Columbia Mills Dye Tests

Monitoring Well Inventory, 6/18-19/09

Photos with Notes

Photo	Description
	Payson Long (left) and I (small inset photo) arrived at approximately 2:30PM. Jeremy Wycoff (middle) and Jeff Redfield (right), both of Malcolm Pirnie were at work sampling groundwater.
	View back along the "spine" of the landfill towards the leachate tank.

Report by Will Welling

Google Map view

Continuing a sweep to the right.

Continuing a sweep to the right.

Jeremy, left; Payson, right

Gated access to the landfill. Jeremy and Payson are opening the manhole covers in the leachate tank area.

Jeremy and Payson are opening the manhole covers in the leachate tank area.

Manhole open, tank end.

Manway riser, cover off. Water levels in both the tank and the manway riser were the same. Eventually we figured out that the influent line's collar connection to the leachate tank in the manway riser was leaky. When the leachate tank filled up, the leak allowed water to fill the manway riser and equalize to the same level as the full tank.

At 3:15PM we opened the sewer manhole cover approximately 1000 feet away. This manhole has a central sewer flow and two pipes which enter obliquely. One pipe, presumably a sewer pipe, was a 6” green pipe plastic pipe and another which was 4” white plastic (see the next photo).

Better shot of the initial conditions inside the sewer manway. The green pipe (top) is a residential sewer connection, the white pipe is our leachate line into the sewer.

Weather: Temperature in the low 60s. Misting, no wind or breeze, overcast. At 3:00 it began to rain with actual drops rather than fine mist. It was raining rather hard. Payson and I donned rain gear.

Payson talking to Jeremy.

Location: standing a the edge of the trees at the sewer looking back towards the landfill. Two old brick and stone apartment buildings are in the rear. One looks abandoned, the one closest to the landfill is occupied.

At 3:18 PM we saw slightly increased central sewer flow. Jeremy had opened the valve in the leachate manway. This valve had been in the closed position. At 8 minutes (3:18) we saw flow increase in the green pipe. Toilet flush?

3:28PM. Payson and I were in touch by cell phone and he called me to say that Jeremy dropped in the dye tablets. The tablets are orange but they make the water green like antifreeze.

3:35 Jeremy says the tank looks like antifreeze.

3:45PM The green sewer pipe has just about stopped. There has been no color change to the flow from this big pipe.

3:45:30 There is now flow from the white pipe. Not much, but some flow. It's clear aside from some pieces of organic matter like dirt. Leaf pieces and “chunks” are coming out with the water. Maybe this pipe hasn't had water flowing in it for a while and this little bit of flow is flushing it out.

3:57 No changes yet.

4:01 Greywater flows out of the green pipe. Makes suds. No color change at the white pipe.

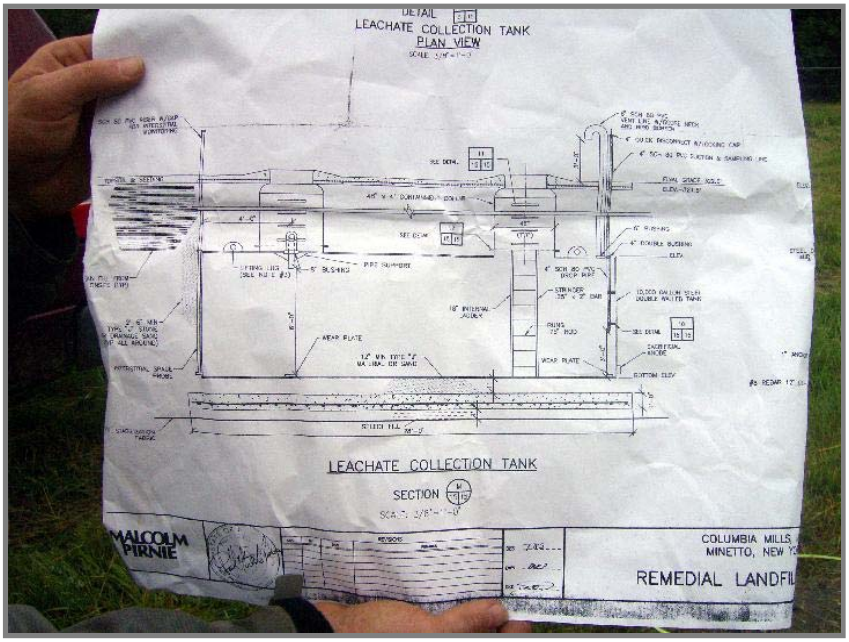
4:06 The big pipe (flow) down the center seems to have increased. The rain has now stopped. Perhaps th big pipe was picking up some of the rain runoff. Flow has doubled.

4:23 Another slug of greywater from the green pipe. Smells like laundry detergent. Somebody is washing clothes, We are seeing the cycle of the washing machine.

4:50 No change. There has been a light mist since the previous rain seemed to have ended but now I think the more steady rain has resumed.

4:50 Another greywater flow. For the rest of the day we saw water flow from the leachate pipe in the sewer but we saw no dye.

5:05 I suspended my watch. I go to find Payson. He's been watching the pond. Photos of the mixed dye.



Jeremy produced the drawing of the tank.

