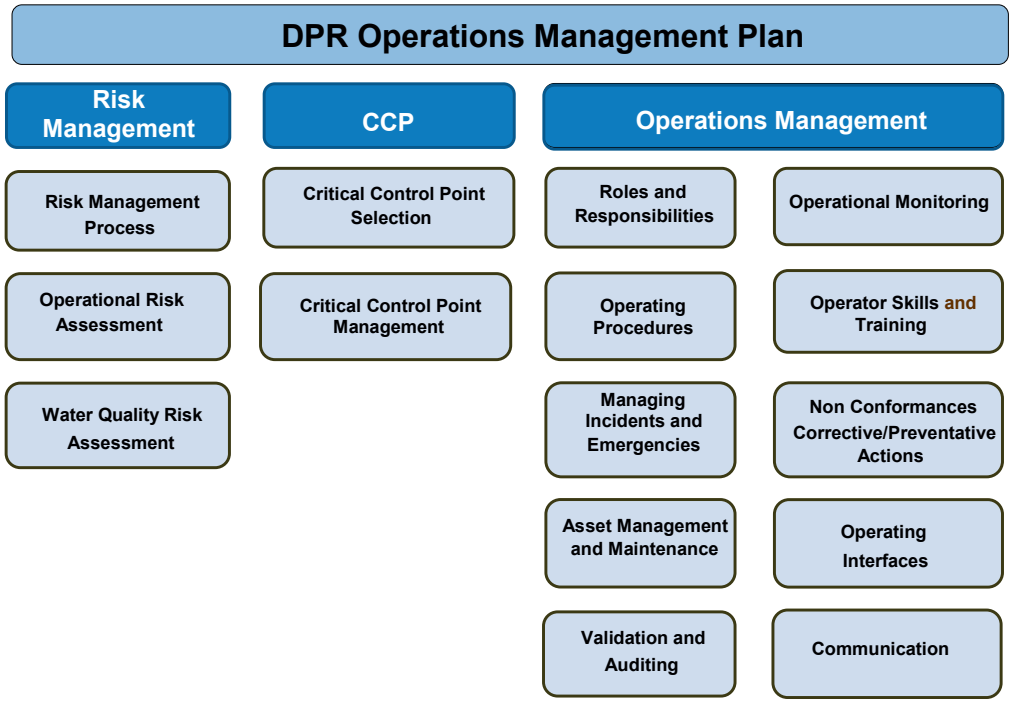
Executive **Summary**

WATER ENVIRONMENT & REUSE FOUNDATION

Outlining an operational framework for direct potable reuse

Development of an Operation and Maintenance Plan and Training and Certification for Direct Potable Reuse (DPR) Systems (Reuse-13-13)



The Central Issue

As the perceived "human element" in the process, operation teams must have robust and reliable operational plans, systems, and processes to ensure safety and reliability – essential elements for the advancement of public acceptance of direct potable reuse (DPR). Current certification programs for wastewater and drinking water do not cover the full array of issues that DPR system operators will encounter in operation of DPR systems.

Context and Background

There are important gaps in current wastewater and drinking water operator certification programs to address when considering DPR systems. This research responds to the need for meaningful, actionable advice that can assist in making DPR a reality in California. It provides guidance on permitting structure, operations and maintenance protocols, and training and certification programs. The researchers sought to develop a standard operations and maintenance plan framework for various DPR treatment processes and to develop a DPR Training and Certification framework for DPR system operators. The results address gaps in training, certification, and permitting programs. They support efforts to expand DPR in California and beyond.

Findings and Conclusions

The overall product of this study is the outline of an operational framework for DPR. The framework incorporates risk management principles and in particular the HACCP (Hazard Analysis and Critical Control Point) methodology for considering a holistic review of operational requirements. The purpose of the HACCP methodology is to determine the points in a treatment train that are most critical to the protection of public health. Additionally, specific attention was given to the requirements of a training and certification framework.

This report provides a comprehensive review of operational requirements in the consideration of a DPR facility. The operational framework can be used as a whole, or in part to inform and support operational planning for future DPR, as well as indirect potable reuse facilities. It will support designers, operators, and regulators in ensuring the appropriate level of design and operational planning requirements.

The operations and training certification element of this research provides additional material for consideration for the development of certification and training programs. It supports other efforts currently underway in California and elsewhere.

Management and Policy Implications

As DPR and other applications of advanced water treatment become more widespread, there will be a need to ensure that facility operators are sufficiently trained and qualified. Unfortunately, current certification programs for wastewater and drinking water do not cover the full array of issues that DPR system operators will encounter. With a review of existing operator certification and training systems across the United States and internationally, this research provides recommendations for the needed DPR operational requirements along with a training and certification system.

Participating Agencies

The following agencies provided access to operational planning and training materials, as well as other operational management systems and processes.

City of Los Angeles, CA – Bureau of Sanitation

Orange County, CA Water District

Suez Environnement

West Basin Municipal Water District

Trojan UV

Separation Processes Inc.

Santa Clara Valley Water District, CA

Related WE&RF Research

Project Title and Number	Research Focus
Utilization of Hazard Analysis and Critical Control Points Approach for Evaluating Integrity of Treatment Barriers for Reuse (WRRF-09-03)	Builds on Australian and broader international experience with HACCP for recycled water management to help evaluate, pilot test, and tailor a HACCP approach for microbial control in U.S. reclaimed water systems.
Critical Control Point Assessment to Quantify Robustness and Reliability of Multiple Treatment Barriers of a DPR Scheme (Reuse-13-03)	Researchers conducted a hazard assessment for key unit operations for DPR treatment trains to develop best design, monitoring, and operational practices by evaluating critical process control points in each of the DPR treatment trains evaluated to meet overall system robustness and reliability.
Developing Curriculum and Content for DPR Operator Training (Reuse-15-05)	Builds upon research efforts to develop the content needed to train operators in advanced treatment processes such as membrane- and non-membrane-based treatment, as well as important operations/ management aspects of a potable reuse scheme.

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