

The Science Against ASR Wells; Alternatives for City of Rockledge

The City of Rockledge wants to inject treated sewage water into the Florida Aquifer by means of Aquifer Storage and Recovery (ASR) Well. On May 4, 2009 at Viera Govt. Center, a forum was conducted to hear pros, cons and alternatives about ASR wells. On behalf of Save Our Aquifer and concerned citizens, Jim Egan presented science-based information that clearly condemns the proposed Rockledge ASR well, and offers multiple reasonable alternatives.

by Jim Egan

Executive Director, Marine Resources Council

ASR Recovery Rates

30% of south Florida ASR wells did not exceed 10% recovery. --USGS, 2004

87 tests of ASR wells in Florida show less than 25% recovery. USGS testing of ASR wells for the Everglades had recovery rates of 3.1%, 2.7% and 7.2%. --Dr Sydney T. Bacchus Ph.D. Hydroecologist, 2003.

The Everglades ASR Project was concluded to be unfeasible.

Impacts of ASR Wells and Arsenic

Arsenic and uranium are leached out of the surrounding rock by ASR injected waters sometimes at levels several times drinking water standards. --USGS.

Recent analyses of water from two ASR facilities in west central Florida showed arsenic concentrations more than 10 times the current EPA drinking water standard. --Dr Price and Dr Pichler, University of South Florida.

Man-made groundwater changes could result in significant physical, chemical and biological changes in the marine ecosystem including predisposing organisms to disease; introducing new disease-causing agents into ground and surface waters; and introducing hazardous chemicals including chemicals that disrupt human and animal endocrine systems. --Conduit Flow: Pathways to Poor ASR Recovery and Subsurface Water Contamination in Florida, Dr Sydney T. Bacchus Ph.D. Hydroecologist, 2003.

Chronic effects of Arsenic Exposure via drinking water include skin lesions, neurological effects, vascular, cardiovascular and respiratory disease, diabetes and skin cancer. The increase skin lesions has been observed even at 5-10 ppb Arsenic in drinking water [half the EPA standard]. --Yoshida et al, Toxicology and Applied Pharmacology, 2004.

ASR Wells and Endocrine Disrupters

Chemicals, used everyday in homes, industry and agriculture, can enter the environment in wastewater. These chemicals include human and veterinary drugs (including antibiotics), hormones, detergents, disinfectants, plasticizers, fire retardants, insecticides, and antioxidants. --USGS.

Large quantities of Pharmaceutical and Personal Care Products can enter the environment after use by individuals or domestic animals. Sewage systems are not equipped for their removal. Currently, there are no municipal sewage treatment plants that are engineered specifically for their removal or for other unregulated contaminants. --USEPA.

Endocrine disrupters are chemicals that may interfere with the body's endocrine system and produce adverse developmental, reproductive, neurological, and immune effects in both humans and wildlife. A wide range of substances, are thought to cause endocrine disruption, including pharmaceuticals, dioxin, PCBs, pesticides, and plasticizers. --National Institute of Health, 2009.

Potential human health effects caused by Endocrine Disrupters according to The European Commission Endocrine Disrupter Research.

For women: Breast and reproductive organ tissue cancers and other diseases, For men: testicular and prostate cancer, low fertility Other potential effects: impaired mental, immune and thyroid function in developing children.

Endocrine Disrupters can cause lifelong health problems, especially for children --Head of the EPA, Administrator Lisa Jackson

National Institute of Environmental Health Sciences and the National Toxicology program found that there was credible evidence that some hormone-like chemicals can affect animals bodily functions at very low levels, levels below the "no-effect" levels determined by traditional testing.

Endocrine Disrupters may not only impact the individual directly exposed but also harm future generations that were not exposed, by causing developing cells to change their gene expression. --National Institute of Environmental Health Sciences.

Connection of Floridan Drinking Water Aquifer to the Indian River Lagoon

In the northern half of Brevard County groundwater in the Floridan moves northeast west of the Indian River Lagoon and northwest east of the lagoon. The change in direction denotes upward leakage of water from the Floridan aquifer. In this portion of the Indian River Lagoon, the thickness of the Hawthorn confining unit is less than 50 ft. Evidence suggests natural discharge of large quantities of water from the Floridan to the surficial aquifer or the Indian River Lagoon from springs or upward leakage through the confining beds. --Toth, SJRWMD.

Before Development, upward leakage across confining units, especially in coastal areas accounted for more than 10% of the discharge of the Floridan aquifer. Where the upper confining unit is thin, there is substantial hydraulic connection between the aquifer and surface drainage. --USGS, 2009.

