Pure Water Demonstration and Artificial Intelligence Update

September 13, 2021

Pure Water Demonstration

Demonstration Project Goals

Goals
Demonstrate Pure Water
Evaluate Full-Scale Design Parameters
Train Operations Staff
Engage Stakeholders

Pure Water Performance

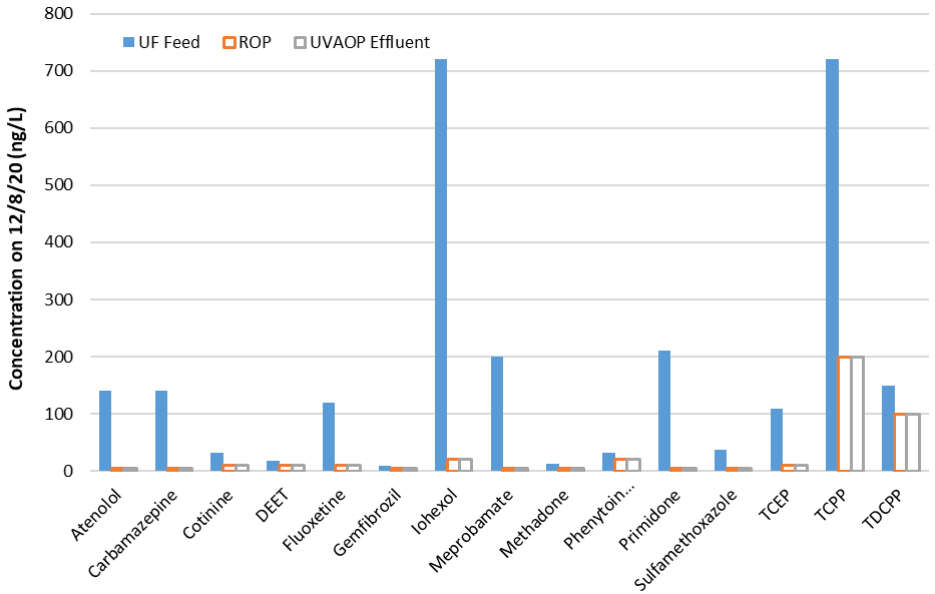
Microbiological (Pathogens) 12/10/10 Log Reduction

Process	Virus	Protozoa
Microfiltration/ Ultrafiltration	2.5+	4+
Reverse Osmosis	2+	2+
Ultraviolet Light with Advanced Oxidation	6	6
Free Chlorination	5	0
Totals	**15.5+**	**12+**

Pure Water Performance

Chemicals

Parameter	Feed	Purified Water
Total Dissolved Solids (TDS)	~750 mg/L	~20 mg/L
Total Organic Carbon (TOC)	6 to 7 mg/L	0.06 to 0.08 mg/L



¼ Sampling for regulated pollutants, zero exceedances of MCLs

Extensive sampling of CECs, zero exceedances of health levels

Full Scale Design

3 Suppliers Fully Vetted

Future “Flux” of 40 to 50 gfd, much greater than conventional 25 gfd designs

$Ms saved due to higher Flux

Operator Training

Conventional Ops Certifications Not Enough!

