



Applied Polymer Systems, Inc.

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Innovations

Water Treatment

Geothermal Well – Treatment of Discharge Water with Floc Logs

Geothermal power is a clean, renewable source of energy that uses heat from within the earth's crust to heat homes, buildings, and more commonly, to convert into other forms of energy, such as electricity. Once a suitable location is found, a hole is drilled, using a similar process as used for drilling a water well. As the well is drilled, water from within the crust often flows up to the surface, bringing with it dirt, rock, and sediment that have been broken and loosened by drilling, resulting in turbid, sediment laden water.

Pennsylvania Ground Water Association (PGWA) contacted Applied Polymer Systems to design a system to treat the discharge water from a geothermal well drilling demonstration in State College, Pennsylvania during PGWA's 2010 Summer Field Conference. Treating discharge water from a geothermal well operation is no different than using a dewatering ditch and Floc Logs in stormwater treatment.



Above: Settling pit is dug out to allow larger sediments reaching the surface to settle out before the water is channeled into the mixing ditch.



Clarity: The actual NTU value of the discharge water was read at about 7.5 NTU. The clarity and color of the water speaks for itself.

The first step, shown in the above photo, is to construct a settling pit where heavier particles can settle out as the water reaches the surface. From here, the water flows into the mixing ditch where the Floc Logs are placed. The length of the ditch and the number of logs used depends on the amount of time required for reaction to occur. Log type, reaction time, and treatment process are determined by conducting a sample analysis on water and soil from the site. As water flows over and around the site tested and approved Floc Logs, they begin to dissolve and the log material disperses throughout the water, allowing reaction with sediment and flocculation to occur.

The mixing ditch (shown in the double photos on page one) is lined with plastic, jute fabric, and Floc Logs places in a row. At the end of the ditch, the treated water enters a pipe (top photo on left) where the water is channeled to a dispersion field.



The dispersion field (bottom photo on left) is a larger area lined with more jute matting. Once turbid water has reacted with the polymer material, the water flows over the dispersion field where the velocity of the water slows down and flocculated particulates are settled out and captured. Enhancing the dispersion field with Silt Stop Powder, a dry powder form of the polymer which is also site tested and approved, increases efficiency and maximizes performance in the capture of fine particulates. The photos below show the sediment and polymer charged particles that did not settle out, adhering to the jute matting in the dispersion field. The polymer charged particles remain attached to the jute while clean, clear water flows off the site.



Above: Photo One - End of mixing ditch channeling into pipe, leading to dispersion field. Photo Two - Jute lined dispersion field which captures reacted sediment.

Below Left: Both photos show water running over the jute in the dispersion field and polymer charged sediment attaching to the jute matting, with clear water running over the top.



Not only is the water leaving the site visibly clear, but the before and after NTU readings speak for themselves. The initial water coming out of the well was in excess of 5,000 NTU. After treatment using Floc Logs in the mixing ditch and the jute lined dispersion field, the water running off site had an NTU of 2.

As well as producing crystal clear water, all APS Floc Logs and Powders have undergone toxicity testing by an EPA certified laboratory and are shown to be non toxic to aquatic organisms (test information may be viewed at www.siltstop.com).

This is another example of the diversity of polymer enhanced treatment systems and how they can be applied to a wide range of operations.

For product and distributor information, please contact us at:

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