Dye

Manway riser and peristaltic pump

Some measurements at the tank: One side (manway riser) has a depth of 16.6 feet and the other side has a depth of 21.7 feet. Why doesn't the shallower one have an inlet/outlet that we can feel with the stadia rod?

Stadia rod the in manway riser. We pumped some of the water out using a peristaltic pump connected to a hose weighted down so it was on the bottom.

Peristaltic sampling pump drawing from the tank.

Shot of both openings and the activity at the time.

6:00PM Back at the sewer. No change in color coming from the white pipe or the big pipe down the middle. Leachate pipe still flowing clear.

6:15 Jeremy dipped three samples one each from three pipes inside “the vault.” Photos. In the photos, three fingers means the third pipe, the middle finger (“the bird”) means the middle pipe and the index finger means first pipe. All dipped water samples are clear. This is a disappointment. We've dyed 10,000 gallons of water and the water coming ut of the pipes is completely clear!

We'll return tomorrow to see if the concentration of color has changed in the tank and/or in the sewer and vault monitoring locations.

Water currently flowing from the middle pipe. Here "the bird" is being used to symbolize the middle tank.

First pipe also clear. All three in the vault are running clear

6/19/2009, Friday. 8:30AM return to the site. Jeremy has been at the site since 6:45 AM. Jeremy is sampling at the vault. Camera was held down inside the vault for this photo.

Kids have been 4-wheeling and making ruts in the grass and stream which drains the perimeter of the landfill. I'm glad the landfill proper is fenced! If not it would be cut up pretty bad.

Camera was held down inside the vault for this photo.

Outlet pipe which leads to the discharge point into the amphibian breeding pond.

Amphibian pond from the edge of the woods, upon the knoll.

View just out from the woods looking back towards the vault. The amphibian pond is to the right , out of view.

Amphibian pond closest to the vault.

The cap was recently mowed. The mower had clipped an ant hill which at first I thought was a mound from a groundhog. No groundhog but I did see two holes dug by a groundhog. Photos will be later in the sequence.

Photo from the cap looking back towards the railroad tracks.

Swinging around slightly to the right with reference to the previous shot.

Photo of a fox on the slope up from the amphibian pond. The fox took off when Jeremy returned to the site with his truck. The noise spooked the fox and he ran to the woods to the rear.

Friday we obtained a diaphram pump. We pumped water here and there testing various theories. We drained the manway riser and discovered a leaky collar joint.

1:30 PM We've done a lot of work this morning and I haven't written much down. We've had success with the dye-tracing. The rain ended at about 11 (it had been lightly raining and misting) and so now I am able to put down the pencil and write my notes in ballpoint pen.

Summarizing the flows we traced: landfill "groundwater" is collected and piped to the vault in two pipes, each with a valve on the end of the pipe in the vault. One leachate system pipe discharges to the vault. It has no valve in the vault. This is the pipe we called "3" and the middle one was (the bird) and the other one was pipe #1. Leachate flows in two pipes to the tank. There is a valve at the entry to the tank (down in the man-way riser) and we believe this connection is leaky. When this valve is off (or when

the tank is full) water backs up and if valves are open to sewer and/or the vault are open, water flows there. We saw that the valve into the tanks was open. Up hill a few feet, until we opened the leachate valve to the sewer (one of the two small manholes) no water was flowing into the sewer (the white pipe). The second small manhole had a valve on the leachate line (before the tank) which controlled bypass overflow water flow to the vault. This was open when we popped the cover. We determined that since the tank was full, water was bypassing

and discharging to the amphibian pond. None of the water in the tank came out to the discharge points. We bailed and pumped it to the leachate system collection pipes and to the groundwater collection system to trace where those pipes went. They all bypassed the collection tank. We eventually got green water out of the white pipe in the sewer manhole.

We think the man-way riser should have been dry. The valve was on the bottom down 13 feet and would have to be turned with a reach rod. If the chamber were full of water, that would be unworkable. Examining carefully we saw that when we pumped the leachate tank to a few inches below the bulkhead the water stabilized at just below the collar in the other manway riser. The water level showed us where the hydraulic connection to the tank is!

Re-arrangement

First pipe inside the vault, looking for green water. No green water.

Pipes "middle" and third (most distant). The third pipe is from the groundwater collection system.

Success! We now have green dye in the first pipe inside the vault. This is a leachate pipe.

The vault slowly filled with enough dyed water so that the dye made its way into the discharge pipe. Standing at the point of discharge to the pond, water can be seen entering the amphibian pond.

Visual sample from the vault. This was just before dye reached the vault.

Visual sample from the vault

Green finally in the sewer. We had pumped some leachate into one of the leachate clean-out stickups behind the tank and the valve access manholes. About 1/2 hour later we saw the green dye.

Close-up

From the surface. Even standing over the manhole the green dye can be seen.

Another positive

Pumping down the manway riser

In pumping mode. We were draining the manway riser.

Discharge end

Tank manhole cover

Looking into the manway riser almost pumped down makes for a surreal image.

Ditto

Now the plumbing is visible. The leachate fill pipe makes a 90-degree bend just beyond the valve. In this plumbing a connection must be leaking because the water height rises to the same height as that of the tank.

Water level paused at the leaky connection.

Now drained.

Photo taken above the ground surface.

Groundwater and leachate cleanout stickups behind the tank.

Swinging a bit to the right to give proximity.

Google map