AWTO Required for Potable Reuse

Engage Stakeholders

Artificial Intelligence/Machine Learning

Broad Collaboration for Project Success

Project Participants

NORI

PURE WATER PROJECT
LAS VIRGENES-TRIUNFO
Bringing Our Water Full Circle

carollo

YOKOGAWA

IOSight

Funding Partners

METI
Ministry of Economy, Trade and Industry

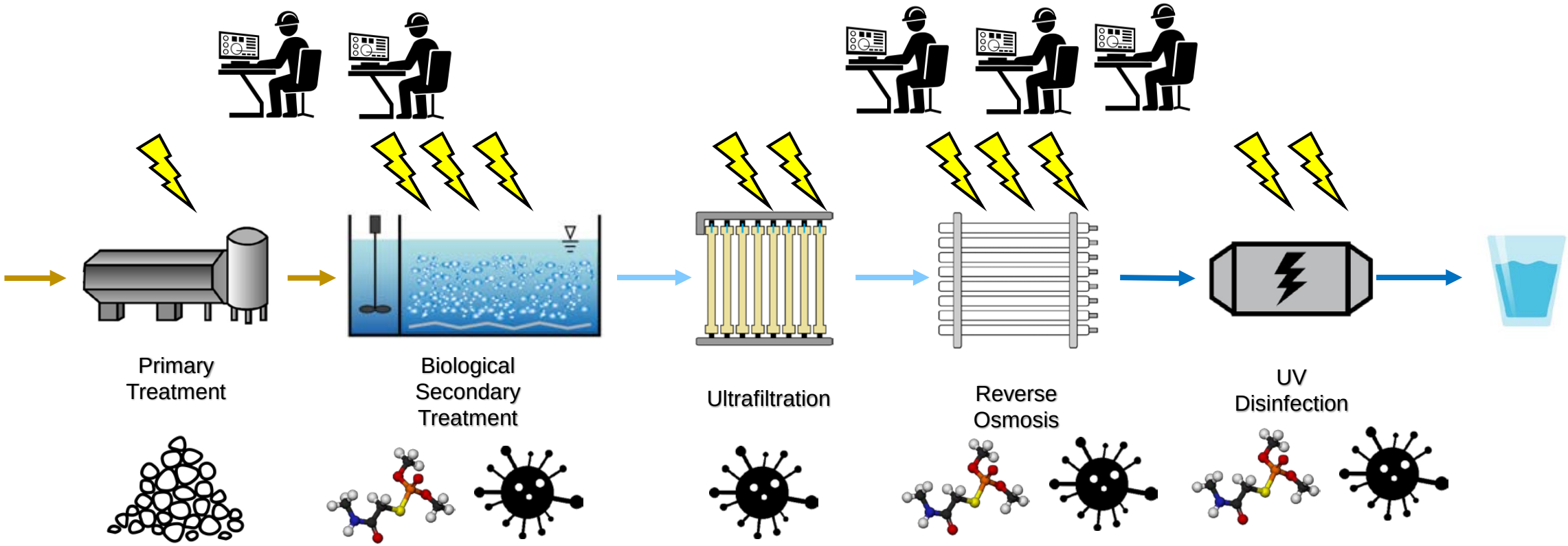
PURE WATER PROJECT
LAS VIRGENES-TRIUNFO
Bringing Our Water Full Circle

YOKOGAWA

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Wholistic Approach to Energy Use and Water Quality



First Work Completed as Part of MWD FSA Grant

Las Virgenes Municipal Water District
FSA Study on Artificial Intelligence

FINAL REPORT

August 2021

Subsequent and Extensive Analysis Moving Ahead

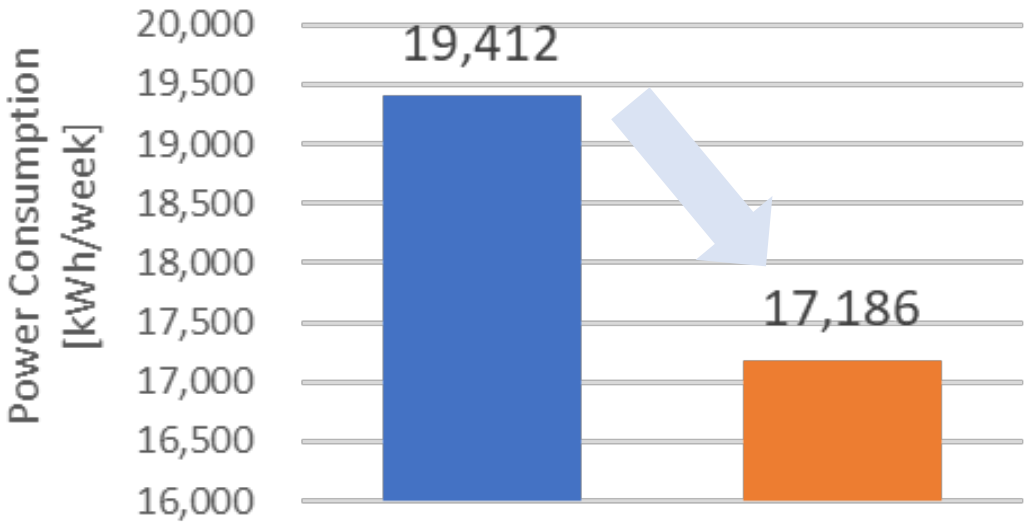
METI
Ministry of Economy, Trade and Industry

YOKOGAWA

Reducing Energy Use at Tapia!