Majority of flow is entering the borehole (of the well) between 160-250 ft. This zone is highly fractured with large conduit flow. Measurements of the Transmissivity, the horizontal movement of water varied from 6,000-76,000 sq ft a day. --Jones and Edmunds Associates reports.

City of Cocoa's Sellers Sewage ASR Well

"Recovery efficiency of the well is not yet to a measurable level" (after 10 million gallons pumped in during two attempts at recovery with storage for only 24 hrs.) --Andreyev Engineering, Inc.

Injected water is leaching Arsenic from the formation [aquifer] --Andreyev Engineering, Inc.

Background aquifer concentration was 6 ppb Arsenic. The Recovered water concentration up to 64.5 ppb Arsenic -- Over 600% higher than EPA and DEP standards (10 ppb). The average of eighteen analysis conducted was over 300% higher than standards.

City of Cocoa Reuse ASR was abandoned, leaving the city out a small fortune and groundwater near the well high in arsenic. Cocoa's ASR well is only about 2 miles away from Rockledge's ASR well.

Legislation Against ASR Wells

Legislation authorizing the use of non-drinking water for ASR recharge has been blocked in several states at least in part due to concerns about aquifer contamination and human health. Current federal regulations requiring that recharge water meet all primary drinking water standards prior to recharge may make it prohibitively expen-

sive to use anything but potable water. --National Groundwater Assn.

Injecting water into an ASR well that is not treated to all drinking water standards is illegal in 47 of the 50 United States --Clean Water Action Network.

The State of Georgia has banned ASR wells into the very same Floridan Aquifer.

Alternatives to ASR

Watson Pit is 55 acres in size and could hold up to 71 million gallons of stormwater that could be added to reuse. City of Cocoa is already using stormwater for reuse. --Jones Edmunds & Associates Report.

Create a 9.25 acre storage pond just south of Rockledge Plant with it's own treatment (2001 est cost \$700,000.). --Jones Edmunds & Associates Report.

Above-ground 6 million gallon storage tank south of the existing storage tank at the Rockledge plant or at city property at Murrell near Levitt parkway. (2001 estimate for 2 million gallon tank: \$800,000.) --Jones Edmunds & Associates Report.

Metering of reuse water typically results in 30-50% savings in reuse water consumption.

Increase water conservation efforts and increase enforcement of existing regulations such as St Johns limit of lawn watering to 2x a week and requirements that all lawn sprinklers have wet-weather cutoffs.

Encourage Xeriscaping to reduce water consumption and reduce fertilizer and herbicide use.

FRIENDLY RESOURCES

Marine Resources Council (MRC) / www.mrcirl.org

Focused on Indian River Lagoon issues including: flow from land drainage and its negative impact on estuarine productivity; loss of sea-grasses and mangroves; coordinating local, state, or federal programs for the lagoon; and the need for public education to incorporate science into decision-making.

Save Our Aquifer / www.saveouraquifer.org

Organized in Rockledge FL to protect the Floridan aquifer system and Underground Sources of Drinking Water (USDW), promote awareness, educate the public, elected officials and agency staff, and conduct other such related activities necessary to its mission.

Space Coast Progressive Alliance (SCPA) / www.spacecoastprogressivealliance.org

Dedicated to improving our quality of life by promoting progressive policies including protecting the environment, affordable and accessible health care, quality education, safe-guarding civil liberties, clean elections and fair districting for better government, and sharing global responsibility for peace and economic prosperity.

XERISCAPING WITH NATIVE PLANTS (Proven alternative to watering the lawn.)

Association of Florida Native Nurseries (AFNN) / www.afnn.org

Advocates for Florida native plants industry, serving preservation, restoration, and sustainable landscape markets. We advocate for increased utilization of native plants, educate the trade and general public about the benefits of native plants and their use in the landscape. Publishers of the *Native Plant & Service Directory* and *Guide for Real Florida Gardeners*.

Florida Native Plant Society (FNPS) / www.fnps.org

The purpose of FNPS is to promote the preservation, conservation and restoration of the native plants and native plants communities of Florida. Two chapters in Brevard: Conradina (south Brevard) and Sea Rocket (north Brevard).

Maple Street Natives / www.maplestreetnatives.org

Brevard County's first native nursery (est. 1987) and remains the only Brevard nursery exclusively dedicated to Florida native plants. Family-owned and operated, offers landscapers and homeowners a range of Central Florida native plants for landscape and wildlife.

This document is available online at Save Our Aquifer and Space Coast Progressive Alliance. See above.