

## SWD WATER TREATMENT AND H<sub>2</sub>S CONTROL USING A RENEWIQ™ SOLUTION



### SITUATION

A salt water disposal well (SWD) operator was injecting produced water that was both trucked in from various local operations and also delivered by pipelines from two water-collection facilities. As a result, the water quality varied substantially and treatment was historically challenging. Water quality issues that faced the site included high bacteria levels, H<sub>2</sub>S, and dissolved and suspended solids. These issues caused concerns related to safety, corrosion, and well plugging, and additional costs were incurred for maintenance, pumping energy and chemicals for managing the risks.

### SOLUTION

The local Nalco Champion sales group saw an opportunity to resolve all of the production issues by applying a RenewIQ™ solution that utilized BIOC16734A biocide and requested permission to conduct a trial. The operator approved the trial and work commenced. The trial consisted of monitoring changes in the levels of H<sub>2</sub>S in both the aqueous and gas phases, bacteria, and water clarity. Water clarity was determined by comparing turbidity, frequency of sock filter changes, and volume of throughput using a Millipore filter.

The goal was to reduce all of these levels and to determine optimal location and rate for the treatment.



Figure 1 - Fouled sock filters prior to injection of BIOC16734A.



### General SWD Overview:

Trucks brought a consistent daily volume of water, while the pipeline flow was irregular. Water from the two sources entered at different locations in the facility and were allowed some settling time through a series of large tanks. The water then flowed through sock filters and was pumped into the injection wells.

While in the settling tanks, the produced water continued to separate, allowing oil to be skimmed off the top and sold by the facility.

Prior to using BIOC16734A biocide, the facility used five separate chemicals for treatment, including a biocide, paraffin dispersant,  $H_2S$  scavenger, scale inhibitor, and a combination corrosion inhibitor-solids remover.

