

International
Advanced
Analytics
Research
Collaborative

Operating a California Full-Advanced
Treatment Plant Demonstration Project
Using Artificial Intelligence

Kevin M. Hardy, JD
Executive Director
National Water Research Institute
Fountain Valley, California 92708
khardy@nwri-usa.org

About Us

National Water Research Institute

- US collaborative resource for the advancement of water resources science, policy, and innovation.
- Independent expert advisory services provider of choice for the most challenging water quality and water resource management issues.
- Insight and understanding of current and future issues in water science and technology.

Athalie Richardson Irvine Clarke Prize for Outstanding Achievement in Water Science and Technology – Laureate 28:

Dr. Shane A. Snyder

Professor, School of Civil and Environmental Engineering, Nanyang Technological University, Singapore

Executive Director of NTU's Nanyang Environment and Water Research Institute (NEWRI)

The Case for Investment in Advanced Analytics



Enables local supply resilience and water quality



Uses data responsibly for public benefit



Simplify regulatory approval and compliance

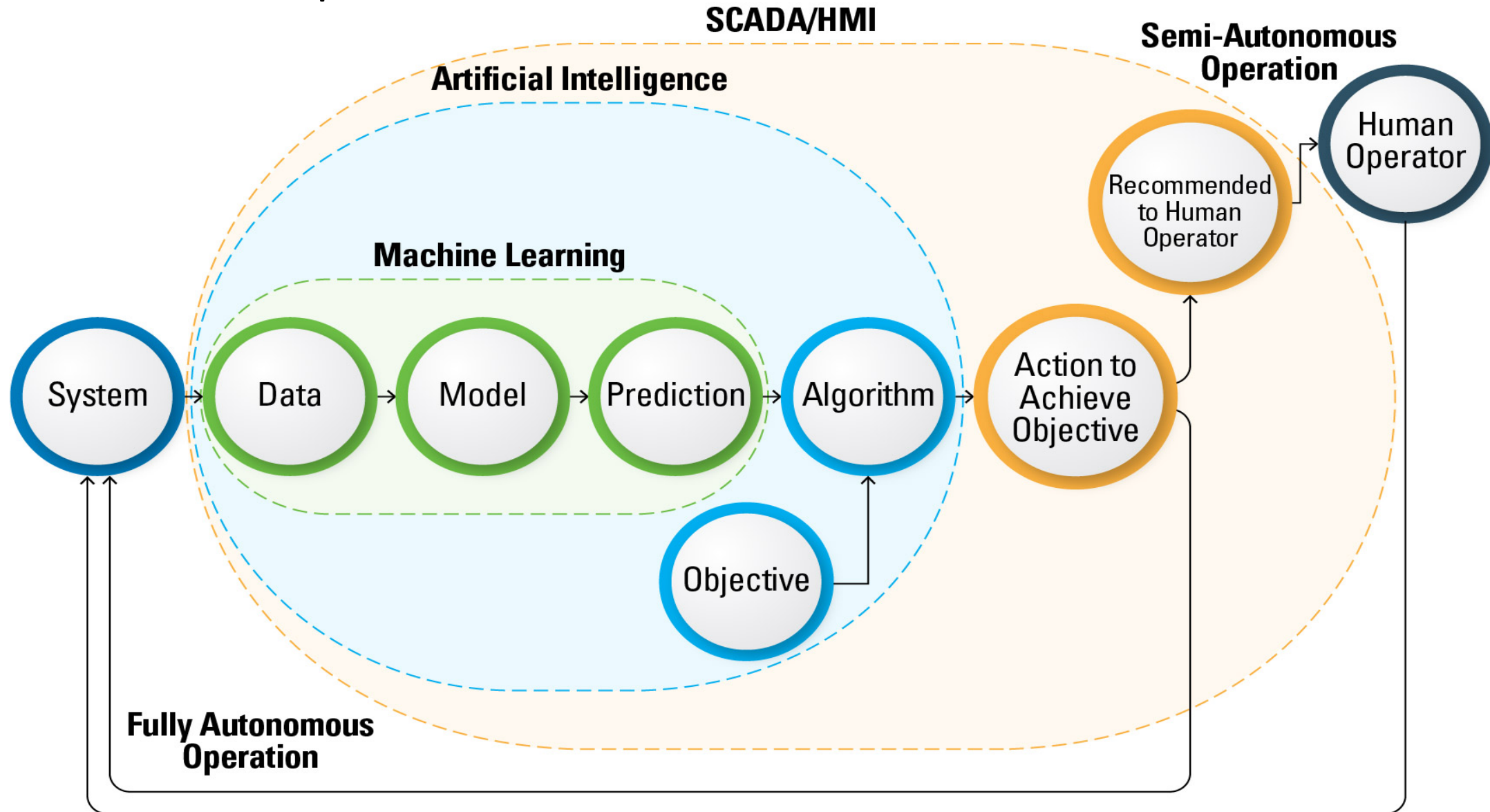


Consumer confidence = appropriate investment



Address emerging global and regional water stress

Our Perspective





Demonstration System

Advanced Monitoring

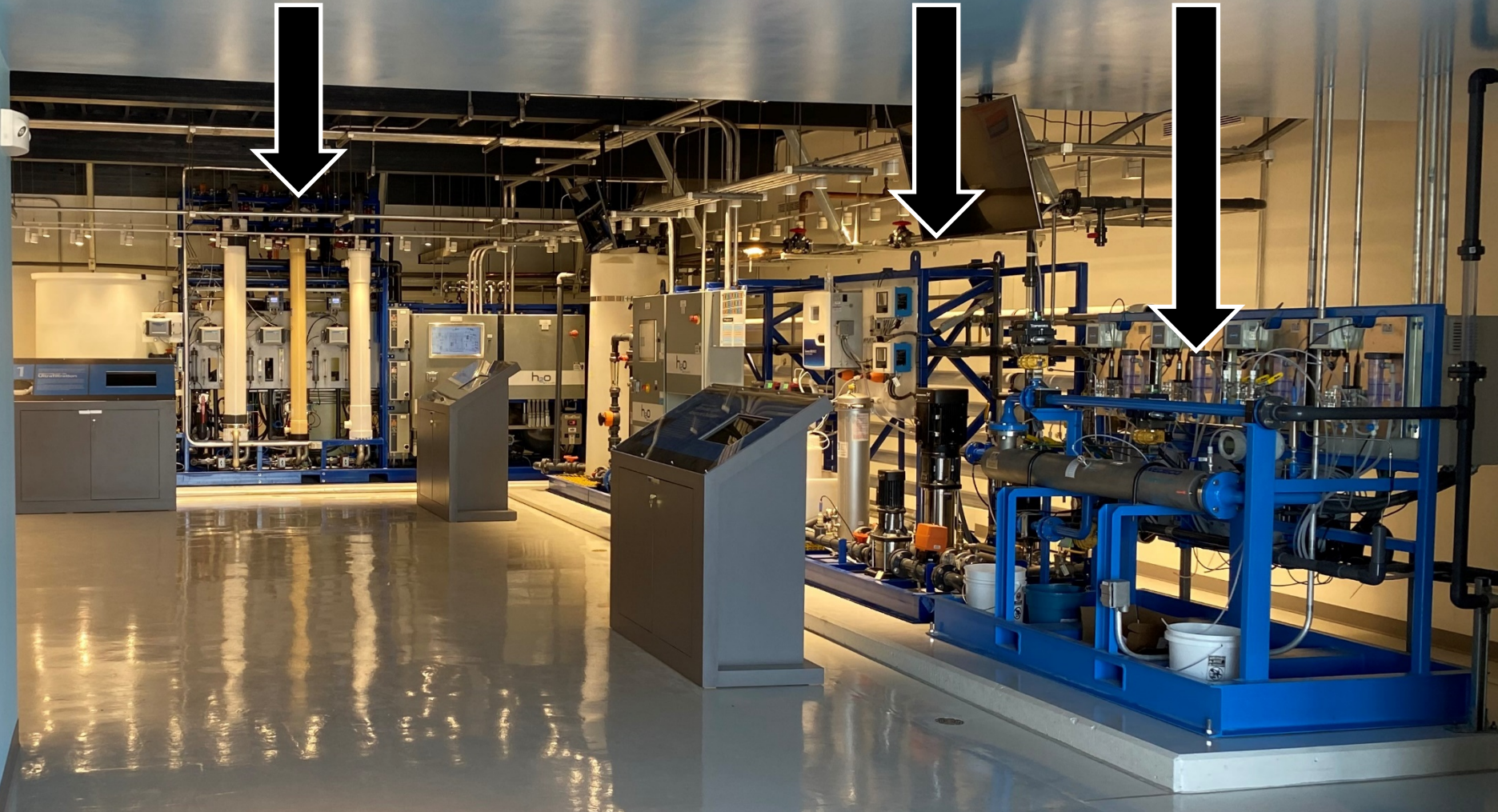
Fully Automated

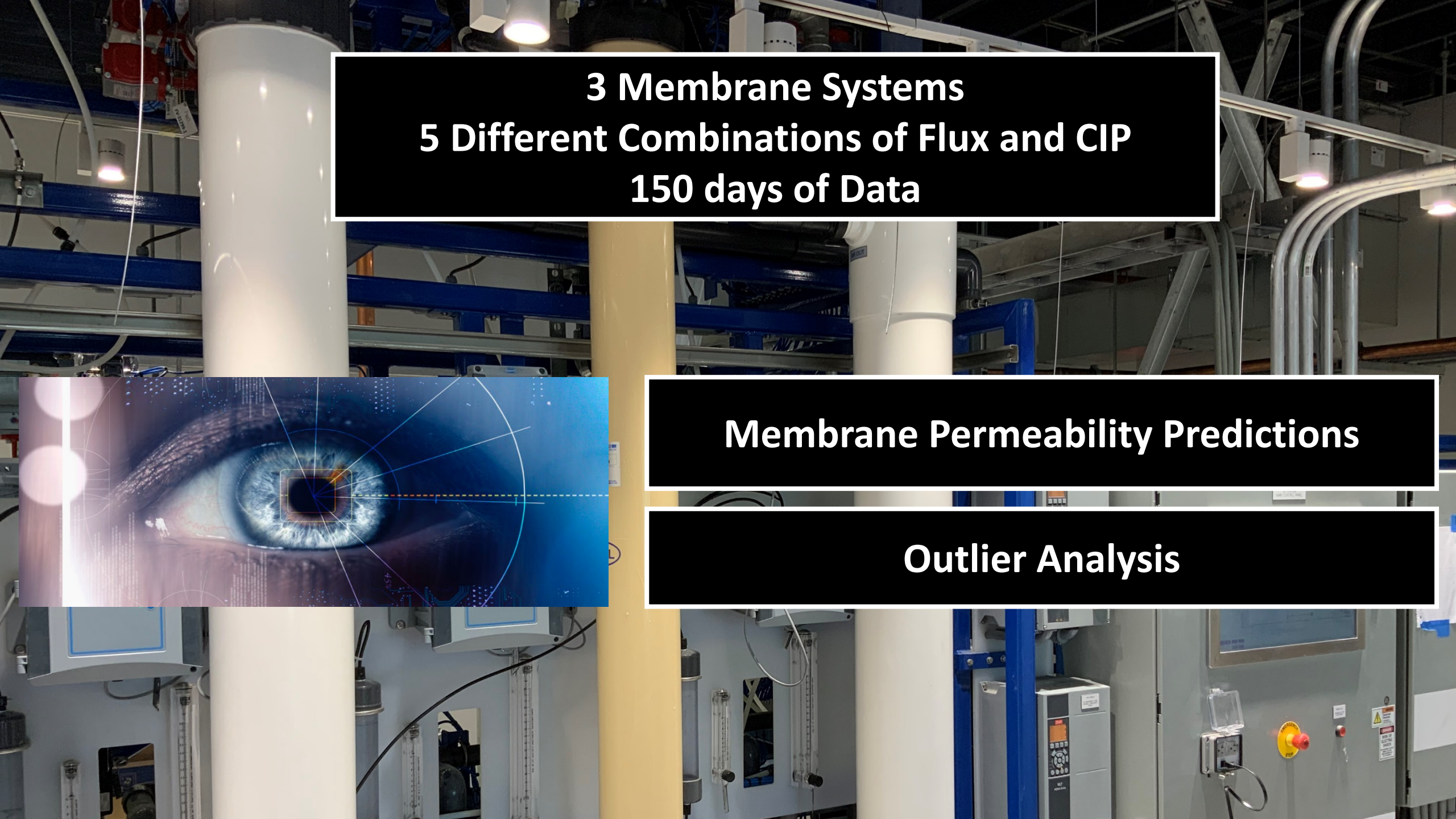
**Designed for
Research and
Optimization**

