

# ADDRESSING ELEVATED LEVELS OF CONTAMINANTS

## City of Tucson Treatment Plant Expansion

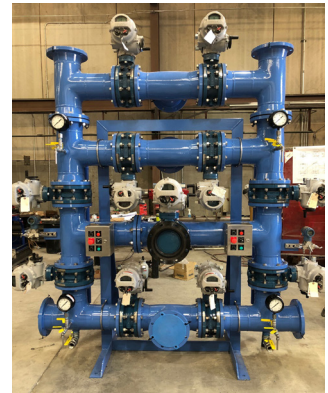
### BACKGROUND

The City of Tucson's water treatment plant was treating 1,4-dioxane using UV AOP with eight existing GAC/carbon vessels for peroxide quenching. Water quality testing revealed significant PFAS contamination. Instead of using their existing vessels, plant managers determined they needed to expand capacity to increase the empty bed contact time for PFAS removal, which requires more time than the peroxide quenching application.

### PROJECT DETAILS

The City of Tucson chose PCL Construction to manage the treatment plant expansion as a Construction Management At Risk (CMAR) project. Carollo Engineers was selected as the design consulting firm, and Aqueous Vets® (AV®) came on board as the treatment and delivery systems provider. During the RFP process, PCL was reassured by AV's technical knowledge of the mechanical equipment and treatment technology and the company's commitment to meeting an aggressive schedule.

PCL Construction depended on AV's Concept to Commission principle and unique ability to handle both the design and installation based on their understanding of engineering, corrosion management and media optimization. AV's expertise contributed to a robust design-build team partnership that resulted in a successful PFAS treatment solution.



#### PROJECT LOCATION

Tucson, AZ

#### PROJECT TIMEFRAME

Dec. 2019 – June 2020

#### AV® SCOPE OF WORK

\$892,000

#### GENERAL CONTRACTOR

PLC

#### PROJECT TYPE

Manufacture, Supply

#### PROJECT PHASE

Complete

#### END USER

City of Tucson, AZ

#### DESIGN ENGINEER

Carollo Engineers

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## SUMMARY OF SYSTEM DESIGN - TWO 12-FT DIAMETER LGAC SYSTEMS

ITEM DESCRIPTION	UNIT	VALUE
Number of Systems / Vessels per System	-	2/2
Operating Configuration	-	Parallel / Lead-Lag
Vessel Diameter	ft.	12
Carbon Capacity / Volume per vessel	ft. <sup>3</sup>	621.7
Design Flow Rate (New WTP / per System)	gpm	5,580 / 930
Estimated Backwash Flow Rate	gpm	900 - 1,100
Hydraulic Loading @ 930 gpm	gpm/ft <sup>2</sup>	8.2
Empty Bed Contact Time @ 930 gpm (per Vessel / Per System)	minutes	5.0 - 10.0
Vessel Backwash Expansion Capacity	-	30% Minimum
Underdrain	-	Septa / External Ring header
Seismic	-	Site Class D
Importance Factor	-	1.5
System Overall Height to Top of Pipe	ft.	15' - 9"

## GAC MEDIA ANALYSIS

The table below illustrates the impact of apparent densities of different GAC materials as identified for standard manufacturers. The below table also provides the volume of GAC required in each vessel to meet a 5-minute EBCT at a design flow of 930 gpm.

GAC	Size	Iodine Number	Approx. Apparent Density (g/cc)	Approx. Apparent Density (lbs./ft <sup>3</sup> )	GAC for 5 min EBCT (ft <sup>3</sup> )	Required Weight per vessel (lbs)
Cabot Norit GAC 400	12x40	1,000	0.49	31.0	621.7	19,273

