From: Paul Gilmore
To: Jennings, Jonathan (ECY); WSDF@msn.com
Subject: Dairy Lagoon Liners CAFO
Date: Wednesday, September 16, 2015 4:05:58 PM

To All,

I have heard a few various systems being proposed. Currently, the assumption is "all liners leak". This is based upon an outdated technical paper which was written prior to modern leak location and QA/QC installation technologies. I have concerns about dairymen being forced to install a system which is not designed for the type of operational expectations the dairymen have in regards to the use of their lagoons. Specifically, the drawdown, emptying and refilling of lagoons and how specific liners perform in these conditions.

GCL cannot, should not and will not be suggested to be approved/designed for use under a liner which will not maintain 100% confinement pressures or significant soil cover such as in a landfill system.(literature available used often for open lagoons which are not similar to landfill applications) I can explain this more in detail at any time. GCL's also cannot be placed on slope angles of greater than 3:1 without soil interface friction engineering. The WSDOT Orange book specifies no GCL be placed on slopes greater than 4:1. These are not good for the dairymen. We need to avoid GCL in most situations unless higher levels of engineering are going into the design and all of the above factors are mentioned. Using a GCL is potentially the worst leak detection layer possible in a design. GCL must remain in confinement with head pressures. When GCL is used in a landfill application the GLC is always in a stand-alone layer under a minimum of 36" of compacted soil. They do not often interface directly with the synthetic geomembrane liners. When GCL is no longer in confinement and hydrated it will expand and fail. When water is flowing against a GCL(potential leak situation) the GCL will be susceptible to failure.

The lowest cost system is an Agru Drain Liner. Using a 40-MIL drain liner with a 60-MIL primary liner over the top. The 40-MIL has elevated studs and acts as the liner and drainage layer combined. The 60-MIL is the primary containment. This eliminates layers and provides the desired liner thicknesses and a leak free, proven full QA/QC system. Eliminating layers placed over geomembranes also lowers the chances of installation damage which can cause leakage. Additionally, an even greater feature is the liner ability to be electronically leak located in the future after periods of clean out and maintenance.

Here are two cost comparisons for a liner supply and install based upon a 3 million gallon pond;

Improper use of GCL system:

60-MIL HDPE	$ 0.65 sf
200-mil double sided 6oz non-woven geocomposite	$ 0.50 SF (geocomposite required because GCL will hydrate, expand and fill in a geonet drain layer plugging it)
GCL	$ 0.80 SF
Total system	$ 1.95 SF

Best value double lined system:

60-MIL HDPE Primary liner	$ 0.65 sf
50-MIL HDPE Drain Liner (acts as liner and drain layer)	$ 0.65 sf
Total system	$ 1.30 sf

State of Washington ECY Requirements for waste water lagoons:

60-MIL HDPE primary layer	$ 0.65 sf
200-MIL Geonet drainage	$ 0.45 sf
60-MIL HDPE secondary layer	$ 0.65 sf
Total system	$ 1.75 SF

I am available to give presentations, educational seminars and meet in person for discussion at any time with any persons or agencies. Our company, Northwest Linings is the oldest continually operating liner supplier and installer in the entire USA. Our Owner, Pres, VP and Operations manager have all been listed as contributors to published technical articles. We have helped establish the recognized details for liner quality control and installations. We have over 41 years and 750,000,000 square feet of installation experience using every type of liner manufactured. We supply and install every type of liner and we are NOT affiliated with a single source supplier. We always strive to offer the best product for specific applications. We have worked all over the world and have extensive experience ranging from working for The Department of Energy, Army, Navy, Ecology, State, Municipal, Irrigation Districts, mining companies and private owners world-wide.

I am looking forward to providing any possible guidance which will benefit the dairymen and the environment,

Paul Gilmore
Construction Installation Sales and Business Development
Northwest Linings & Geotextile Products, Inc.
21000 77th Ave South
Kent, WA 98032
P: 253-796-0012 Construction Office
D: 253-867-5367 Direct Line
C: 206-851-6326 Cell
F: 253-872-6953
paulg@northwestlinings.com
www.northwestlinings.com
“Helping to Protect the Environment”
Celebrating 41 Years of Service 1973-2014

From: Paul Gilmore
To: Jennings, Jonathan (ECY); WSDF@msn.com
Subject: RE: Dairy Lagoon Liners CAFO
Date: Thursday, September 17, 2015 8:28:35 AM

Also,

NWL and any competent HDPE installation contractor can provide 100% leak free liners. We can prove this with electronic leak location surveys. This have become proven technology in the last 10 years. This is well after the technical paper was written which ECY and EPA often use to state "all liners leak". A single layer of liner which has been electronically surveyed for defects will not leak. Some facilities have single liners and are required to have a liner cleanout and inspection on a regular 5 year interval. A single liner, electronic leak location survey prior to being put into service and a clean out and inspection every 5 years would be a much more reasonable expectation for dairy waste management. A single layer of liner can cost as low as $ 0.50 SF. The current system which has been proposed is about $ 2.00 SF. This is unreasonable because the expectation for the system being proposed with multiple layers is a completely incorrect application and use of membrane materials. I have added a few links below for leak location services. As an industry expert in lagoon linings, I believe a single layer of liner which has been leak detected prior to being put into service should be the chosen system for animal waste lagoons.

See articles and links below to leak location services.

http://www.appliedsoilwater.com/LeakLocation.aspx
http://www.llsi.com/
www.beyondleakdetection.com (Pasco, WA based company)

Also, one must consider Conductive HDPE. Conductive HDPE can have every inch scanned for defects or potential leak sources. This can be scanned prior to use and at any time in the future.

Regulators need to read and understand MODERN technical articles rather than making policy based on outdated technical papers written by people who are no longer considered "leading edge" or "modern" within the HDPE installation industry.

Thank you,

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From: Paul Gilmore [mailto:paulg@northwestlinings.com]
Sent: Wednesday, September 16, 2015 4:06 PM
To: 'jonathan.jennings@ecy.wa.gov'; 'WSDF@msn.com'
Subject: Dairy Lagoon Liners CAFO

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