Dry Wash PFAS and Heavy Metals Evaluations

CITY COUNCIL WORK MEETING 5/2/24

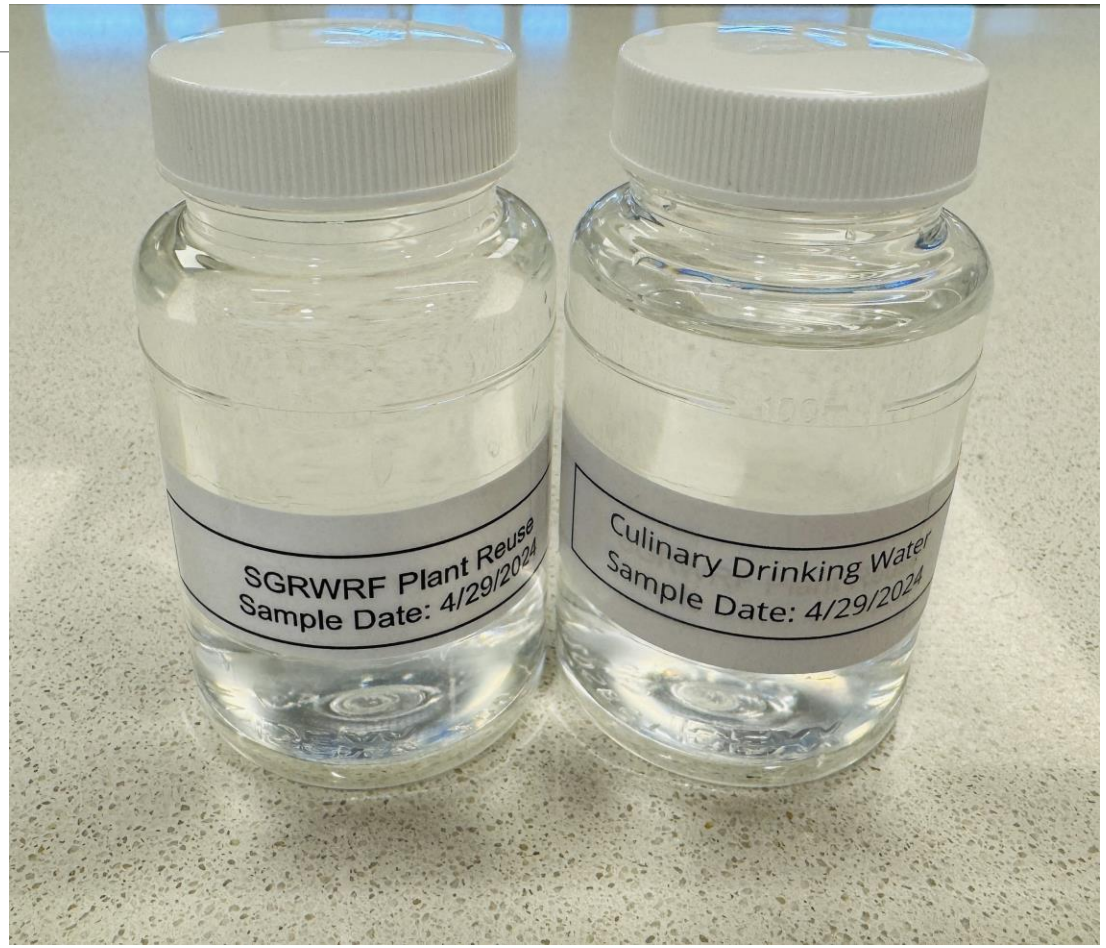
St George Regional Water Reclamation Facility

Goes through multiple steps of treatment.

- Chemical Flocculation
- Primary Physical Settlement
- Secondary Biological Breakdown and Settlement
- Ready for Discharge to the Virgin River
  - 25 ppm of Total Suspended Solids
  - 17 ppm BOD

Reuse Facility

- Traveling Bridge Sand Filter
  - Max 5 ppm of Total Suspended Solids
  - Turbidity 2 NTU
  - 1.0 mg/l of Chlorine Residual, E. Coli not detected in median sample



Heavy Metals Evaluations

St George Regional Water Reclamation Facility is required to test for Heavy Metals as part of their permit to discharge to the Virgin River.

17 Metals were tested in the January sampling that I was given a copy.

8 metals were not detected.

9 metals were detected.

None of the effluent measurements exceeded Drinking Water Standards for these metals.

		1/8/2024	1/9/2024		EPA Drinking Water Standards				% DW Limit
Metals	units	Influent	Effluent		MCL	Secondary	HA		
Cyanide	mg/l	ND	ND		0.2				0%
Aluminum	mg/l	0.3	ND			0.2			0%
Antimony	mg/l	0.0024	0.0022		0.006				37%
Arsenic	mg/l	0.0047	0.0044		0.01				44%
Boron	mg/l	0.43	0.41				5		8%
Cadmium	mg/l	0.0002	ND		0.005				0%
Chromium	mg/l	0.0022	0.0008		0.005				16%
Copper	mg/l	0.0337	0.0032		1.3				0%
Iron	mg/l	0.32	ND			0.3			0%
Lead	mg/l	0.0011	ND		0.015				0%
Mercury	ug/l	24.1	1.3		2,000				0%
Molybedenum	mg/l	0.0035	0.0027				0.04		7%
Nickel	mg/l	0.0025	0.0014				0.1		1%
Selenium	mg/l	0.0006	ND		0.05				0%
Silver	mg/l	ND	ND			0.1			0%
Thallium	mg/l	ND	ND		0.0002				0%
Zinc	mg/l	0.13	0.06			5			1%

PFAS Evaluations

SGRWRF tested for PFAS on August 25, 2023 and March 6, 2024

Samples were analyzed for 40 PFAS Chemicals

8/25/23 samples of effluent were found to contain 10 PFAS chemicals.

3/6/2024 samples of contained 8 PFAS Chemicals.

How does reuse water compare to new EPA PFAS Drinking Water Standards

Chemical	MCLG ppt	MCL ppt	8/25/2023 ppt	3/6/2024 ppt
PFOA	0	4	11.5	10.6
PFOS	0	4	2.1	2.9
PFHxS	10	10	0.99	1.3
HFPO-DA	10	10	0	0
PFNA	10	10	1.2	0
Mixture Criteria	1*	1*	0.22	0.13

Concentration of Contaminants in Reservoir

Analysis assumptions:

- 1500 AF reservoir
- 300 AF dead pool
- Reservoir is 100 percent filled with reuse water (drought year) during a 6 month period October to March.
- Reservoir is drained to dead pool from April to September.
- 7.2 sq mile drainage basin, 10” rain annually, used 5” denoting drought conditions.

Results:

- Started with PFOA concentrations 10 ppt. After 1-year PFOA concentrations dropped to 7.2 ppt using mass balance equations. The evaporation of water in the reservoir did not cause concentration of the PFOA.

Accumulation of Contaminants in Reservoir Sediments

PFOA is a liquid that does not settle out easily.

It may accumulate in sediment by the fact that when the water recedes, water retained in the soils will evaporate and leave the PFAS residue attached to the soils.

Sediment is accumulating from the natural basin.

1200 AF of water contains 14 grams of PFOA