**Three Full-Scale
MF/UF Systems**

**2-Stage and
3-Stage
RO System**

**UV Advanced
Oxidation
System**



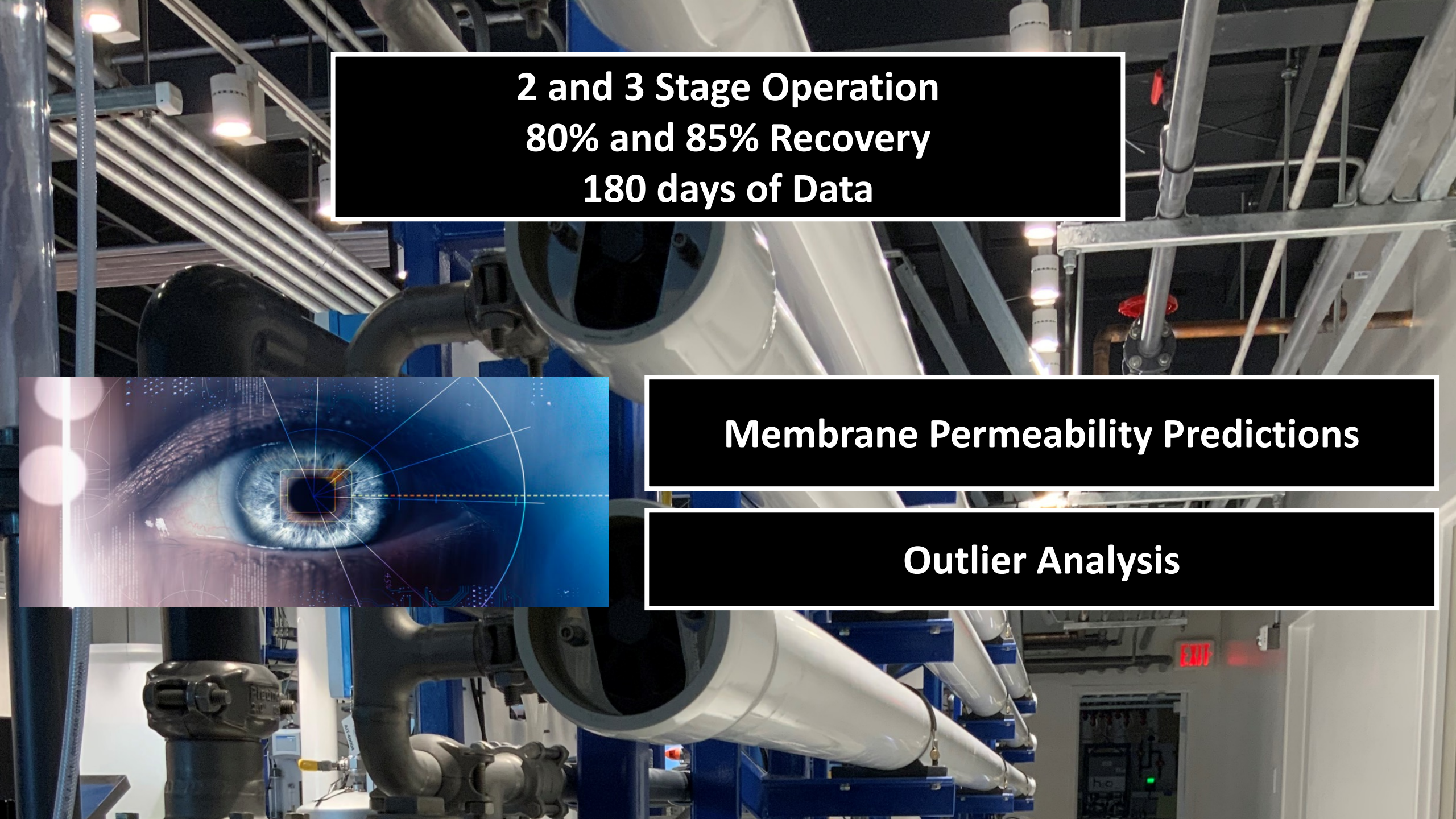


**3 Membrane Systems
5 Different Combinations of Flux and CIP
