

## ABSTRACT

The new Ujams Wastewater Treatment Plant is a newly operated treatment plant in Windhoek using the latest technologies to treat industrial wastewater. It was constructed to treat the industrial wastewater such that the final effluent meets the National and the US EPA standards. It replaced the old Ujams Wastewater Treatment Plant which had challenges treating the industrial wastewater and was releasing the effluent of poor quality into the environment. The new UWTP treats wastewater from industries located in the Lafrenz and the northern industrial area of Windhoek. These industries range from abattoirs, beverage companies, tanneries, metal plating and paint factories. The incoming wastewater is screened and de – gritted. It passes through the latest generation membrane bioreactor, a UV disinfection stage, sludge treatment and odour treatment process before being discharged into the Klein Windhoek River. This study generally aimed to investigate how the effluent from the new UWTP impacts the water quality of the Klein Windhoek River.

Water samples were collected at the inlet and outlet point of the new UWTP to determine the physical and chemical parameters in the wastewater that is received by the plant and in the final product of the plant. Some water samples were also collected from the Klein Windhoek River, upstream and downstream of the plant's discharge point. Secondary data on the quality of the effluent was collected from the City of Windhoek to measure the performance of the new plant in achieving its objective of achieving a tertiary treatment of  $\text{NH}_4 - \text{N} \leq 1.0 \text{ mg/l}$  and  $\text{PO}_4 - \text{P} \leq 0.2 \text{ mg/l}$ . The water samples were collected from February to May 2016 and were analyzed onsite for physical parameters (pH, temperature, Electrical Conductivity (EC), Dissolved Oxygen (DO), Total Dissolved Oxygen (TDS), Chemical Oxygen Demand (COD), and Turbidity). Chemical parameters (copper, cadmium, chromium, lead, zinc, nickel, iron) were analyzed at NamWater laboratory. The secondary data indicate a positive performance trend with close to 100% efficiency. All detected chemical parameters met the standards set out in the Water Act (Act No. 54 of 1956), Water Resource Management Act (Act No. 11 of 2013) and US EPA. However, the COD and EC exceeded the allowable limits at all four sampled stations with the highest record obtained at the inlet to the plant. The TDS and DO recorded levels upstream of the discharge point were also above the allowable limits. Generally, the new UWTP complies with most effluent standards and is improving the quality of the water in the Klein Windhoek River.

**Key words:** Klein Windhoek River, Ujams Wastewater Treatment Plant, Ujams Oxidation Ponds, Heavy Metals.