

Dewatering Option: Belt Press

**Fifth Annual Waste Treatment
Symposium, September 2010**

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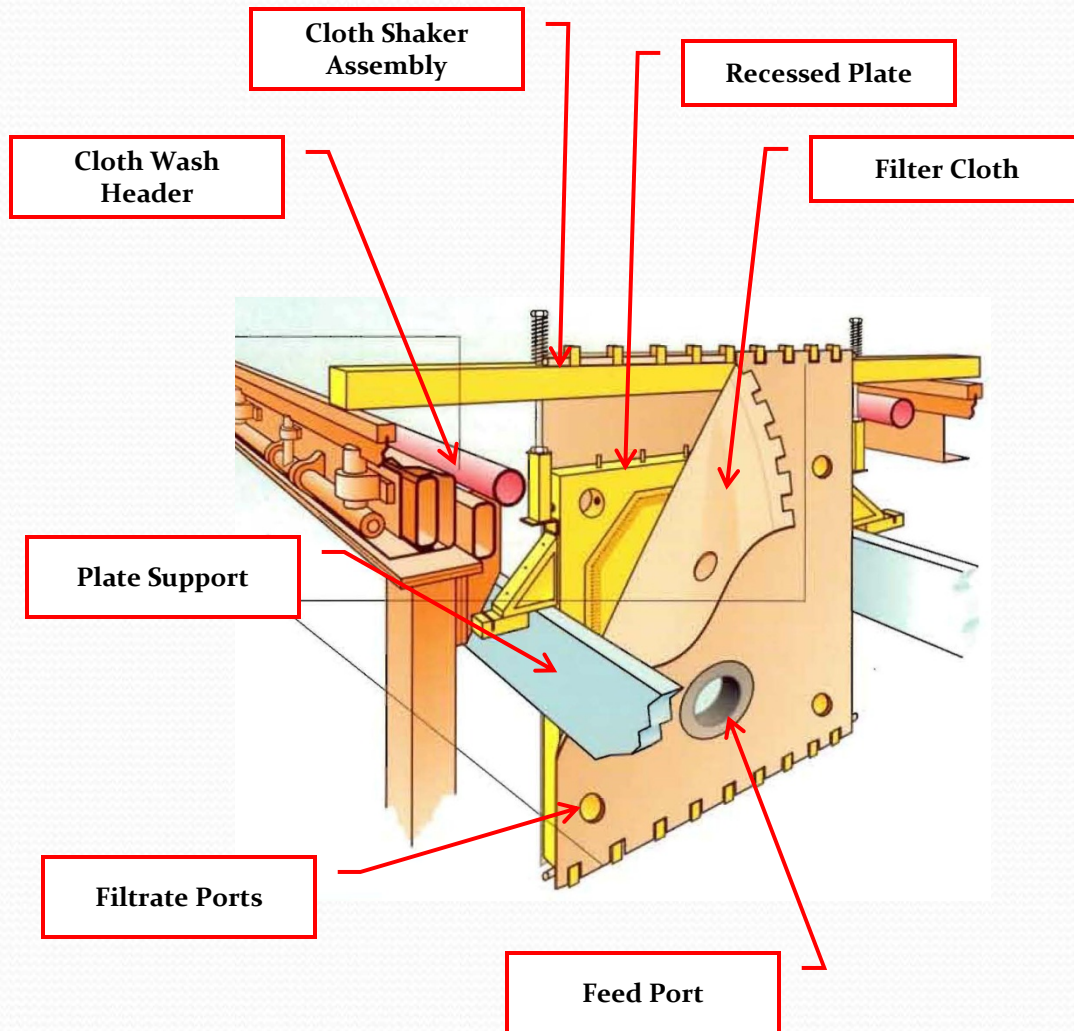
Agenda

- Description of Operation
- Advantages / Disadvantages verses Other Options
- Performance Parameters
- Capital and Operating Costs
- Case History: Musser Sewer & Septic LLC.
- Summary
- Questions

Dewatering Options

- Recessed Chamber Press
- Centrifuge
- Belt Press
- Screw Press / Rotary Press
- Dewatering Box (Containment Filter)

Chamber Press



Chamber Press

Advantages:

- Highest filtration pressure: 100 to 225psi.
- Maintenance can be done by plant personnel.
- Most repairs can be made in a couple of hours.
- Excellent solids capture when conditioned properly.
- Conditioning chemical costs can be lower.
- Amenable to daily operation. Must insure 2 hr cycle can be completed.