150 days of Data**



Membrane Permeability Predictions

Outlier Analysis

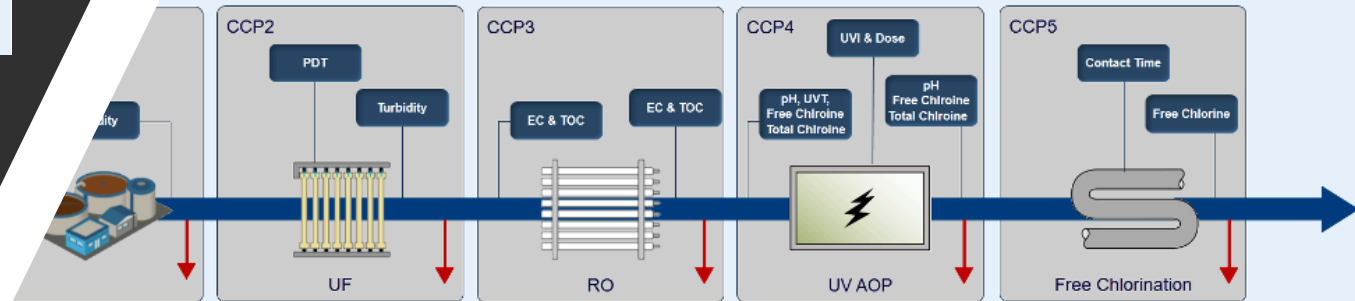
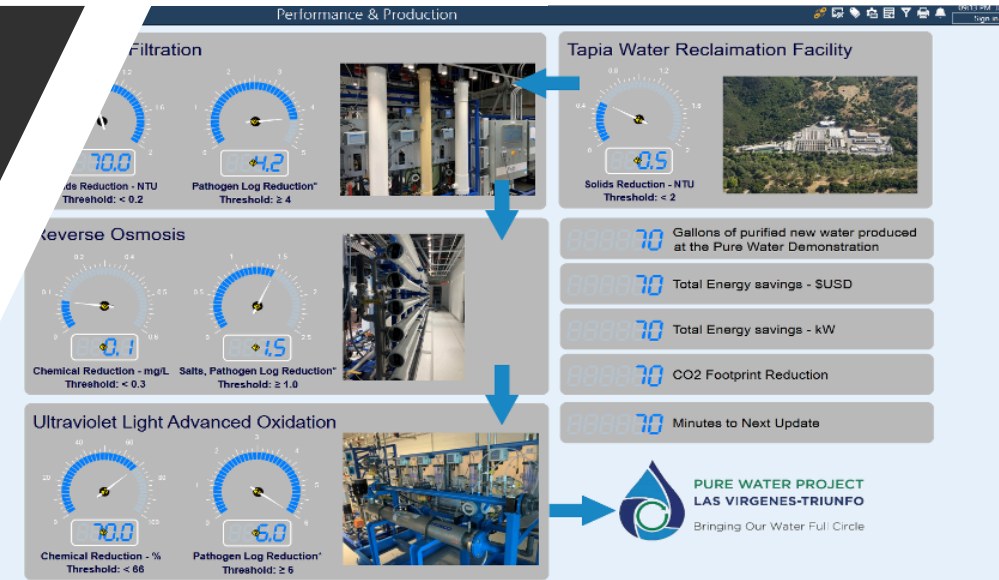


