

## Achieving compliance with California's new Chromium-6 MCLs

### INDUSTRY

Water utilities industry

### LOCATION

California USA

### PROJECT

Collaborative route to evaluate treatment objectives and technology options

### THE CHALLENGE

On July 1 2014, California became the first State in the US to mandate an MCL of 10ppb for hexavalent chromium (chromium-6). The MCL dictated quarterly compliance monitoring at individual water sources or entry points to the distribution system after treatment. Evaluation is made by running an annual average of quarterly samples. Water utilities were required to begin compliance sampling by the end of 2014.

To ensure compliance, starting in 2012, Soquel Creek Water District in Santa Cruz County and Corona Environmental Consulting, in collaboration with the Water Research Foundation, began implementing a small scale bench and field pilot study to find an optimum treatment for chromium-6. Approximately one third of the district's water supply is impacted by naturally occurring chromium-6.

It was imperative to find a reliable, proven technology and minimise capital and O&M costs. Criteria included: a system that was easy to deploy, utilised standard, approved ion exchange resin, with components that are NSF 61 certified and a demonstrated capability to remove chromium-6 with a low waste output.

For the full-scale demonstration study, the district selected a strong-base anion exchange technology developed by Ionex SG. While the treatment method is new to the district, the system, known as the IX-C™, was chosen for its modular design, as well as its cutting-edge brine treatment process.

### THE SOLUTION

The district deployed the system as a temporary full scale (1,000gpm) facility until a permanent facility could be evaluated under the California Environmental Quality Act (CEQA). This process was expected to take approximately two years including design, permits and construction.

The 1,000gpm demonstration system was designed, built and connected over a six month period. This streamlined installation was enabled by the system's modular, plug and play configuration that requires just a simple inlet/outlet connection, along with a power connection.

The installation process included construction of a half mile raw water main and on site utility modifications. Although the district's chromium-6 impacted wells are geographically dispersed, construction of a centralised strong-base anion exchange treatment facility rated at 2,000gpm was planned to treat any two of three wells in the vicinity. Approximately one mile of raw waterline was required to convey untreated water to the centralised treatment facility. A fourth chromium-6 impacted well located in a separate pressure zone was placed on standby with the State Water Resources Control Board's (SWRCB) Division of Drinking Water (DDW) and an intertie between the two pressure zones was planned to supplement the lost production.

### THE OUTCOME

Through bench and pilot studies conducted in collaboration with Ionex SG and Corona Environmental Consulting, the district demonstrated that the strong base anion exchange treatment process is by far the most suitable technology to use given its water quality. Not only did the pilot testing capably reduce chromium-6 levels and produce water that exceeded the requirements of the DDW, but the equipment also provided confirmation for the chromium treatment capacity of the plant. This demonstrated the feasibility of brine reuse and waste volume minimisation and treatment.

#### In particular, the technology demonstrated several advantages during the pilot study:

- ✓ The study showed that it was feasible to remove the chromium-6 from the water to the treatment objective of 8ppb with greater than 99.99% water efficiency.
- ✓ The small system footprint exceeded expectations, occupying under 800m<sup>2</sup>. This was important in this case as the available vacant land is limited.
- ✓ The modular configuration also allows for flexibility and quick deployment.

Over the next six months, the district continued to work with Ionex SG to optimise the brine treatment technology – important activities that informed the design of a full-scale permanent treatment facility. Due to the successful pilot, the district's board decided to set a treatment goal of 2ppb where treatment is implemented, and directed the implementation of one full-scale 2,000gpm treatment facility at the district's Bonita Well Site.



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