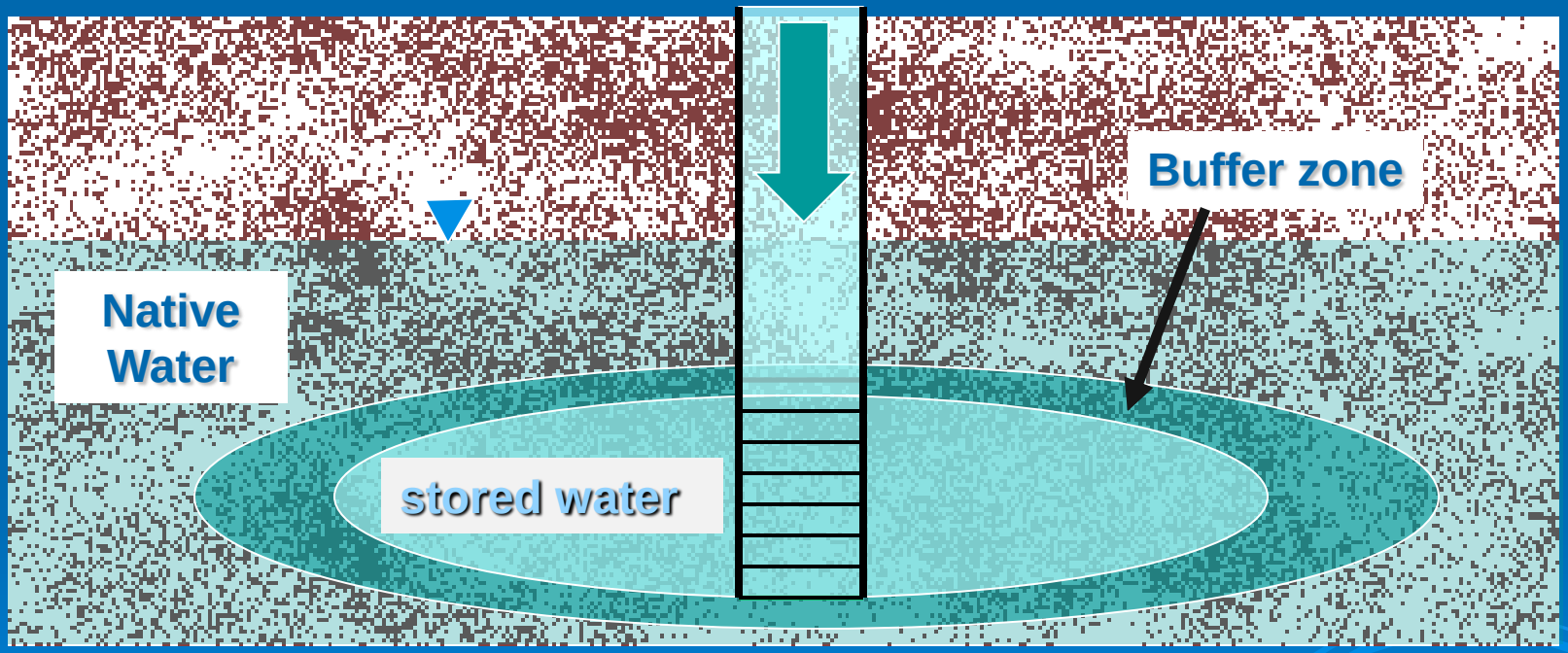



Piping Tee
10-inch to 4-inch
Cla -valve
Flow Meter
Flow During Injection

Buffer Zone:

Zone of marginal water quality from previously injected water that is not pumped.

