"What we are doing to the forests of the world is but a mirror reflection of what we are doing to ourselves and to one another."
— Mahatma Gandhi

EDITORIAL

Zero Liquid Discharge

Zero Liquid discharge, well known as ZLD is not a new term to many practicing environmental professionals. ZLD technology has been available and mandated in industries in Europe since the 1980s. The implementation in India has gained success in some industries, such as distilleries and also did not result any good in many others, for example pulp and paper. Some experts blame that the definition of ZLD is not very clear. The Central Pollution Control Board (CPCB) defines ZLD as installation of facilities and system which will enable industrial effluent for absolute recycling of permeate and converting solute (dissolved organic and in-organic compounds/ salts) into residue in the solid form by adopting method of concentration and thermal evaporation. ZLD will be recognized and certified based on two broad parameters that is, water consumption versus waste water re-used or recycled (permeate) and corresponding solids recovered (percent total dissolved / suspended solids in effluents).This definition is often misunderstood. Many regulators in India have also twisted the requirement of ZLD, which has diluted the need and perception. In simple terms ZLD means 100% recycle or reuse of treated wastewater in manufacturing and allied processes or in domestic usages. However, use of treated wastewater in watering greenbelt is not considered as ZLD.

A close look at the Environment Statement for the Financial Year 2018-19 submitted by Aditya Aluminium, Lapanga to the Odisha State Pollution Control Board, shows that the company claims zero disposal of wastewater. Under Part-C, the water pollution discharged to the environment per unit of output has been stated as "Nil", as against water consumption of nearly 32802 KLD (process+cooling+domestic). There is no statement regarding RO reject characterization and disposal. Further, the treated wastewater from Sewage Treatment Plants of capacity 600 KLD +300 KLD is disposed of onto the land for watering greenbelt. This disposal falls under regulation and is a part of the water pollution pertaining to the industry's activities. Therefore, this pollution, RO reject should have been accounted for. The Odisha State Pollution Control Board, the Zonal Office of the Central Pollution Control Board, and also the Regional Office of the Ministry of Environment, Forest, and Climate Change should act on this. All these authorities must have received copies of the statement, as per applicable legal requirements. There might be several cases like this in India.

Another important factor is that ZLD systems are associated with significantly high capital investments and even higher operating expenses. There is a need to find various options to reduce the ZLD CAPEX and OPEX. Although currently the industry is looking at it as a challenge and a sunk cost, in long term ZLD has the potential to provide tangible as well as intangible benefits to the companies. Apart from this in some cases this cost can be offset by the resource recovery i.e. salt and other chemicals which can be again reused in the process. In textile industry for example there is enough scope to recover salts and brine solution which can be reused in the manufacturing process and reduce the impact of treatment cost on the overall cost of production. Nevertheless, there are several industries, such as; pharmaceutical industries and food industries, where implementation of ZLD seems to be highly impractical or needs to be designed very carefully.

The ZLD mandate has helped increase the focus of the industry to water which has traditionally been an underpriced resource.

Ecological Rejuvenation of Mowa Lake, Raipur

By
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Sprawling over an area of two acres, Mowa Lake is a magnificent waterbody in Raipur, the capital city of Chhattisgarh. Its location near the civil lines, the Legislative Assembly and the posh residential area of the city – makes it more special. The city administration takes utmost care for maintenance of the waterbody. In 2017, the whole Lake was decanted, desludged and refilled.But it was back in a mess in just two years of time. And, the principal cause of the problem was sewage, which is linked to the human population. Burgeoning population in cities is well known. On a conservative estimation, human being generates a minimum of 33 litres of sewage every day. The two most prevalent chemicals in sewage are ammonia and phosphates.Ammonia has been used around the household for decades, despite it being also dangerous if not used properly. Ammonia can eliminate stains and tarnish and can also be used against hard-to-remove soap build up in tubs, sinks and bathroom tiles. It is mostly used as a cleaning agent.Naturally occurring inorganic phosphates are found in virtually every living thing which means it's a key source is food and food waste, and synthetic phosphates are used in a wide variety of applications, including cleaning and baking products, as well as fertilizers. In addition to cleaning products, phosphates have a dizzying number of other uses. They may be found in water-based paints and coatings, metal polishes, flame retardants, processed foods, personal care products, pharmaceutical products, and more.