Solid Bowl Centrifuge

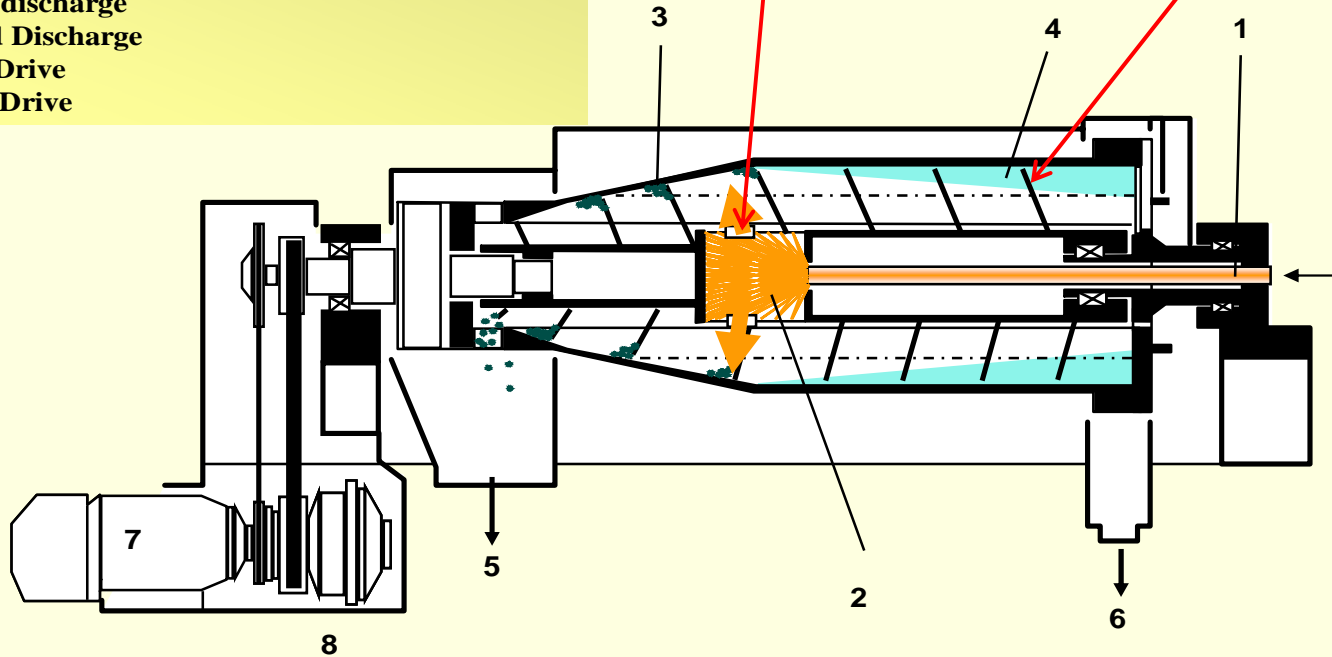
Feed Ports



Cake Scroll



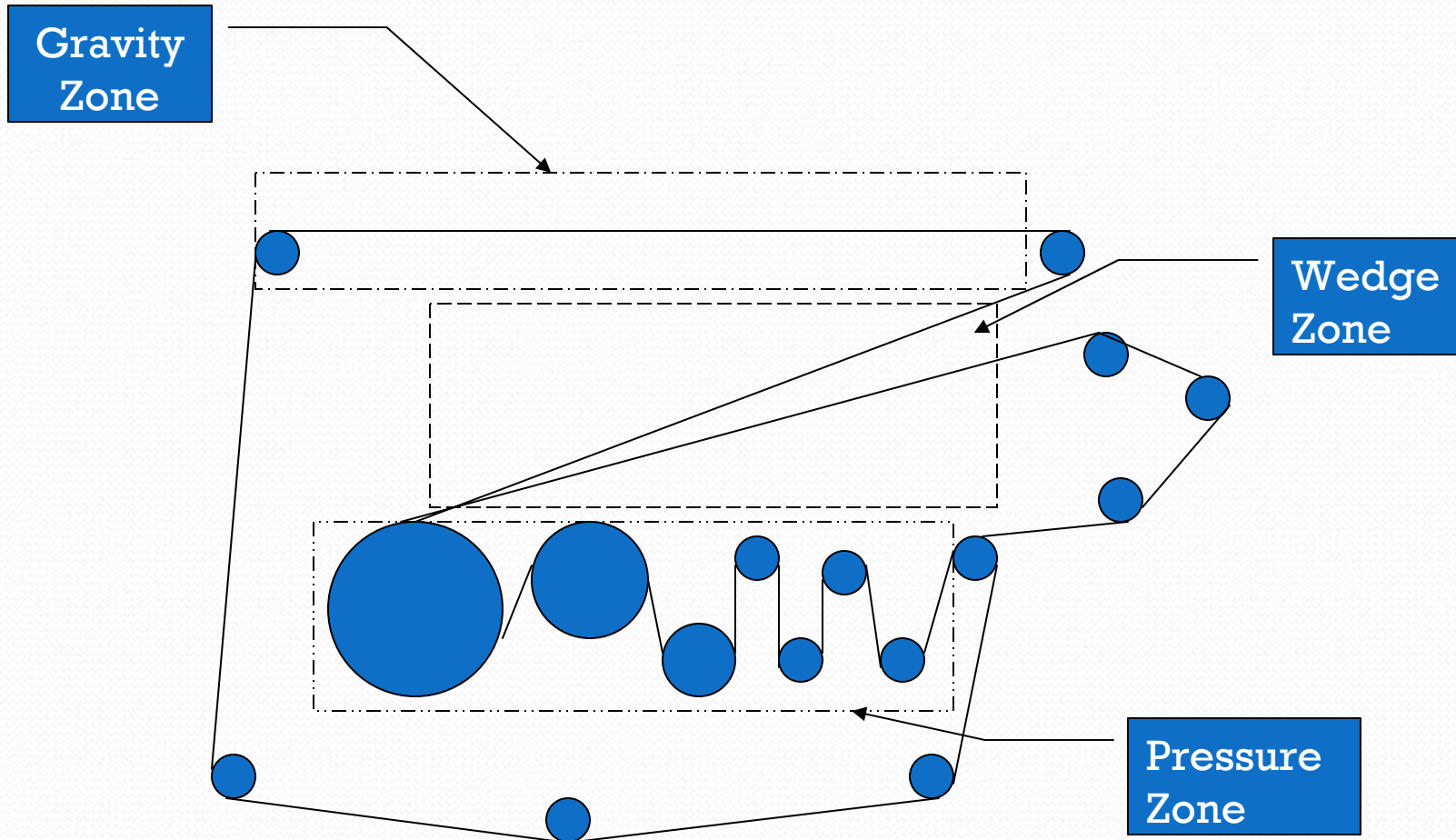
- 1) Feed
- 2) Feed Acceleration in Feed Zone
- 3) Solid Blanket
- 4) Clarified Liquid
- 5) Solids discharge
- 6) Liquid Discharge
- 7) Main Drive
- 8) Scroll Drive



General: Advantages

- ▣ Centrifuge:
 - Occasionally higher cake solids
 - High unit capacity