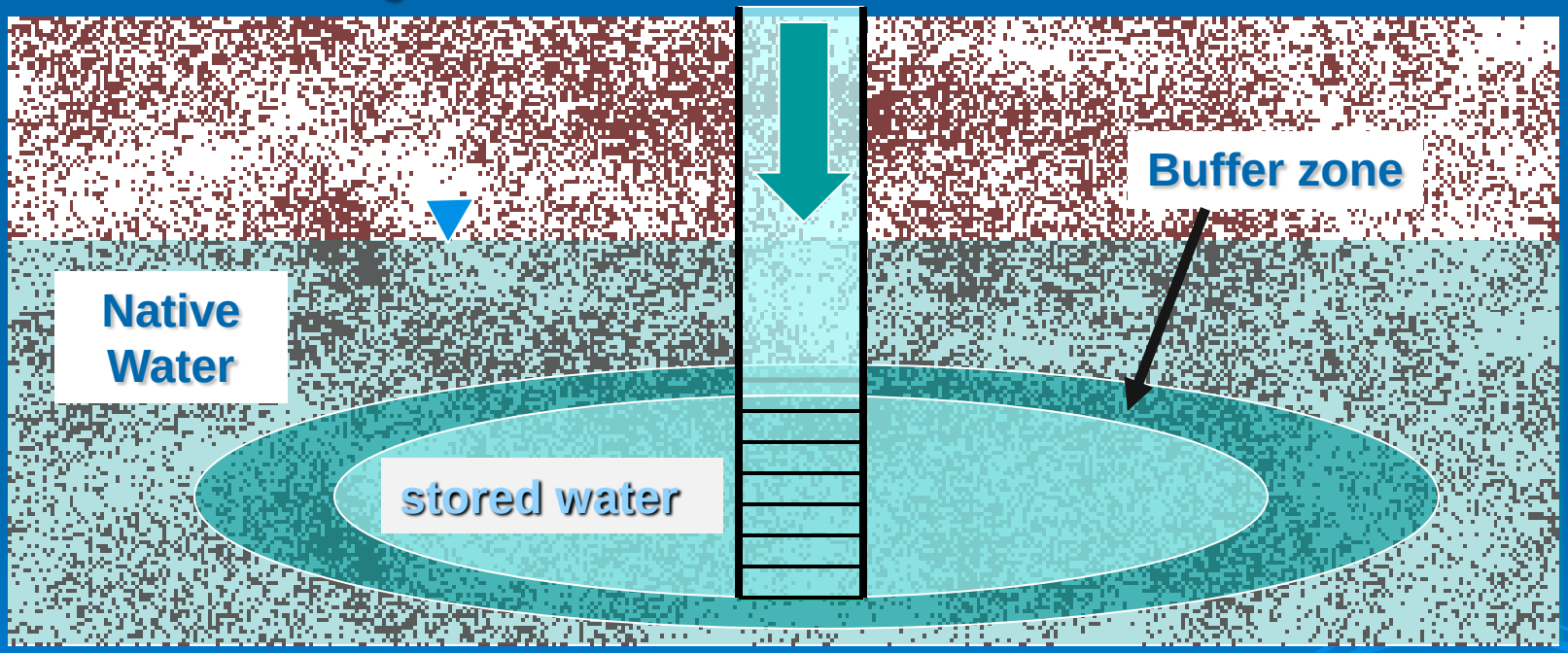
Typically 3-6 cycles to create buffer (Pyne, 1995).



Recovery efficiency:

The percentage of stored water relative to the injected volume that is subsequently recovered while meeting a target water quality criterion in the recovered water

Can be greater 100%



IRON AND MANGANESE

22 Wells

- 17 Sequestering agents

2 ASR

3 Greensand Filters

GREENSAND Advantage

Manganese greensand process for the removal of iron, manganese and hydrogen sulfide from groundwater has been used since the 1950's in the United States

2001 UWID put 300,000 lbs of Phosphate in to the water.

2010 only 52,500 lbs

Huge Savings for our customers while receiving a better product

Bali Hai Well Greensand

Loprest Greensand Filter

Three Cells in one tank

BALI HAI today

Analytical Laboratories, Inc.
1804 N. 33rd Street
Boise, Idaho 83703
Phone (208) 342-5515

Date Report Printed: 7/6/2010 11:04:26
http://www.analyticallaboratories.com

Laboratory Analysis Report

Sample Number: 1018422

Attn: CAMILLE CEGNAR
UNITED WATER IDAHO
P O BOX 190420
BOISE, ID 83719

RECEIVED
JUL 12 2010
UNITED WATER

Collected By: CSC
Submitted By: CSC
Source of Sample: BALI HAI - RAW

Time of Collection: 11:05
Date of Collection: 6/29/2010
Date Received: 6/29/2010
Report Date: 7/6/2010

Field Temp: Temp Rcvd in Lab: 19.3 °C

PWS#: 4010016
PWS Name: UNITED WATER IDAHO

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Iron, Fe	UR	0.70	mg/L	0.01	EPA 200.7	7/1/2010	KC
Manganese Low		0.266	mg/L	0.005	EPA 200.7	7/1/2010	KC
Ammonia Direct (as N)	UR	0.64	mg/L	0.04	EPA 350.1	7/1/2010	SS

CC: DEQ-BOISE

MCL = Maximum Contamination Level
MDL = Method Minimum Detection Limit
UR = Unregulated

Thank you for choosing Analytical Laboratories for your testing needs.

