EarthTec QZ successfully controls zebra mussels at the intake of a major municipal water treatment plant

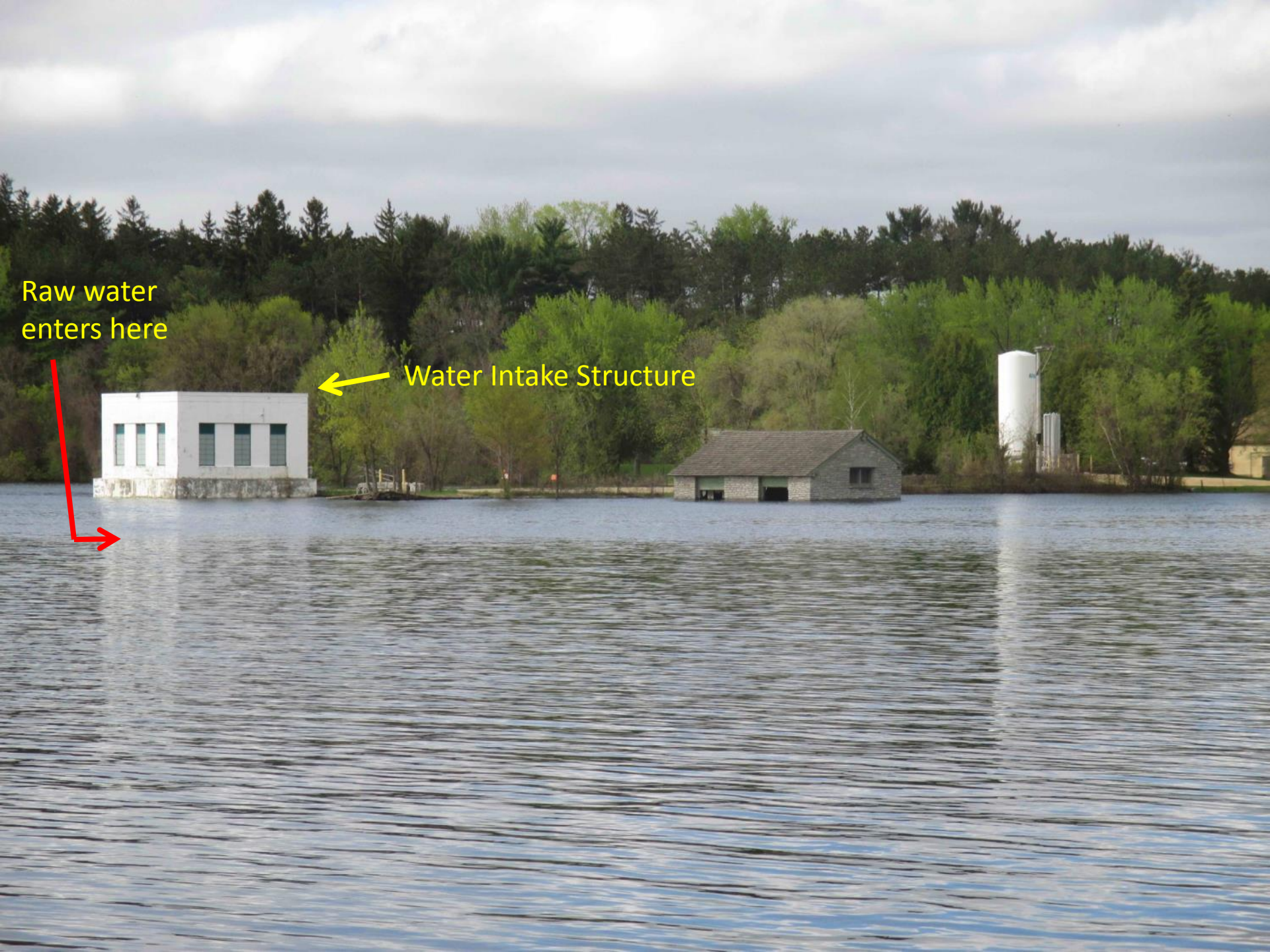
David Hammond, PhD,
Senior Scientist, Earth Science Laboratories, Inc.

