



August 17, 2023

Patrick Siers, Facility Engineer
Flathead National Forest
650 Timberwolf Pkwy
Kalispell, MT 59901

Re: Holland Lake WWTF
Leakage Assessment

Dear Mr. Siers:

On June 8, 2023, Josh Viall and I conducted an inspection of the Holland Lake wastewater treatment lagoons. I would like to thank you, Vincent Chapell, and Justin Trodick for taking time to meet with us and for showing us the system. It was very helpful and informative.

In general, the system appears to be in good shape, and we commend the efforts taken to accomplish that. A few items are listed at the end of the attached report, which need to be addressed to ensure the adequate, long-term operation of the system. **Please indicate in writing within 15 days how those items at the end of the enclosed report will be corrected. Failure to address these issues may result in system violations.** DEQ's Enforcement Program will send a separate letter related to complaint response and citing the applicable regulations.

As you know, the reason for our visit was to gather information regarding operations and to assess the physical condition of the lagoon to determine if there is evidence that the lagoons are leaking excessively. After reviewing the data, results of the water balance were inconclusive. Due to the significant variability of influent flow from year to year, we would need records of evaporation, precipitation, and the volume irrigated on an annual basis as well, which we do not have. While such data could be collected going forward at the lagoon site, it may be easier and timelier to do an on-site leakage assessment where each cell can be isolated, and the water level monitored for a minimum of two weeks. During the testing period, evaporation and precipitation would also be recorded and factored into the any changes in the water level of the lagoon.

The following is one method that you could use to assess leakage: Equipment and method: Two 12-inch (304.8 mm), minimum diameter PVC pipes shall be securely placed vertically (and temporarily) to the floor or sidewall of the pond being tested. The top of each pipe shall be at least 12 inches (304.8 mm) above the water surface. Both pipes shall be open to the atmosphere and must have a waterproof scale secured to the interior of the pipe near the water surface in increments no less than 1/16" (1.6 mm). One pipe (control pipe) shall be water-tight below the water surface and filled to the level of the basin at the start of the testing period. The second pipe shall have holes below the water surface to allow a hydraulic connection between the inside of the pipe and the water in the basin. The leakage through the liner is the difference between the two levels over the testing period.

If you have any questions regarding this report, please do not hesitate to call me at (406) 444-6776.

Sincerely,

A handwritten signature in blue ink that reads "Mike Abrahamson". The signature is written in a cursive style with a long horizontal stroke at the end.

Mike Abrahamson, P.E.
WPCSRF Section Supervisor
Engineering Bureau

Encl. Inspection report