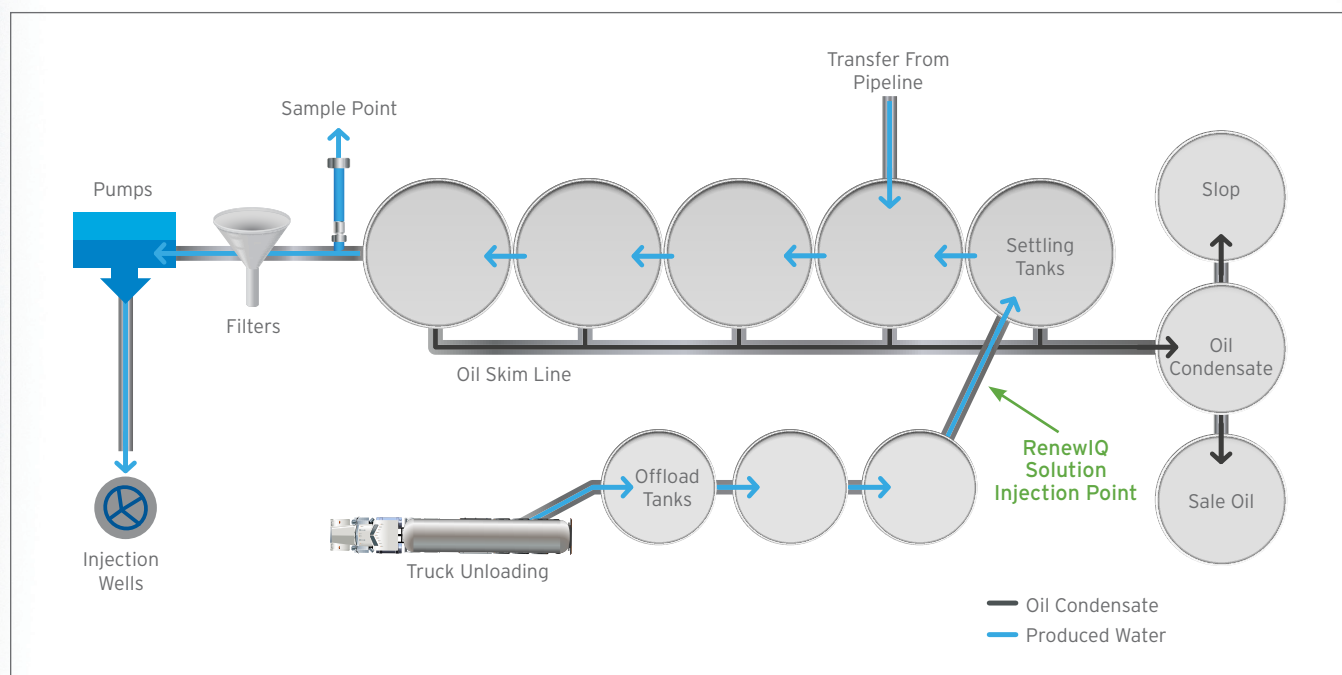


Figure 2 - Layout of the SWD facility. Trucks deliver water daily into the offload tanks and the pipeline flow is delivered into the settling tanks sporadically. Samples were taken from the sample point to determine the effects of BIOC16734A biocide.

## RESULTS & CONCLUSION

The RenewIQ solution greatly improved the operation of the SWD facility and the customer was pleased with the Nalco Champion team's careful implementation of the program.

All key performance indicators that were monitored showed improvement with the new treatment. Specifically,  $H_2S$  levels were reduced in both the water and gas phases (see Figure 3), bacteria levels were reduced, and water quality was improved (see Figure 4).

In addition, BIOC16734A biocide delivered benefits beyond the main goals. The oil quality improved, thereby reducing the volume of fluids going to the slop tank for additional settling time.

In addition, BIOC16734A biocide showed improved performance in all five production-stream parameters for which chemicals were being added. The client decided to replace the practice of injecting five separate chemicals with the injection of BIOC16734A biocide alone. Replacing the previous chemical program with BIOC16734A biocide was estimated to have saved the customer approximately \$500,000 in annual chemical and operating costs.

Safe implementation was paramount, and the customer felt comforted by the level of testing, training, and engagement that Nalco Champion provided. The success at this site has led to other opportunities to use BIOC16734A biocide in other SWD facilities with multiple customers in the area.

