

GE's EDR Technology Solves A Unique Set of Water Quality Problems for Magna, Utah

Challenge

The town of Magna, Utah – located approximately 20 miles west of Salt Lake City – is a rapidly growing community, and the home of Kennecott Copper. In planning for future water demands including a new federal unfunded mandate to treat arsenic, the Magna Water District was looking for technology to address this issue. Additionally, the discovery of perchlorate contamination made the task more difficult. Very high levels of dissolved silica in the groundwater meant that a large portion of the treated groundwater might be wasted, if certain membrane processes were used.

Solution

GE's EDR technology was shown to operate with 80% to 85% water recovery rates on Magna groundwater, compared with recovery rates as low as 60% provided by other membrane processes. After multiple pilot tests confirmed the specific removal capabilities for EDR on arsenic, perchlorate, and other salts, EDR was formally accepted as the optimum process to use at the Magna Water District's new treatment facility. Plans were drawn up to install EDR with the capability to remove even higher levels of groundwater contaminants in the future by simply adding more membrane stages.

The basis of EDR's superior recovery on Magna's high silica ground water is that the process uses an adjustable DC electric field, which is applied across ion exchange membranes, to remove unwanted constituents from water. Water does not pass through EDR membranes; only salts are removed. Passing water through sequential DC fields, called staging, allows for greater removal of salts. EDR is a less restricted process because constituents that



Figure 1: EDR treatment facility at Magna Water District

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limit other membrane processes, such as high levels of silica, do not affect it. The reduced volume of concentrated brine developed with EDR allowed the Magna Water District to cost effectively install a new and innovative anaerobic perchlorate destruct system. This system allows Magna to remove the perchlorate before EDR brine is discharged to the conventional wastewater treatment facility. Magna's EDR system was initially installed with two membrane stages in the series. The system and the building were designed for up to four stages, to allow for future expansion as the growing community requires higher production.

Results

The system, which was put into operation in October 2008, has met Magna's requirements and is operating as predicted. With an initially installed membrane capacity of 6 million gallons per day (947 m³/h) of EDR product, and two stages of membrane treatment, the plant reduces influent arsenic levels by 82%. In other words, EDR brings the levels



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of arsenic down to 2.2 parts per billion. It also provides a salinity reduction of approximately 70%. This allows for bypass blending with raw water to produce greater volumes of drinking water, while remaining within State and Federal water quality guidelines. In the future, Magna has the option of adding membrane stages for better EDR product water quality and still greater volumes of blended water, or to remove higher levels of raw water constituents, should that need arise.

The combination of EDR and perchlorate destruction marks a new chapter in municipal water treatment. GE's technology allows the plant to efficiently provide high quality drinking water, while conserving resources through the reduction of wastewater.

The success of Magna Water District's EDR system has led to still more applications with EDR removing both salinity and arsenic from drinking water supplies, while producing absolute minimum wastewater volumes. To read more about the Magna Water District innovative process from GE, please visit www.magnawater.com.

With the broadest solutions portfolio, GE focuses on difficult to treat water and wastewater and implementing water reuse solutions to provide customers with the quantity and quality of water they need for their processes.

If you would like to learn more about how GE can solve your water challenges, contact your local GE representative or visit us at www.ge.com/water.