Priority Sites for Mussel Control

- Open Waters (lakes)
- Flowing Waters (pipelines, aqueducts)
- Closed Systems (ballast, sprinkler)

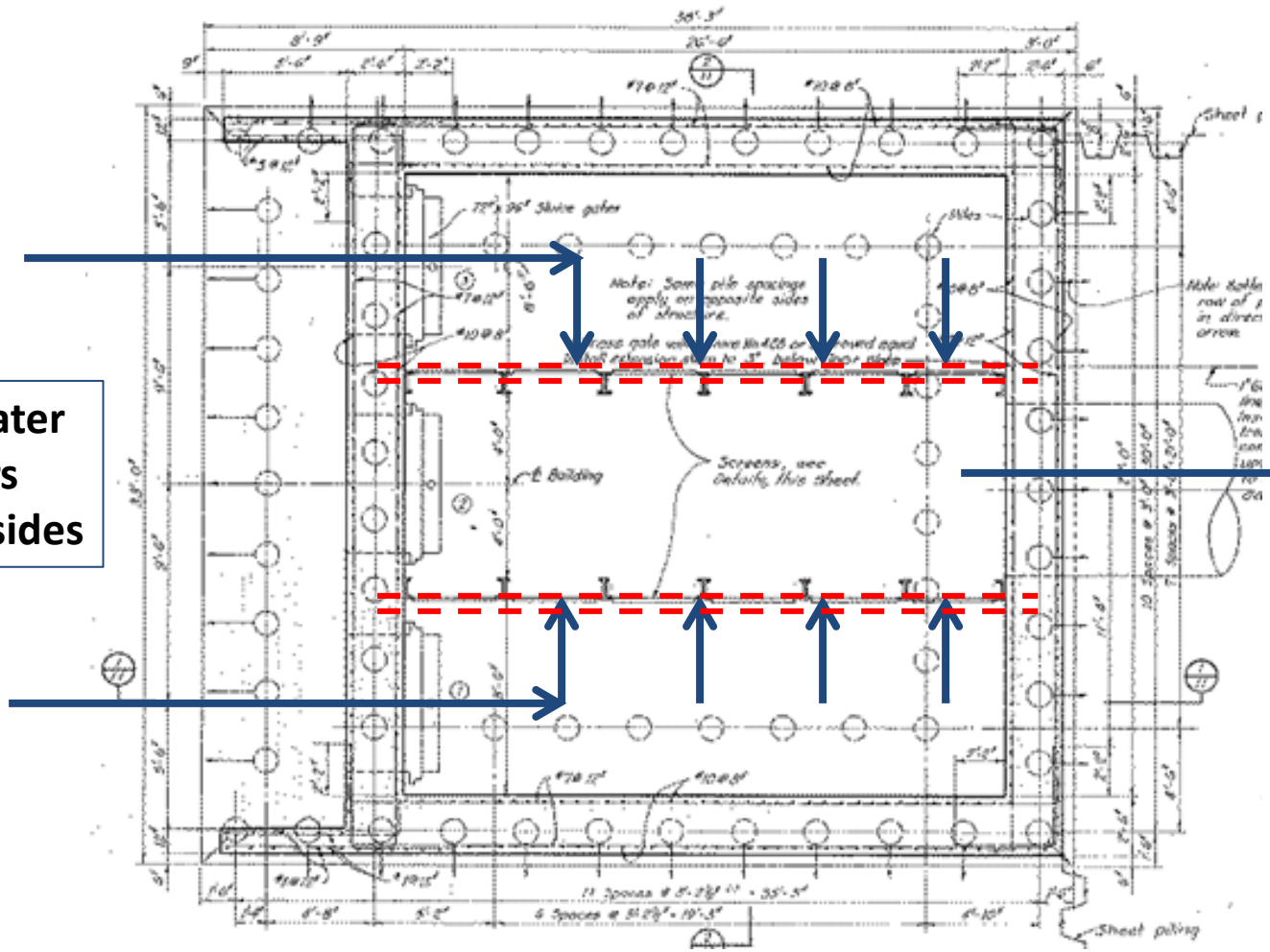
Zebra Mussels Infesting City of St Paul, Minnesota
2015-16

