Excavation vs Pumping

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Long reach excavation of a lagoon or settling basin is a distinct possibility, but there are a few limitations and usually some additional expense, inconveniences and truck traffic involved.

Lagoon Pumping and Dredging does offer excavation as an alternative service to their pumping operations, but this is often limited to lagoons that are being decommissioned or to settling basins that are easily reachable with both the excavator and trucks.

Long reach excavators have to sit on a flat stable platform which is almost always on the lagoon bank. The most common long reach excavator has a 60 foot arm. Due to the long reach weight lifting limitations, the lifting load is usually limited to ½ to ¾ of a yard bucket.

The ½ yard of material removed each load causes an excavator to make 20 to 30 swings per truck load. This will increase the load time and thus the time it takes to complete the job.

In addition, most lagoons have banks that are raised above the normal ground level. This creates an awkward situation for large trucks to manipulate in and around the lagoon edge. The many truck-loads in and around the dairy creates a tremendous amount of truck traffic and soil compaction at the destination site.

Most lagoons need to be dewatered before an excavator can effectively do their job. If excavating in a working lagoon with daily water inflow, then the manure slurry needs to hauled in trucks or wagons that are water tight or else there will be excessive amounts of manure spilled on the roadways. Complete manure removal from a working lagoon is impossible since a dozer or mechanical removal cannot happen in a water-filled or working lagoon.

The reach limitations of a long reach excavator dictates that it can only reach the length of the boom, which generally is limited to 60 feet. This reach often does not even allow the excavator to reach to the bottom of the lagoon slope *(3:1 slope and 20' depth = 60' to bottom of slope).* This means the whole interior of the lagoon cannot be excavated without the aid of a dozer of skid steer.

To totally remove all the solids you would need to bring in a bulldozer or skid steer and push the solids to the excavator in order for the excavator to remove it. This will often

creates havoc on a earthen lagoon liner. Most state regulatory agencies require a permeability test before they will certify a lagoon after mechanical removal of sludge.

Excavation is an excellent solution for the following situations:

A) Settling or seeping wall basins that have easy access to truck traffic, or
B) Lagoons that are being decommissioned, or
C) Lagoons that a tremendous amount of sand that has reduced the lagoon capacity.

In active lagoons where there is daily inflow of water, agitation and pumping is the best alternative. This allows you to continue to operate during the clean out operation.

In order to pump solids, enough water is required to thin out the slurry to make it pumpable. This means having about 1 part water to 1 part sludge. This will create 12% to 14% slurry solids which pumps very easily.

Dewatered sludge is usually about 50% solids; a cubic yard of excavated solids will dry down to 1000 pound or ½ dry ton. To get the same amount of dry ton sludge out by pumping you would have to pump 3,921 gallons of manure slurry at 12% solids.

Cost comparison of moving 1 Dry Tons of manure and applying it to a field within one mile from the lagoon vs. pumping 7,842 gallons to the same field would be as follows:

Pumping Costs @ 12% solids to field 1 mile or less = .01360 / gallon
7,842 gallons @ .01360 = **$106 per dry ton**

Long Reach Excavation Costs per Dry Ton = 2 Wet Tons manure
Excavation yields three 10 yard loads an hour @ $240 / hour
$240 / 30 wet tons * 2 wet tons per DT = $16 per DT
Hauling costs = $3.50/WT + .25/ton mile = $7.50 per DT
Spreading costs are about $10 per acre.
At 7 WT/acre; spreading costs are $2.86 per DT
Total cost is about **$26.36 per dry ton** of manure removed.

One could argue that excavation is only ¼ the cost of pumping. But if you totally removed the sludge from a lagoon there would be dozer costs, permeability test costs, liner repairs, crop yield loss due to soil compaction, excess dairy traffic, lagoon not useable for weeks and possible delays and costs associated with getting the lagoon certified.

In addition, it would take up to 10 times longer to excavate versus pumping out the same lagoon. ***Are the limitations, inconveniences and time delays worth the cost savings?*** *Only you can answer that question.*

Recently, a dairy operation used an excavator who mistakenly removed some of the clay liner as they removed the sludge; this caused manure water to leak through the earthen liner and into their test wells. The DEQ required them to repair the lagoon. This required them to build a new lagoon to handle their daily manure water inflow before they could totally empty the problem lagoon and repair it. The DEQ would not certify their lagoons or dairy operation until the leaking lagoon was decommissioned or repaired. This came at a huge expense to the dairy. *Could your dairy handle this kind of a financial setback?*