- Nutrients and Performance →
- Airflow ↓
- Power ↓

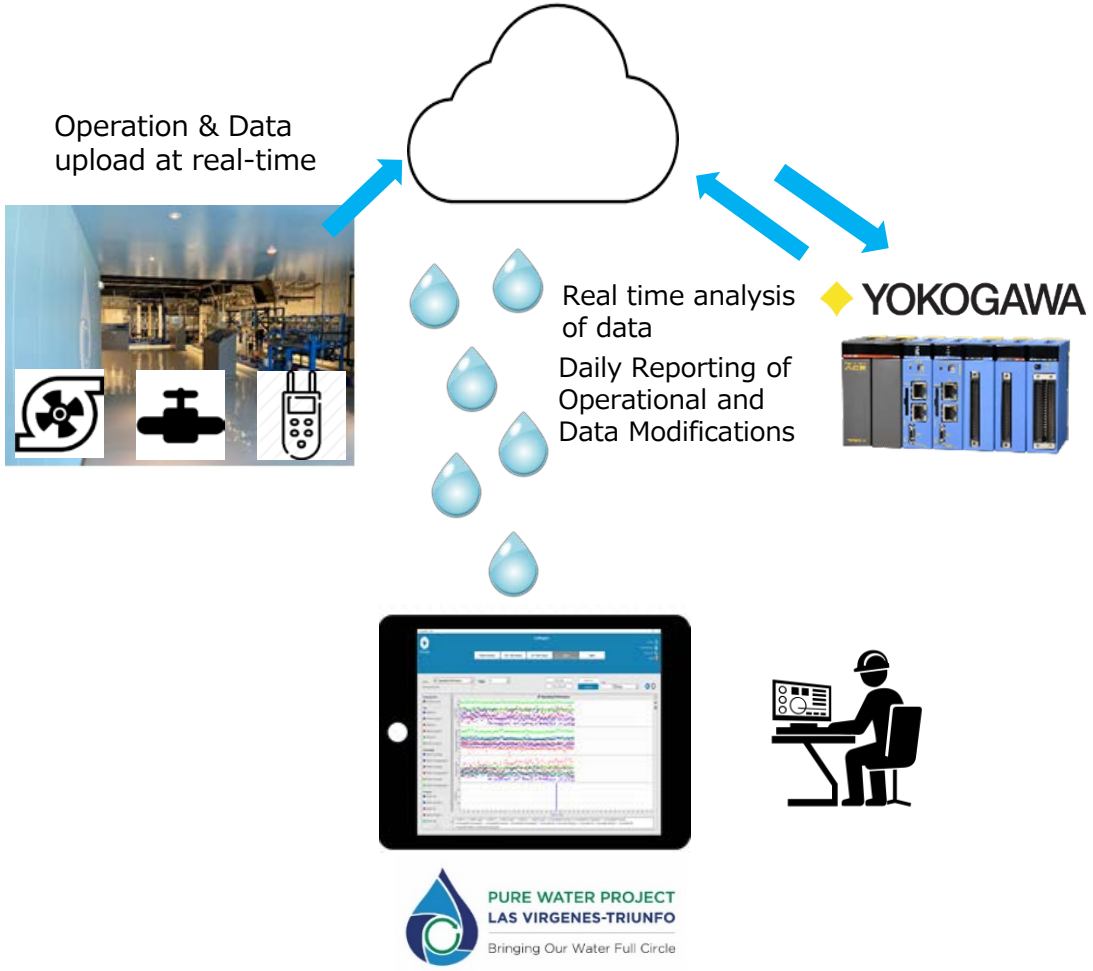
AI/ML Predicts 10% Energy Savings



- Data Driven Model Optimization (DDMO)
- Accurately Predicts Performance
- Energy Savings!

We have the Technology…but how do best communicate it?

OPTimization Interface and Control System (OPTICS)



Full-scale OPTICS Trials Now Underway

PURE WATER PROJECT
LAS VIRGENES-TRIUNFO
Bringing Our Water Full Circle

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

Thank You!