Raw Water Intake Structure for a 60 MGD Municipal WTP


Raw water
enters here
Water Intake Structure

Zebra Mussels Infesting City of St Paul, Minnesota

2015-16



Clever intake design allows treatment to protect the screens

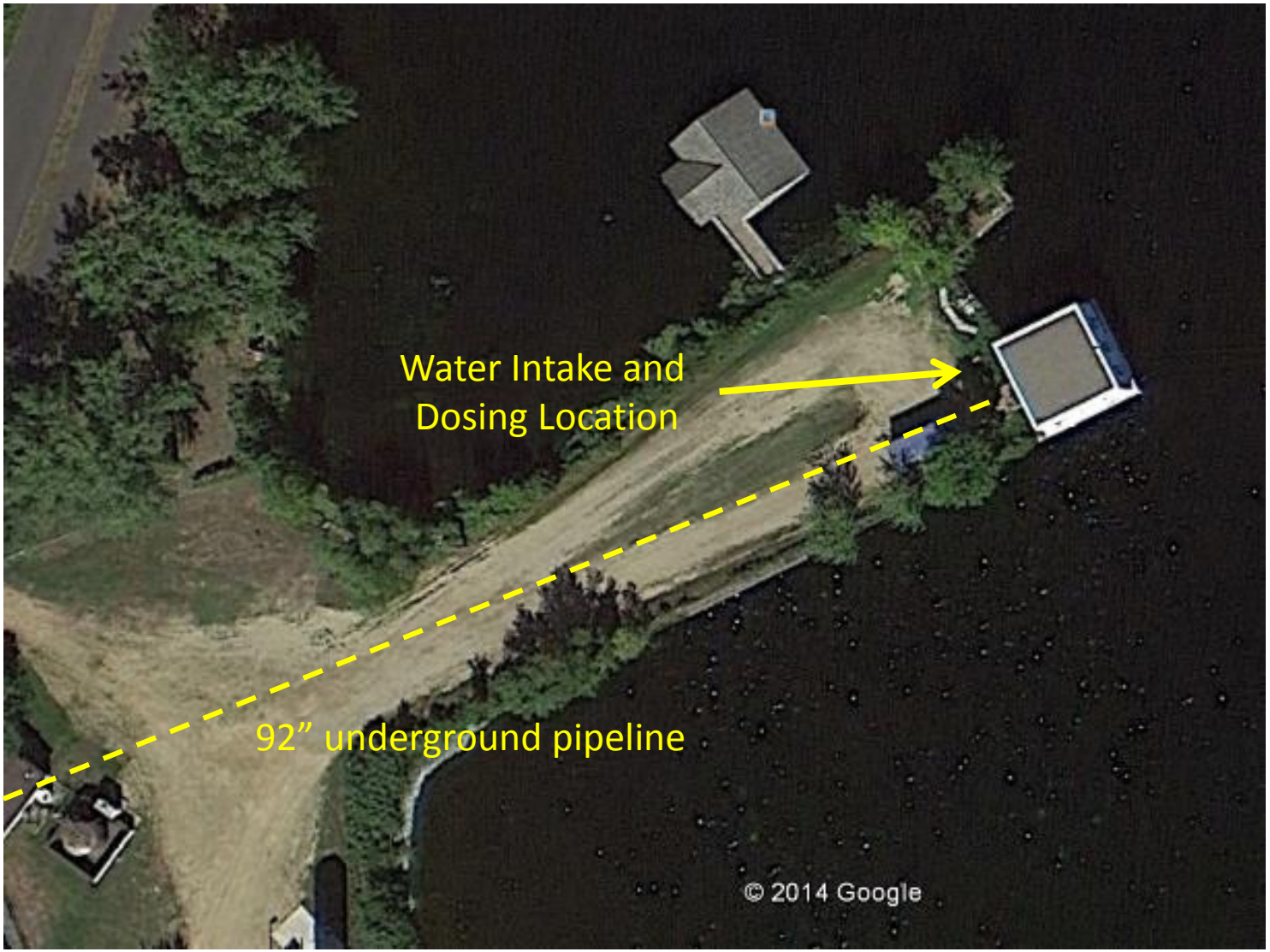
This is what the clean screens look like

