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Evaluation of the performance of a rural municipal wastewater treatment plant in Nacogdoches, East Texas (USA) (Abstract)

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Abstract:

The performance of a rural wastewater treatment facility, Nacogdoches Wastewater Treatment Plant (NWWTP), in East Texas, USA, was assessed from January 2013 through June 2014. The elemental concentrations (Na, Mg, Ca, Ni, Pb, Mn, Cr, Mo, and Cu, Al, As, B, Ba, Ag, Cd, Fe, Hg, K, Se, Zn, Co, P, and S) were measured using inductively coupled plasma optical emission spectrometry. The anion concentrations (Br⁻, NO₃⁻, NO₂⁻, PO₃⁴⁻, F⁻, Cl⁻, and SO₂⁴⁻) were measured by ion chromatography. In general, the NWWTP was found efficient in removal to ≥ 96% for metals. The removal efficiency for anions was in the range 33–100% (33% for Cl⁻, 39% for F⁻, 84% for PO₃⁴⁻, and >96% for NO₃⁻ and NO₂⁻). The mean concentrations for Cl⁻, NO₂⁻, NO₃⁻, PO₃⁴⁻, F⁻, and SO₂⁴⁻ were in the range 0–172.5, 0.0–0.4, 0.0–18.6, 0.0–98.0, 0.0–0.9, and 4.0–89.4 mg/L, respectively. The concentrations for most metals and anion concentrations, with the exception of phosphates, were found below USEPA maximum contaminant limits.

Keywords: wastewater treatment, water quality, activated sludge, Nacogdoches; ion chromatography, inductively coupled plasma optical emission spectrometry (ICP-OES)