If you have any questions about this report, or any future analytical needs, please contact your client manager:

Sandy Koch

Analytical Laboratories, Inc.
1804 N. 33rd Street
Boise, Idaho 83703
Phone (208) 342-5515

Date Report Printed: 7/6/2010 8:15:24
http://www.analyticallaboratories.com

Laboratory Analysis Report

Sample Number: 1018239

Attn: CAMILLE CEGNAR
UNITED WATER IDAHO
P O BOX 190420
BOISE, ID 83719

RECEIVED
JUL 12 2010
UNITED WATER

Collected By: J ADAMS
Submitted By: J ADAMS
Source of Sample: BALI-HAI Treated

Time of Collection: 14:05
Date of Collection: 6/28/2010
Date Received: 6/28/2010
Report Date: 7/6/2010

Field Temp: Temp Rcvd in Lab:

PWS#:
PWS Name: UNITED WATER IDAHO

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Iron, Fe		<0.01	mg/L	0.01	EPA 200.7	7/1/2010	KC
Manganese Low		<0.005	mg/L	0.005	EPA 200.7	7/1/2010	KC

MCL = Maximum Contamination Level
MDL = Method Minimum Detection Limit
UR = Unregulated

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Sandy Koch

Maple Hill Well

Maple Hill Greensand

1800 GPM

BHS

200 PPD

1 of 32 Sodium Hypo Generators

Covering the filter for winter operation

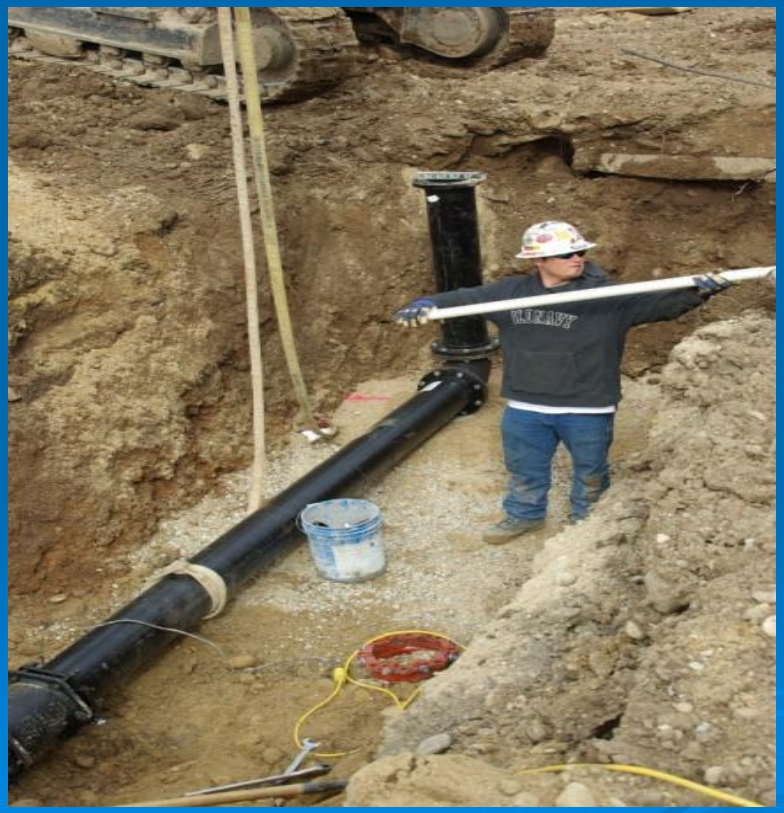
Maple Hills #2 Well

Blended with treated water or ASR

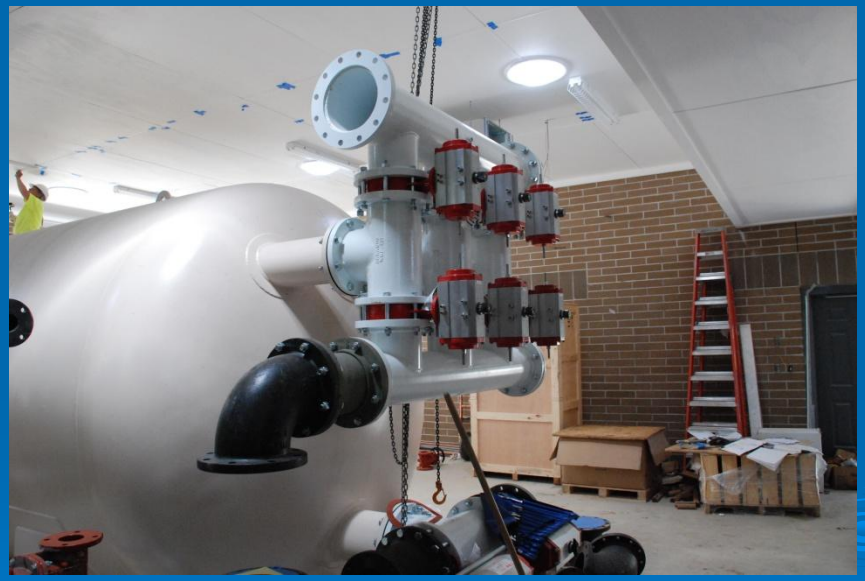
Hilton Well

February 2010

Building It Back



CAT



Can’t Please Everyone

Back Wash Water is reclaimed

Jenny

.8 % Sodium Hypo

12 Ton Brine Tank

Tetrachloroethene

- FIVE Wells with levels of concern

2 - Treated using GAC

I – Blended

2 – Under a Pilot test

Swift Wells GAC

Designed for 2,000 GPM

Siemens

Filling The Tanks

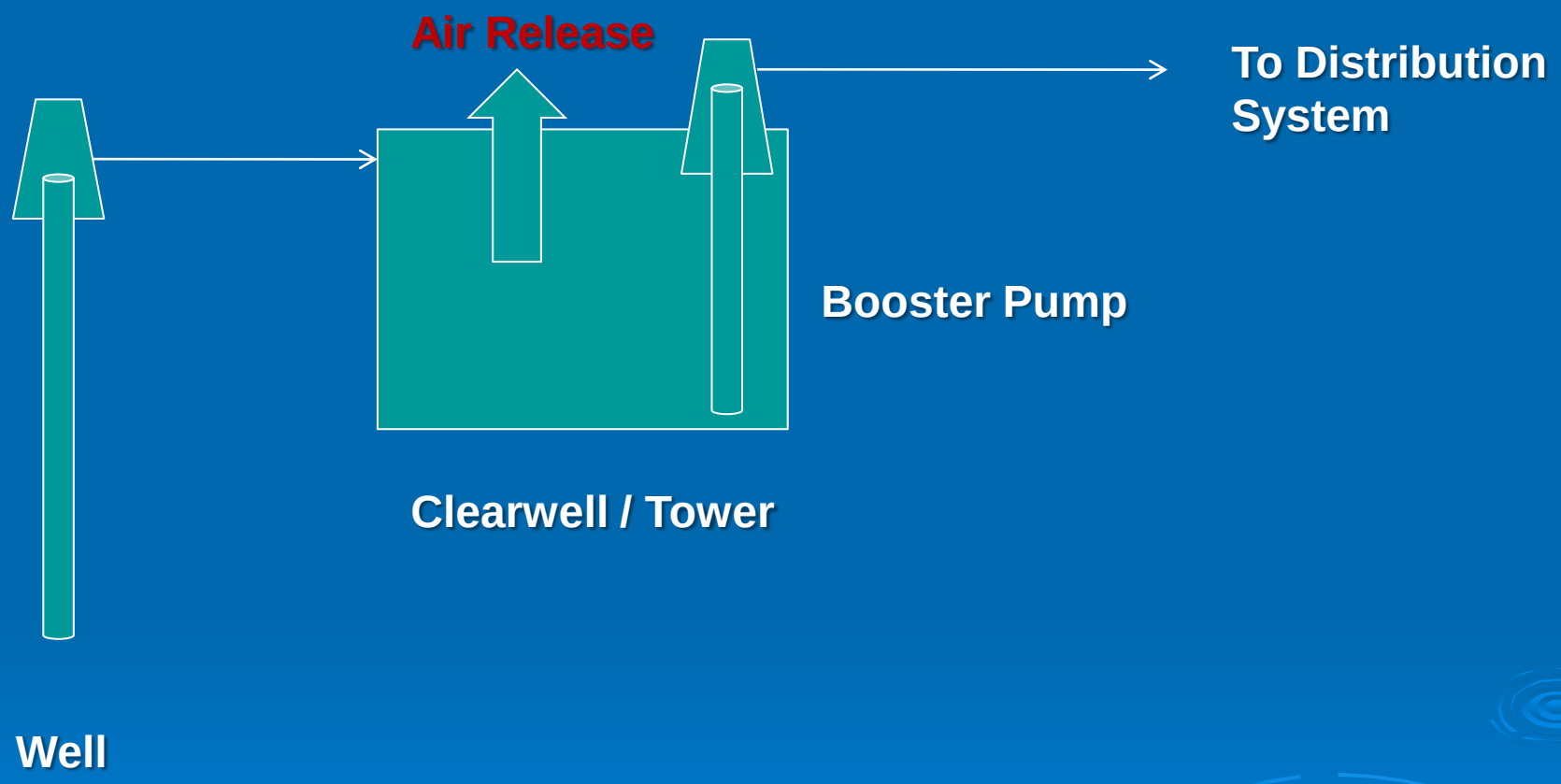
Old Swift

New Shift

New Application of Membranes

- Problem - entrained/dissolved air in ground water – milky water
- Classical solution - use of stilling basin to allow release of air
- New solution - use membrane
- Benefits
  - **Remove air without losing head**
  - **Smaller footprint**
  - **Lower cost – both CAPEX and OPEX**