Zebra Mussels Infesting City of St Paul, Minnesota

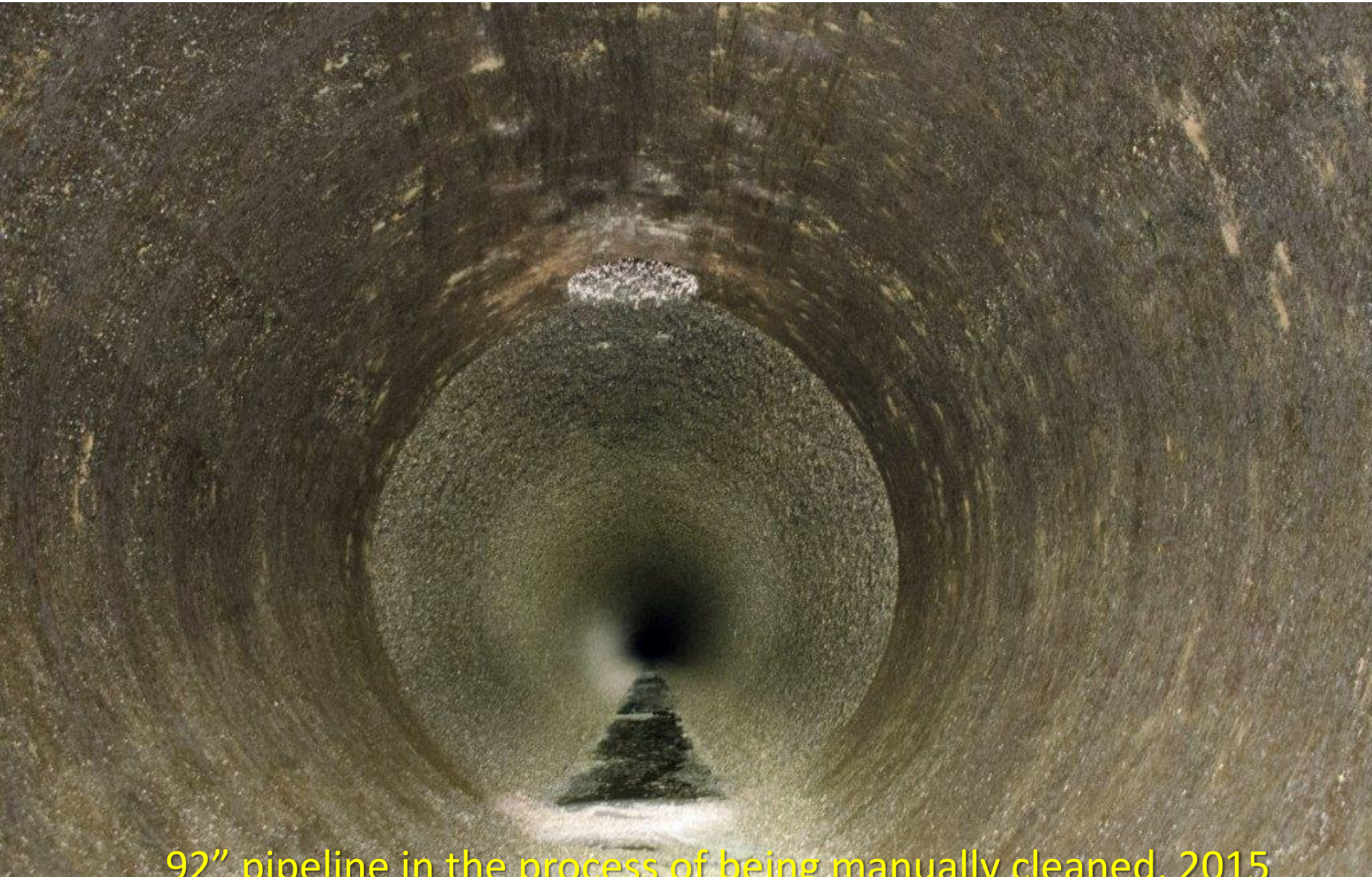
2015-16

Screen fouled with zebra mussels, 2015

Overview of St Paul Intake and Trial of EarthTec QZ



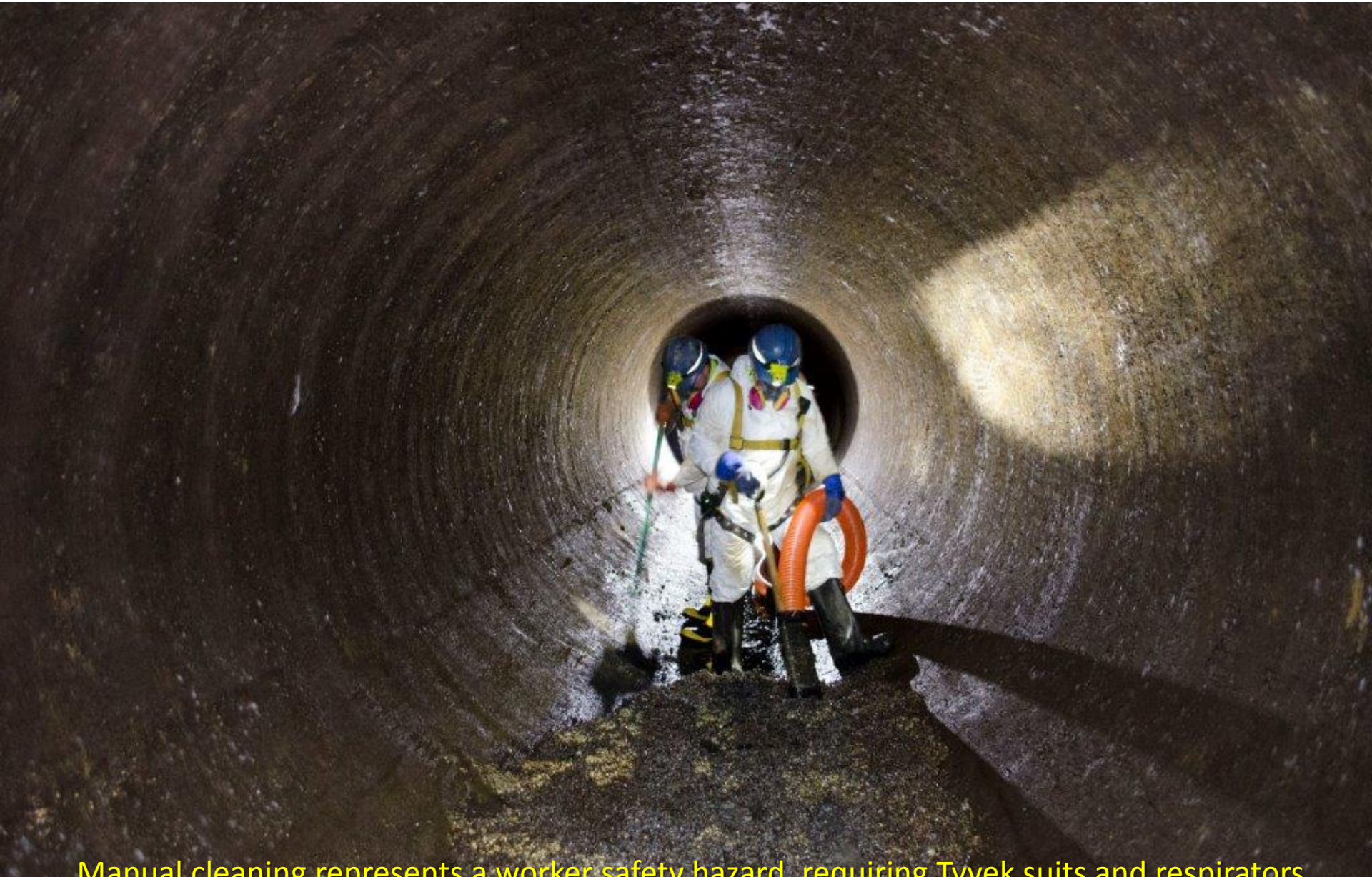
Zebra Mussels Infesting City of St Paul, Minnesota
2015-16



92” pipeline in the process of being manually cleaned, 2015

Zebra Mussels Infesting City of St Paul, Minnesota
2015-16

Zebra Mussels Infesting City of St Paul, Minnesota
2015-16



Manual cleaning represents a worker safety hazard, requiring Tyvek suits and respirators