Thus, the key ingredients of our sewage are ammonia and phosphates, access of which causes a phenomena called "eutrophication" in Waterbodies. And due to eutrophication, the weeds develop, cover the surface, which in turn make an anaerobic environment in Water helping pathogenic microbes to grow and eventually the Waterbody dies with sludge in the bottom, water in between and weeds / algae covering the top surface.

Sustainable Solution: Cownomics© technology is one of the best and eco-friendly solutions for in-situ restoration of lakes and waterbodies. The Raipur Smart City Limited opted for this unconventional, holistic, and ecological solution of restoration instead of the conventional approach of physics, chemistry or bio-remediation. The restoration project officially started from 16th October2019, with quite a fan following at the inauguration being participated by who's who of the city from Mayor Mr. Pramod Dubey, Councilor Mr. Jasbir Singh Dhillon, Mr. Sanjay Sharma & Mr. Anshul Sharma from Raipur Smart City Limited, and Social activists like Dr. SN Madheria and Mr. Raj Kiran representing his NGO, apart from many other dignitaries. The event was widely covered by print and local TV media too.

Treatment Process: The process adopted was quite simple, designed for ease of executive by any urban local body. Administration was to arrange for two tankers of 5000 liters, each, with pumps and pipe to release the water in the waterbody after dilution of Cownomics© concentrate in the said tankers and the process was done. The Quantity, Frequency and Potency (QFP) of the concentrate was to be monitored, calibrated and decided by the technology owners – M/s. Vedic Cownomics Private Limited, Delhi. After effects were encouraging:

17th October 2019 – within mere 24 hours of the treatment, the entire foul smell was gone from the whole vicinity & catchment area. A close observation of the water lilies as shown in the figure below that the leaves had started to decay. And the itching from the touch had also miraculously disappeared.

19th October 2019 – The viscosity had reduced and the color of Water had become much lighter than before. The observatory team even spotted some small fishes on the embankment area. Decay of the weed leaves continued and the surface could be spotted in between the dense weed infestations.

21st October 2019 – By now local residents had started using the lake for daily usage, from bathing to washing closes and utensils and so on. Three out of four key issues (foul smell, itching and mosquitoes) were already resolved in mere three days, as the weeds has covered major portion of the surface, the process was to take a longer period, but the action was on and decomposition of the weed leaves was observable with naked eyes.

The project went on for a month and the problems were resolved to a massive extent. But the real test of time with zero possibility of any loophole was about to come in form of a festival – The Chhath Festival.Chhath is an ancient Hindu Vedic festival historically native to the Indian subcontinent, more specifically, the Indian states of Bihar, Jharkhand, Chhattisgarh, Madhya Pradesh and Uttar Pradesh, in India and the Madhesh region of Nepal. The festival is dedicated to worship the Chhathi Maiya (Shashthi Mata) and The Sun God Surya along with his consorts Usha and Pratyusha – the Vedic Goddess of Dawn and Dusk respectively. It is believed that the main sources of Sun's powers are his wife Usha and Pratyusha. In Chhath, there is a combined worship of both the powers along with the Sun. In the morning, worship of the first ray (Usha) of the Sun and the last ray (Pratyusha) of the Sun in the evening are offered to both of them. And the rituals are rigorous and are observed over a period of four days. They include holy bathing, fasting and abstaining from drinking water (Vratta), standing in water for long periods of time, and offering prasad (prayer offerings) and arghya to the setting and rising sun. Some devotees also perform a prostration march as they head for the river banks.

Environmentalists claim that Chhath is the most eco-friendly Hindu festival and the entire Puja is observed on the banks of a Waterbody. The devotees performing the Puja have to offer arghya while standing half submerged in the Water and the process starts way before dawn, somewhere around 3 AM, so they have to be in water for almost 6-7 hours.In case of any impurity in water, it could lead to chaos.The Puja was due on 2nd November 2019, and everyone from project team to the administration were waiting anxiously to give this test of time to this unconventional treatment process, newly adopted by them. Good part was, that the occurrence of the festival was within the period of the treatment. And then finally came the due date of Puja. The devotees were there on the banks of the Lake and the Puja went on pretty well. The devotees were there since dawn and were absolutely happy with the quality of water. It was a success story.

The views and opinions expressed in this article are those of the author.