Typical Treatment Process



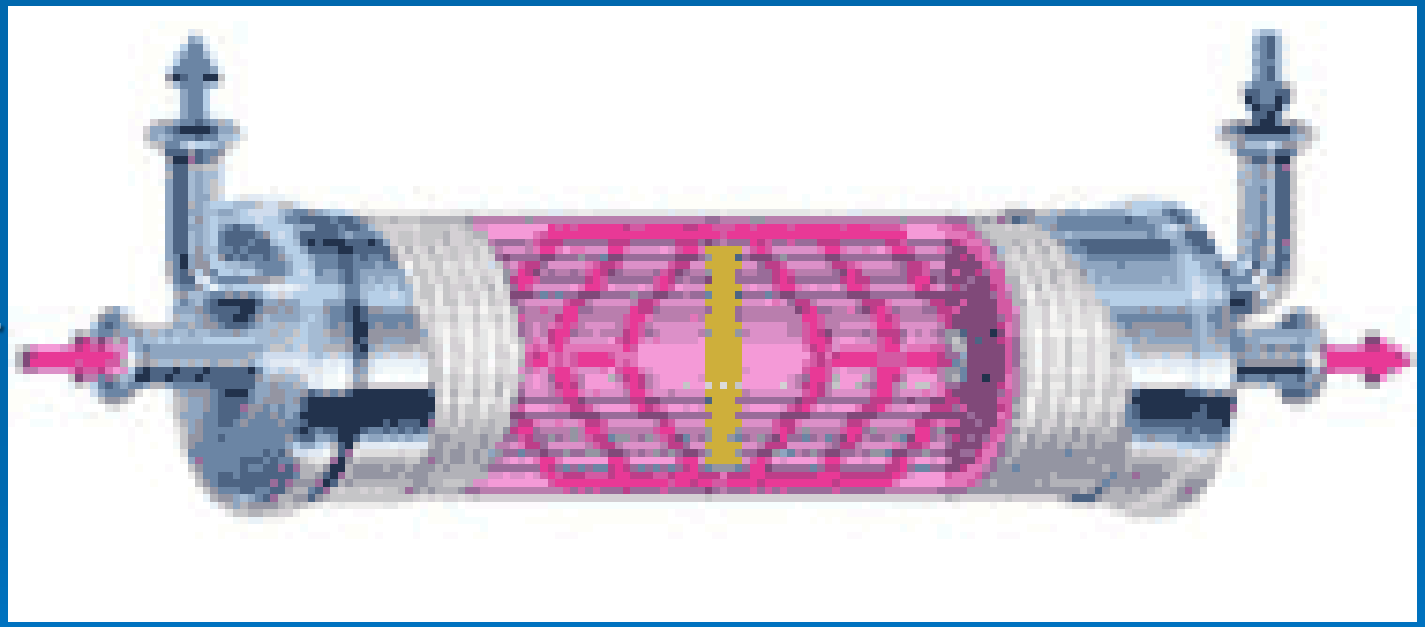
Liqui-Cel Membrane Device

Hydrophobic membrane

Air out

Air in

Water in



Water out

Fisk Well Pilot

Membrane VOC Results

		gpm			PERC ug/L	% Removal	
	RAW				3.50		
	R2	10	Vacuum Applied		<0.5	100.0	
	R3	15	Vacuum Applied		0.60	82.9	
	R4	20	Vacuum Applied		0.70	80.0	
	R5	25	Vacuum Applied		1.20	65.7	
	R6	30	Vacuum Applied		1.20	65.7	
	R7	35	Vacuum Applied		1.70	51.4	
	R7	40	Vacuum Applied		1.80	48.6	

Potential Applications

- De-aeration
- VOC removal
- Radon removal
- Hydrogen sulfide removal
- CO2 removal (avoid chemical addition for raising pH in wells with high CO2)
- Stabilization of water after RO

Liquf-Cel
Liquf-Cel
Liquf-Cel
Liquf-Cel

Thank You