

A discussion on NGT Order on Use of RO & Implications for SWE Sector

In recent years the use of Reverse Osmosis (RO) for water purification has come under extensive scrutiny, with regard to loss of water in reject stream during the purification process, as well as the loss of minerals (low TDS) in the purified water. In response to a petition filed with the National Green Tribunal, in May this year the Tribunal issued a directive regarding use of RO. This is relevant for those of us in the SWE Alliance who are working in the Sector to provide safe and healthy drinking water access to the underserved. This note discusses the substance and implications of the NGT Order OA No. 134/2015, dated 20.05.2019 for the SWE Sector.

BACKGROUND

Petitioners filed an application with the National Green Tribunal (NGT) on 24.04.2015, relying upon some newspaper articles, to state that in a water scarce area, wastage of water in the RO process may need to be regulated. Also, that in the RO purification process, important minerals are lost adversely affecting the health of the users. The matter was considered by NGT vide order dated 20.12.2018. An Expert Committee was constituted by this Tribunal comprising of representatives of the Ministry of Environment, Forest and Climate Change (MoEF&CC), Central Pollution Control Board (CPCB), Bureau of Indian Standard (BIS), Indian Institute of Technology, Delhi, (IIT Delhi) and the National Environmental Engineering Research Institute, Delhi (NEERI, Delhi). The Expert Committee studied the RO process and examined the question of use and disposal of RO reject water, deficiency of minerals caused by RO process, whether RO systems should be deployed irrespective of water quality of raw water, and other considerations. After deliberations, a report (dt. 30.04.2019) was submitted by the CPCB on behalf of the Committee containing the recommendations of the Expert Committee. On the basis of this report, on 20th May, 2019, the Tribunal issued an Order regarding use of RO (OA No. 134-2015). On 7 November, 2019, it was reported that the NGT has followed up the Order with a “last opportunity” ultimatum to the MoEF&CC to issue notifications pertaining to the ban of certain RO systems, which the Ministry had not done so far. The potential ramifications of this order could be significant in our country where nearly 2 lakh people die each year due to inadequate water, sanitation and hygiene, and where, in 2016, the per person disease burden due to unsafe water and sanitation was 40 times higher than in China and 12 times higher than in Sri Lanka (NITI Aayog, Composite Water Management Index, 2019).

The text of the Order is as follows –

- (i) The MoEF&CC may issue appropriate notification prohibiting use of RO where TDS in water is less than 500 mg/l and wherever RO is permitted, a requirement is laid down for recovery of water be more than 60%. Further provision be laid down for recovery of water upto 75% and use of such RO reject water for purposes such as utensil washing, flushing, gardening, cleaning of vehicles and floor mopping.
- (ii) Appropriate directions in the matter may be issued. The Notification/Policy to be notified may also provide for a mechanism for public awareness about ill effects of demineralized water on public health and for effective enforcement requiring the concerned Local Bodies/Municipal Corporations/Municipalities/ Panchayats and institutions like Public Health Engineering Department (PHED)/ Jal Nigam / Jal Boards etc. be required to display water quality at regular intervals, particularly TDS concentration component by an appropriate mechanism.
- (iii) Above regulatory regime may ensure regulating consumption and use of low TDS water by requiring manufacturers to maintain minimum TDS concentration to 150 mg/l or the minimum levels of calcium and magnesium.
- (iv) Directions be issued for enforcement of Extended Producers Responsibility by the manufacturers for disposal of cartridges and membranes and requiring the manufacturers to provide proper labeling on the purifier specifying that the unit should be used if TDS is more than 500 mg/l.
- (v) MoEF&CC may file an affidavit of compliance by e-mail at judicial-ngt@gov.in within one month.
- (vi) The Expert Committee constituted by this Tribunal vide order dated 20.12.2018 along with Central Ground Water Authority may collect and provide data with regard to availability of ground water and its usage in 21 cities mentioned in the report of NITI Aayog and furnish a report to this Tribunal within one month by e-mail at judicial-ngt@gov.in. The said report may be placed in the file of O.A. No. 176/2015 which is listed on 04.07.2019.

