From: Steve Christensen
To: Kevin Lundmark; OGMCOAL
Date: 11/17/2010 8:59 AM
Subject: Fwd: Polymer Testing
Attachments: October, 2010 Installation report.pdf

Hello Steve,
I spoke with Randy and he will have some information to us by the end of the week. He has been out of town and apologized for not getting right on it. As soon as I have any information, I will forward it to you. Have a great day!

Dana Marrelli

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MEMORANDUM

To: Dana Marrelli- UtahAmerica Energy, Inc.

From: Randy Wilcox, PE- WaterSolve, LLC

Cc: Gregg Lebster

Date: November 4, 2010

Regarding: Technical Notes, Pictures, and Recommendations from the Initial Geotube® installations- October 20 - 22, 2010.

Summary of Work

WaterSolve LLC, was tasked to provide technical assistance for the installation of a Geotube® container dewatering system at the Crandall Canyon Mine near Huntington, Utah. Two-22.5 ft. circumference by 22-ft. long Geotube® MDS containers, polymer feed systems, and appurtenant piping and fittings were installed to dewater mine drainage residual stored in an onsite holding pond. Randy Wilcox was the on-site representative from WaterSolve, LLC to assist in the installation and start-up.

Geotube® containers (two MDS containers), and polymer (one drum) were on-site when WaterSolve arrived on October 20, 2010. The polymer make-down unit purchased from WaterSolve was lost after it was shipped from WaterSolve. In order to continue the initial installation, WaterSolve sent a polymer pump and a static mixer to use for polymer injection instead of the polymer make-down unit. Dewatering polymer used for this installation was based on the "Dewatering Performance Trial" completed by WaterSolve, LLC on July 21, 2010.

On-site personnel were very friendly and helpful. They were able to accomplish a significant amount of work to set-up and start-up the installations in addition to their normal daily work. The personnel that we reviewed the operations of the Geotube® containers and chemical feed systems are technically capable for continued operations.

The unconsolidated residual is generated by the chemical treatment of the mine drainage and appears to be iron precipitate. This residual was chemically conditioned and pumped to the Geotube® container using piping that was installed to remove the solids from the pond.

The make-shift polymer make-down unit was plumbed into the residual line directed toward the Geotube® container. This unit blends and activates Solve 151 polymer with water and meters it into the injection port.

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The existing piping and on-site plumbing was utilized to transport residuals from the pond to the Geotube® container.

The filtrate was directed toward another pond prior to discharge to a watercourse.

The residual polymer was a significant concern at this facility. The materials and equipment to complete the qualitative test to determine the residual polymer was sent to the site prior to our arrival on October 20, 2010. We reviewed this testing with on-site personnel. In addition, we discussed the testing with regulatory agencies that visited the site on Friday, October 22, 2010. We also met with SGS (local analytical laboratory) to discuss the potential of performing the quantitative testing at their facility.

When we tested the effluent or Geotube® filtrate for residual polymer using the qualitative method, there was no noticeable polymer present.

Recommendations and Observations

- The make-shift polymer make-down unit was adequate for the initial trial, but should be replaced prior to long-term operation.

- On-site jar testing verified the recommended chemical conditioning program of 50-ppm Solve 151. This was also observed on-line in the Geotube® trial. However, the dose of polymer varied as the solids in the residual line changed.

- When the chemical conditioning is monitored using the sample port, it is important to keep in mind that the floc is slow to form and there may be a tendency to add more polymer than required. Swirling the sample and waiting for several minutes will give the best indication.

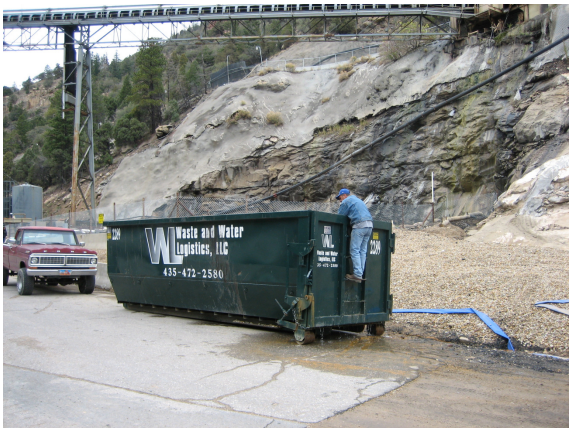
- We recommend measuring the totes (or drums) of polymer before and after a one hour time trial to determine the actual use rates.

- The maximum fill height for these MDS containers is 5.5-ft. as noted on the containers by the fill ports. The containers can be “topped off” after dewatering, but they should never be filled over the maximum fill height.

WaterSolve LLC

Project Photographs

The treatment pond after removal of a portion of the solids is shown here.



The Geotube® MDS container was placed in the dumpster and the filtrate water was allowed to drain as shown on the left. The partially filled Geotube® MDS container is shown inside the dumpster (right).

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The chemical conditioning was verified at the sample port. The above photograph shows the conditioned residual with excellent floc formation and water separation.

Raw residual (left) was chemically treated with Solve 151 (center) creating flocculation of the solids and release of water. The filtrate water from the Geotube® container is shown on the right.

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