Zebra Mussels Infesting City of St Paul, Minnesota

2015-16

Mussels are removed by the dumpster load

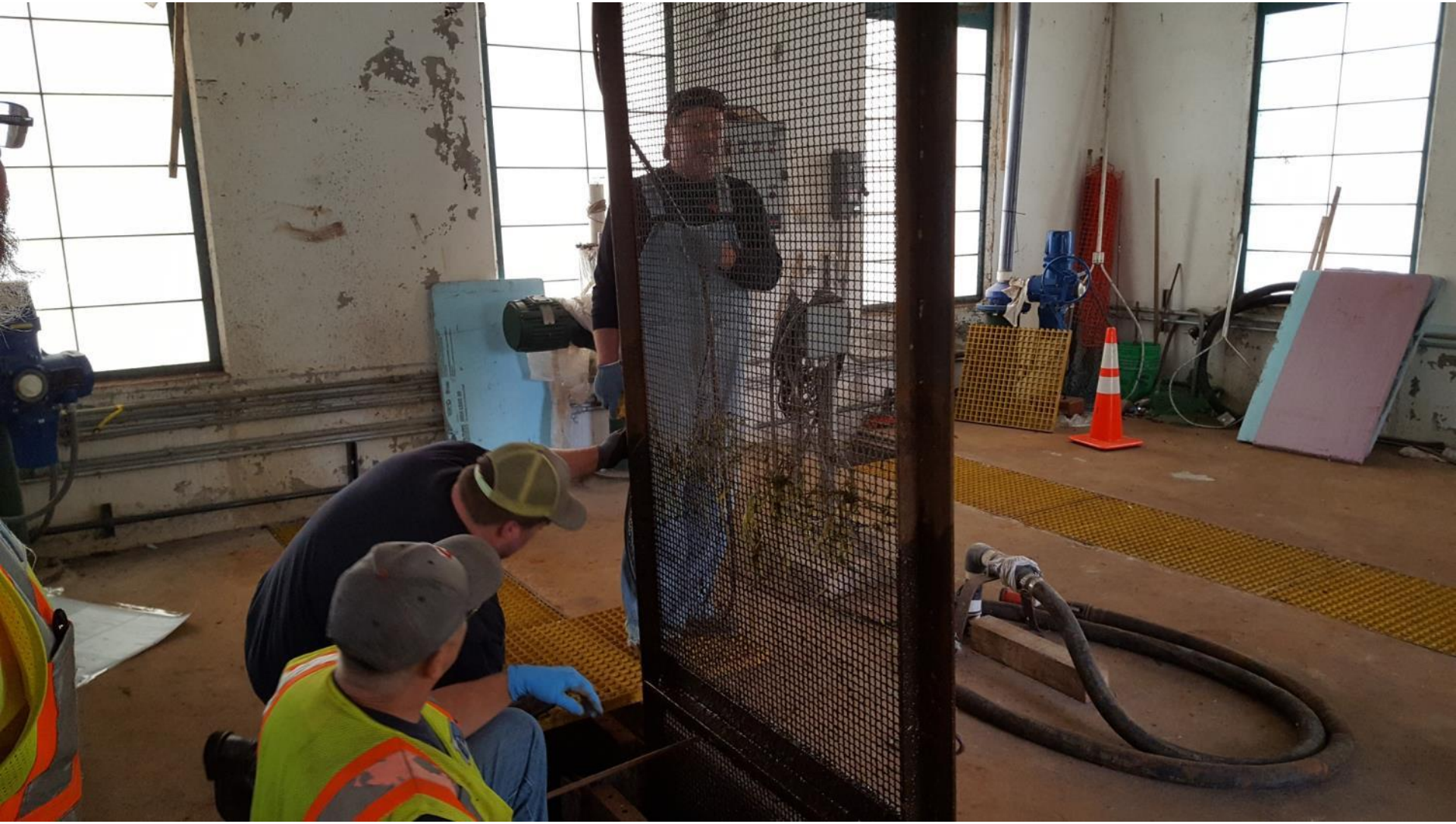
Zebra Mussel Control at City of St Paul, Minnesota

