WaterSolve LLC

Your Water, Wastewater, & Materials Dewatering Partner

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Mine clean-up in Northwest Territories of Canada

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In the Northwest Territories of Canada the Tundra Mine is one of many abandoned gold mines. The water had elevated levels of aluminum, arsenic, chromium, manganese, copper, iron, lead and zinc.

Watersolve was contracted to assist in the testing, start-up and optimization of the chemical feed components of the treatment system. The 2011 season was the third for this treatment system designed to remove arsenic and other containments from the water. A representative from WaterSolve was on site to help with the project.

Since the site was in a remote location all of the equipment, products and supplies were delivered to the site via ice roads or cargo plane. The products provided by WaterSolve included Geotube® containers, filtration fabric, and chemicals.

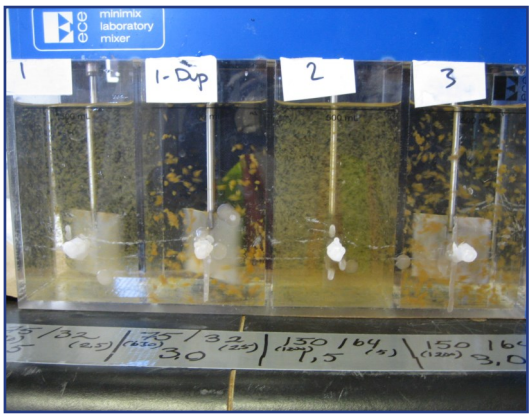
Bench Testing of the water was done onsite to confirm the treatment of ferric sulfate, lime and polymer to precipitate the arsenic as a hydroxide. The precipitating solids could then be collected into the Geotube® containters. The Geotube® containers are made of polypropylene fabric and designed to allow the effluent water to escape while retaining the chemically conditioned solids.

Every year the treatment system was optimized to determine the most effective chemical conditioning and treatment system layout. In addition to the ferric sulfate, lime, and polymer, the use of sodium metabisulfite was also evaluated to precipitate other containment's of concern such as lead and zinc.

After the on site safety training, the WaterSolve representative was accompanied by on-site personnel to observe the layout and get familiar with the site. For the remainder of the first day, he worked with on-site personnel in the laboratory to confirm and refine the doses of the various products. Based on the initial testing, the most effective doses were determined to be:

1. 75-ppm Ferric Sulfate
2. 32-ppm Lime
3. 3-ppm Polymer

On Saturday, June 25, 2011, the weather caused delays in the plans to start the treatment process. The liner to be placed on the dewatering pad could not be installed due to high winds. We then worked during the morning to collect additional samples from the pond and perform laboratory testing to estimate the required dose of sodium metabisulfite that may be required to reduce the concentrations of zinc and lead.



On left, bench testing was completed to optimize the chemical doses. On right the chemical addition was done in sequence using temporary "onion" tanks and the flow was by gravity between tanks and to the Geotube® containers.

Along with the additional bench testing, we performed analytical testing on the samples which was a priority. Then we assisted with the liner installation for the trains 1 and 2. We met to review the objectives and procedures for the initial start-up. The primary objectives and items to evaluate were:

- Verify chemical conditioning from bench testing
- Further evaluate the flocculent dose required.
- Evaluate the shear on the floc formed.
- Evaluate the effect of the lay-flat hose.
- Optimize the mixing in the flocculent addition tank.

Two 45' circumference by 200' length Geotube® containers were placed for each treatment train and connected with hoses.

The Geotube® containers under full scale operation.

In this meeting, we also discussed the operation of the Geotube® containers. In the past, it has been necessary to break the surface tension by striking the tubes with a PVC pipe. Our recommendations were to only do that as necessary to keep the Geotube® containers below the maximum fill height and to do it on the top and if possible, only at the down-stream area where the depth is greatest, and to avoid it if significant solids are released consistently while relaxing the tubes. It is anticipated that this will be required less than previous years because there are two tubes per treatment train.

Geotube® Dewatering Tests (GDTs) were performed on two 10,000-mL samples which were collected . The lime dose was adjusted based on the pH of each sample (32 to 50-ppm). The ferric sulfate dose was 75-ppm and the polymer dose was 1.5-ppm. There was some break-thru of solids as expected, but significant solids capture.

For the remaining days on-site, the treatment was started-up and optimized. Initially, the treatment system was operated only during the day shift. The treatment system and solids collection into the Geotube® containers ,were fully operational when the WaterSolve representative left the site on Friday, July 1, 2011.