Experience with SAT system in Israel and Future Plans

Avi Aharoni* **and Haim Cikurel**

Mekorot Israel National Water Co.
Lincoln St. 9, Tel-Aviv,
Israel

Abstract

Israel, as a semi arid country, in the last 50 - 60 years is looking for technologies to save water, among them also recycling of treated sewage for irrigation of crops. Israel with 7 million inhabitants is consuming about 750 million M^3 of water for domestic and industrial uses. The reuse of treated sewage for agriculture is 75% – 80%, one of the highest in the world.

A reclamation system that uses the SAT (Soil Aquifer Treatment) technology, which includes infiltration of the secondary treated wastewater from the Tel Aviv Metropolitan area in sand dunes, has been operated since the seventies of the last century.

The first step of this project used lime treatment of recirculated oxidation ponds effluents, stripping of ammonia in polishing ponds at high pH (above 10) and infiltration in basins . Around 20 Million M^3/Year of treated effluents were infiltered in about 15 hectares of infiltration basins.

In the late eighties of the last century, the sewage of Tel Aviv Metropolitan area was treated in a more advanced plant using the CAS (Conventional Activated Sludge) technology. The resulting, high quality secondary effluents were infiltered in the infiltration basins.

Today the system is treating and infiltrating about 120-140 Million M^3/Year in about 110 hectare area, with a retention time of 6-12 months in the aquifer (long term SAT). The infiltration regime is mostly one day flooding and 2 days drying.

Substantial problems in the infiltration regime were encountered during the 30 years of infiltration: Deterioration of the infiltration rates (mostly in winter – rainy days and low temperature), anoxic conditions in the aquifer that cause release of manganese to the

* *Corresponding Author: Aaharoni@mekorot.co.il*

reclaimed water and to the irrigation systems and no more available lands for the increasing quantities of effluents to be infiltrated.

Few alternatives were tested in the last 6 years in pilot plants in Shafdan to solve these above mentioned problems:

- UF-short SAT in Dug Well (EU Reclaim project)[1] or Short SAT + NF (EU SWITCH project)[2] with 1-2 months retention time techniques showed better infiltration rates than the actual infiltration technique while the technique used in the EU SWITCH project showed also a more efficient removal of contaminants.

- Another pilot experiment using Deep – Bed Sand Filtration, hydrogen –peroxide and ozone to boost aerobic conditions before the short –SAT (Dug Well infiltration and 1-2 months retention time in the aquifer before recovery) will be started these days (a German –Israeli cooperation project)[3].

The future plans in Shafdan plant are to optimize the best technology, to design the expansion of the infiltration system for the expected amounts of the effluents in 2040.

Reference

Hein A., Ernst M., Reemtsma T., Cikurel H., Aharoni A., Jekel M., (**2008**) "Fate and behavior of selected trace organic pollutants in artificial ground recharge – Results from soil column tests and case study campaigns in Berlin and Tel Aviv", IWA World Congress and Exhibition, Vienna, 7-12 Sept. 2008

Cikurel H., Sharma S.K., Jekel M., Kazner C., Wintgens T., Amy G., Ernst M., Guttman Y., Tal N., Kreitzer T., Putschew A., Vairavamoorthy K., and Aharoni A., (**2010**), "Alternative hybrid SAT-membrane treatments: Short SAT-NF treatment to upgrade effluent quality", *IWA MTWR 2010*, Regional Membrane conference, Oct 18-22, Istanbul Turkey

Jekel M., Ernst M., Putschew A., Aharoni A., Cikurel H., Tal N., Kreitzer T., "Evaluation and enhancing ground water effluent recharge technology- Part A: Reduction of manganese dissolution and micro-pollutants by Enhanced Short SAT" (**2010**). German –Israeli (BMBF-MOST) cooperation project.