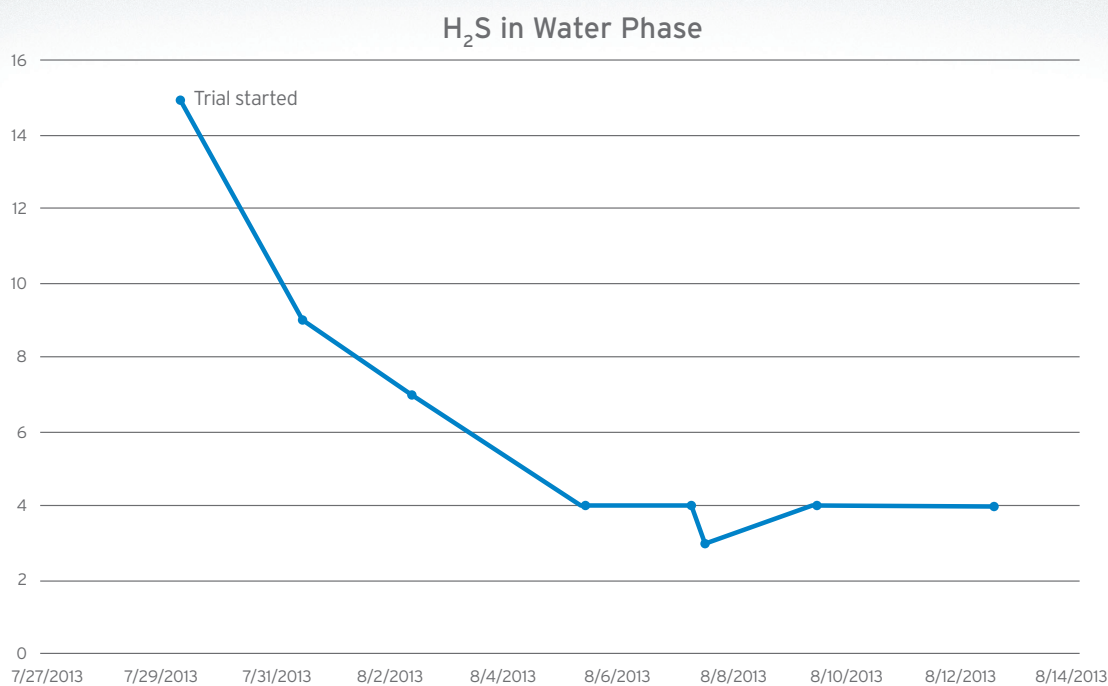


Figure 3 - The figure above shows that BIOC16734A biocide reduced the dissolved H<sub>2</sub>S in the water phase from 15 ppm to a consistent level of 4 ppm. In addition, H<sub>2</sub>S in the gas phase was decreased from as much as 200 ppm to 0 ppm.

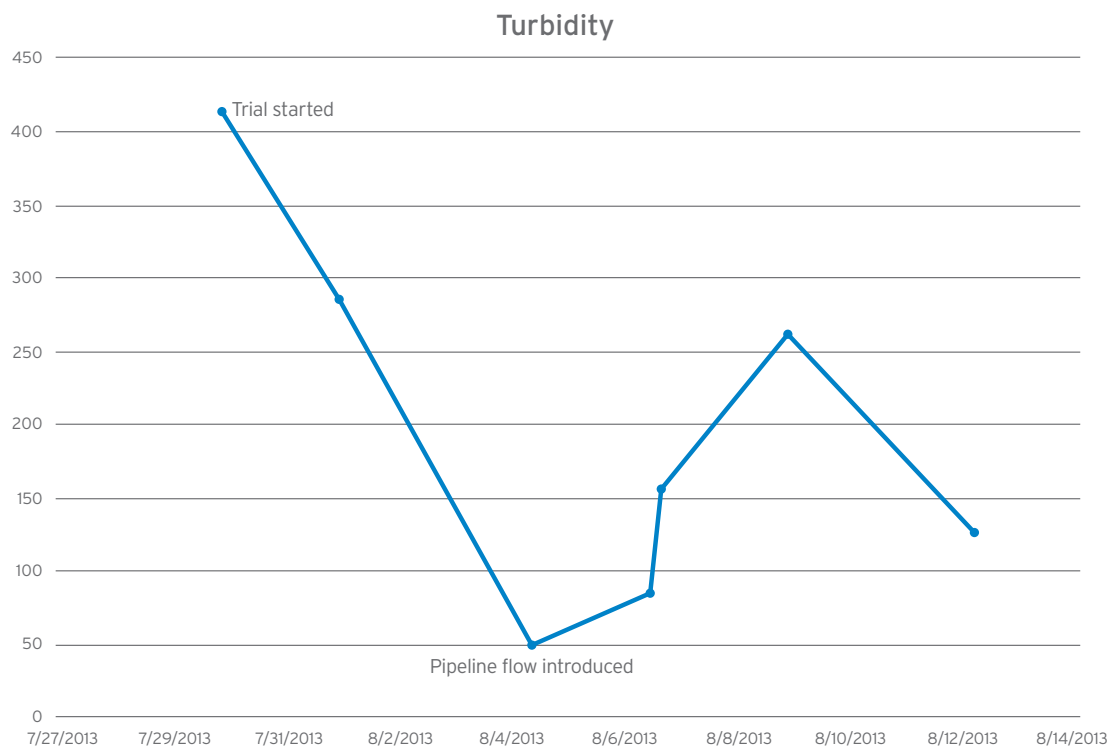


Figure 4 - The figure above shows the effect of BIOC16734A biocide on water quality at the sample point. Initially, turbidity was reduced. The introduction of untreated pipeline water created a temporary spike in turbidity. After adjusting the RenewIQ solution treatment, water turbidity was again reduced. BIOC16734A biocide addition also helped extend the frequency between sock filter change outs, which were previously changed daily due to excessive system fouling, to once every 6 days after implementation of the RenewIQ solution.



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