DISCUSSION

The NGT order is directed to manufacturers of point-of-use (domestic) RO systems, and to industrial RO installations (packaged drinking water, beverages). The SWE Sector is facilitating safe water access to under-served communities, with purification systems utilizing appropriate technologies, including Reverse Osmosis (RO) to treat higher than acceptable levels of contaminants such as nitrates, fluorides, heavy metals, salinity, etc. Therefore, the points raised in this Directive can provide us with some guidance and cautions going forward.

To summarise, the notable points in the NGT Order are as follows –

1. Use of RO is to be banned where source water TDS is lower than 500 ppm¹.
2. Where RO use is permitted, treated water recovery should be at least 60 %. In future systems should improve this further to 75 %.
3. RO reject water should be utilized for utensil washing, washing vehicles, watering plants, flushing etc.
4. Manufacturers of RO systems are required to maintain minimum TDS concentration of 150 ppm².
5. There should be a mechanism (deployed by government bodies) to spread awareness about “ill-effects of demineralized water on public health”.
6. Manufacturers are responsible for disposal of cartridges and membranes.

There is some ambiguity whether this is applicable to the SWE Sector/Small water Kiosks/Water ATMs. But we need to acknowledge and anticipate that in the future, our Sector may need to adapt (plant designs) to comply with the demands of this Order, or adopt some variation in model.

Accordingly, the SWE sector may adopt the following modifications in their Purification System Design –

1. In all geographies where ground water is utilized as source water, RO stations are permitted to operate, provided that TDS of product water is in excess of the 500 ppm lower limit cut-off prescribed in the NGT order.
2. To improve recovery beyond 60%, multistage RO purification or reject water recirculation may be used, depending upon the existence of other contaminants.
3. We recommend targeting a TDS value of 150 in all new Stations going forward. To achieve this, we may explore various strategies of either purification or post-treatment of purified water.
4. In Urban Water ATMs, when the source water used is the municipal treated water, the TDS of raw water is generally ~500 ppm or lower. Thus, in the urban scenario, the purification systems may use microfiltration, ultrafiltration, nanofiltration, UV, zeolite-based technologies or a combination of these, rather than RO-based technology.

CONCLUSIONS

The Order issued by the NGT provides important guidelines for the way forward, and our Sector must adapt accordingly. Several of the recommendations are admirable, such as those regarding minimizing waste or utilizing reject water, where possible. We are committed to serving communities to the best of our capabilities, and the foremost among our goals is safe and healthy water for all. To this end, the SWE Sector must lead the way in modernizing and adapting to meet the highest drinking water standards.

¹ The Expert Committee in its recommendations suggests the exception that “input water shall not have critical impurities such as nitrates and fluorides more than the acceptable limits of 45 mg/L and 1 mg/L, respectively as per IS 10500:2012” (pg. 8). However, this exception is not mentioned in the Order itself, neither are exceptions made for any other contaminants such as heavy metals, pesticides and other organic pollutants etc. Also, potential of secondary microbial re-contamination occurring during distribution through municipal pipelines needs consideration.

² There is a widespread negative perception about health effects of low TDS drinking water, specially RO-treated water. A WHO monograph dedicated this subject concluded that there is insufficient scientific information on the benefits or hazards of long-term consumption of very low mineral waters (Chapter 11 in WHO monograph titled “Calcium and Magnesium in Drinking Water, Public Health Significance” (2009)). However, it may be that some elements present in hard water, likely magnesium, have a protective effect on heart health, in the long-term, **when diet (food intake) is deficient in these elements**. On the other hand, RO provides substantial benefits in communities lacking access to safe drinking water – it removes a broad-spectrum of undesirable and potentially dangerous contaminants, including disease-causing bacteria, viruses, protozoan, heavy metals such as lead, arsenic and cadmium, pesticides, medicines etc. to meet Indian Drinking Water Standards (IS 10500:2012).