

CASE STUDY

Olift™, Ozone Foam Fractionation achieves PFAS non-detection for fire training water

REMEDIATION PROJECT

**Hobart International Airport
Hot Fire Training Ground**

MATERIAL

PFAS Contaminated Fire Fighting Water

VOLUME

106,000 gallons (400,000 liters)

PRINCIPAL

Airport Emergency Services Provider

LOCATION

Hobart, Tasmania, Australia



Olift™

BREAK FREE FROM PFAS™

SUMMARY

Supporting airports, EVOCRA has delivered a 6,600 gallon/day ozone foam fractionation advanced water treatment plant (manufactured and marketed exclusively in the USA and Canada by Ovivo) to remove PFAS from fire-fighting fluids. During live fire training, PFAS is leaching from hard surfaces, even though the client has not used PFAS foams at any of its sites since 2010. All the water is collected for treatment.

Installation of the plant occurred in mid 2018, with the plant continuing to operate until demobilization in late 2019. As required by the client, the treated water produced by the water treatment plant has no detectable PFAS, (<0.01µg/L). All water was batch tested prior to discharge to local infrastructure.

Although the site only required a 2,600 gallon/week plant for its current need a larger plant was supplied to allow for storm events and future work.

SOLUTION

Initially, Olift™ was installed with a RO final polish stage, with IX resin to treat the RO's brine. However, due to performance concerns associated with operating the RO at low temperatures, the plant was reconfigured to utilise the small IX resin bed as the final treated water polish.

IX resin bed volumes before breakthrough are expected to increase by a factor of 10 with the Olift™ pretreatment.

RESULTS

The combination of the Olift™ and IX polishing systems has provided non-detection for all measurable PFAS compounds, providing a high level of reliability in meeting local drinking water criteria.

CONTAMINANT	INFLUENT QUALITY	Olift™ TREATED	PERCENT VARIANCE	POST NF/RO POLISH	PERCENT VARIANCE
pH	8.33	4.48		4.34	
PFOS	27.5 µg/L	0.05 µg/L	99.81%	<0.01 µg/L	99.96%
PFOA	1.39 µg/L	<0.01 µg/L	99.22%	<0.01 µg/L	99.28%
PFHxS	3.77 µg/L	0.11 µg/L	97.15%	<0.02 µg/L	99.47%
PFHxA	4.25 µg/L	3.22 µg/L	24.05%	<0.02 µg/L	99.53%
PFBS	1.11 µg/L	1.04 µg/L	6.50%	<0.02 µg/L	98.20%
PFBA	1.77 µg/L	1.67 µg/L	5.45%	<0.1 µg/L	94.35
6:2 FTS	4.03 µg/L	<0.05 µg/L	98.76%	<0.05 µg/L	98.76%
8:2 FTS	28.9 µg/L	0.06 µg/L	99.76%	<0.02 µg/L	99.93%
Sum of PFAS	49.7 µg/L	7.90 µg/L	84.1%	<0.01 µg/L	99.98%

ISSUE

Historical use of PFAS in aqueous film forming foam (AFFF), industrial surface coatings and other household products, coupled with their persistent nature and high mobility, has led to a widespread global problem. PFAS is a group of over 10,000 synthetic compounds, with current human health concerns dominated by specific compounds including PFOS, PFOA and others. Additionally, there is growing apprehension about the potential toxicity of many shorter chain PFAS precursor compounds.

Traditional adsorbent methods do not provide a complete solution for PFAS. Adsorbent media, such as ion exchange resins and activated carbon, primarily target specific compounds such as PFOS, PFOA, and other long chain PFAS. Limitations of adsorbent media include an inability to capture short chain PFAS, high susceptibility to fouling when exposed to biology, blinding of the resin by many co-contaminants and the generation of relatively large volumes of spent media that requires landfill disposal at specialised facilities.

Olift™ offers a solution that produces clean treated water (>99.8%vol) and a PFAS concentrate (<0.2%vol). The concentrate is then sent for destruction, aligning with Ovivo's commitment to removing PFAS from the environment.

Olift™ and its patented advanced bubble technology has been developed and deployed for removing PFAS and other contaminants from the environment. We strive to produce high quality treated water streams with whole-of-project cost efficacy. We have achieved drinking water PFAS specifications from complex co-contaminated fluids, without pre-treatment.

TECHNOLOGY

The patented Olift™ process, marketed exclusively in North America by Ovivo, is a new generation technology that can be customized to meet the demands of the raw materials being treated. Olift™ utilizes micro-bubbles of ozone in a multiphase process that provides great versatility for the removal of contaminants and sediments via oxidation-reduction, precipitation, electrostatic flotation and if required reagent absorption, dependent upon the chemical group and species of interest.

Olift's vast gas-liquid interface elevates oxidation-reduction potential (ORP) conditions of the Olift™ chambers, degrading organic co-contaminants including petroleum hydrocarbons, and persistent contaminants as well as transforming metal ions into stable compounds and facilitating bubble adhesion for PFAS compounds. Degraded or stabilized byproducts are captured and removed via a number of industry established methods, providing a high-quality treated water. Collected contaminants can either be destroyed or disposed externally or where possible beneficially reused on site.

Olift™ ability to carry out several extractive techniques within a single reaction vessel provides significant advantages in reducing overall footprint and cost.

PROCESS

The multiple foam fractionation columns of an Olift™ plant remove greater than 99.5% of regulated PFAS from raw influents. This arrangement also reduces the total measured PFAS concentration by more than 85%, in the treated water.

The Olift™ process provides the following benefits:

- **Eliminates** down time from organic fouling due to its destructive treatment of almost all organic compounds.
- **Eliminates** process obstructions by removing suspended solids from the process fluid.
- **Reduces** the number of unit operations required for complex water contaminations by using the multifunction reaction chambers.
- **Reduces** waste volumes, which reduces on-site costs and external transport and disposal costs.
- **Recovers** resources, water and valuable minerals.
- **Reduces** reagent usage, by up to 75% in comparison to traditional methods. Reagents include adsorption media, if required for polishing to higher quality discharges.
- **Removes** contaminants from the environment eliminating risks to human health as well as other ecology.

APPLICATION

Olift™ can be installed either as a stand-alone process, an upstream bulk cleansing process for ultra-trace polishing processes or as a (pre- or post-) bolt-on to existing infrastructure. This versatility minimizes any potential disruptions to present operations. Olift™ plants are modular and can be scaled to meet any site requirements. Olift™ is designed to be energy efficient, while the energized process fluid, produced in the high oxidation-reduction environment, increases reagent efficiencies.