**2 and 3 Stage Operation
80% and 85% Recovery
180 days of Data**



Membrane Permeability Predictions

Outlier Analysis

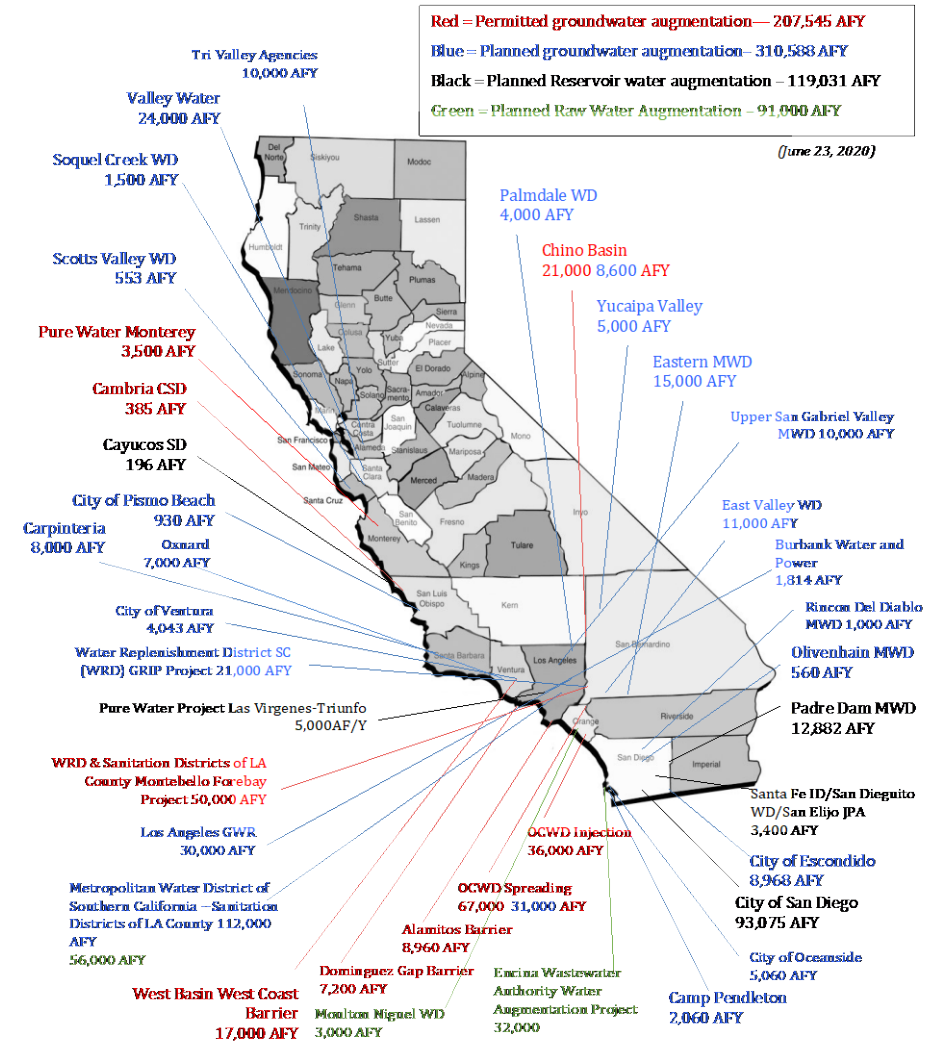


↓ = Diversion Point

Next Steps

- California Potable Reuse Regulations
- Memorandum of Cooperation
- SAO – OPTICS Demonstration
- Extend Membrane Optimization
- Community of Practice

Potable Reuse Projects



Acknowledgments

Yokogawa Electric Company

- Singapore Based DS Team
- Yasuhiro Matsui
- Tsuyoshi Abe

Carollo Engineers

- Andrew Salveson
- Jason Assouline
- Amos Branch
- Kyle Thompson
- B Naraynan

Orange County Water District

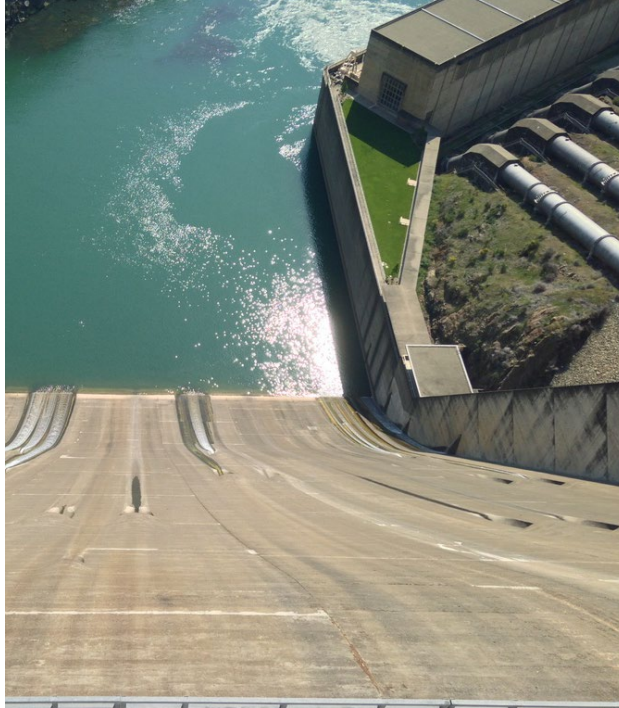
- Dr. Megan Plumlee
- Mehul Patel
- Jason Dadakis
- Mike Markus

Irvine Ranch Water District

- John Withers
- James Colston

National Water Research Institute

- Suzanne Sharkey
- Mary Collins
- Julie Abshire



Join Us

Kevin M. Hardy, JD

Executive Director

National Water Research Institute

Fountain Valley, California 92708

khardy@nwri-usa.org