Summer, 2016

Permanent storage tank for EarthTec QZ -- 5,500 gallons

Zebra Mussel Control at City of St Paul, Minnesota

September, 2016



Zebra Mussel Control at City of St Paul, Minnesota

September, 2016

EarthTec QZ successfully prevented biofouling in Summer-Fall of 2016

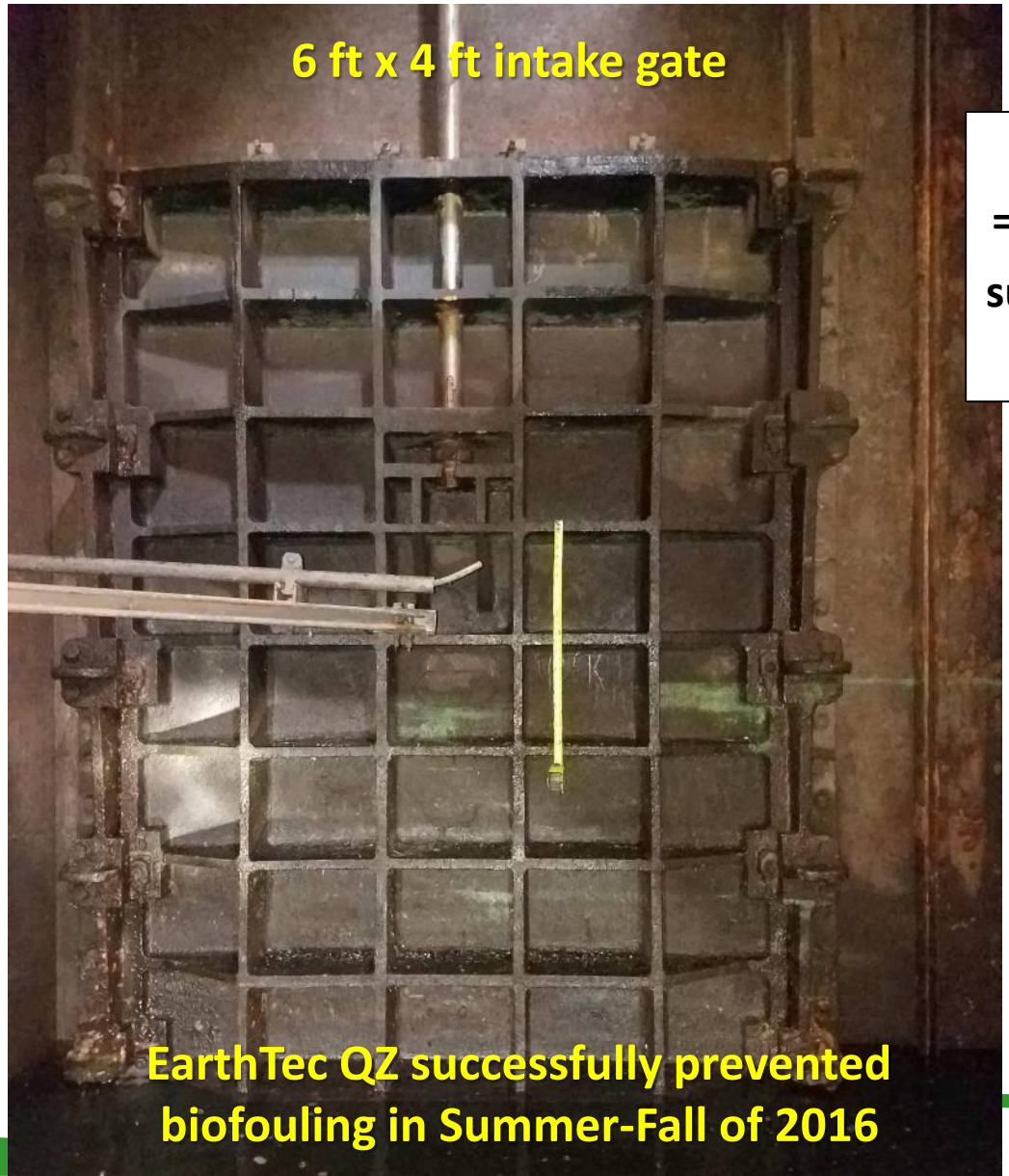
Zebra Mussel Control at City of St Paul, Minnesota

October, 2016

1 ppm dose as QZ = 60 ug/L as copper sufficient to achieve complete control

Zebra Mussel Control at City of St Paul, Minnesota

October, 2016



1 ppm dose as QZ = 60 ug/L as copper sufficient to achieve complete control

Zebra Mussel Control at City of St Paul, Minnesota

October, 2016

1 ppm dose as QZ = 60 ug/L as copper sufficient to achieve complete control

Note that mussels were only able to colonize a few spots within eddies of unmixed water, such as the feed line itself.

Zebra Mussel Control at City of St Paul, Minnesota

Copper Concentration (ug/L = ppb) in treated water reaching the St Paul WTP, summer of 2016

Dose applied at pipeline intake = 1 ppm as QZ = 60 ug/L as copper

Date	WTP
6/14/2016	0
6/23/2016	2
6/30/2016	0
7/7/2016	3
7/14/2016	4
7/21/2016	1
7/28/2016	0
8/11/2016	0
8/18/2016	1
8/25/2016	0
8/31/2016	0
9/15/2016	0
Average:	**0.92**

Copper is consumed by biological background demand in the pipeline