 - Containment of odor and process fluids
 - Lower operator attention when operation stable
 - Easier to keep operator area clean
 - Maintenance no higher than belt press, but big ticket item when required
 - Maintains cake solids at higher than design loading, although solids capture suffers
 - Smaller building.

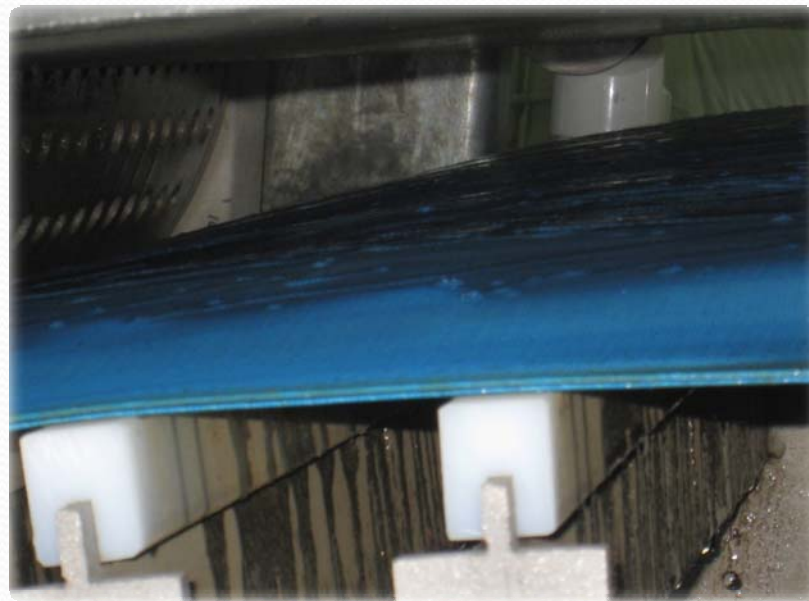
Belt Press



Gravity Zone



Wedge Zone



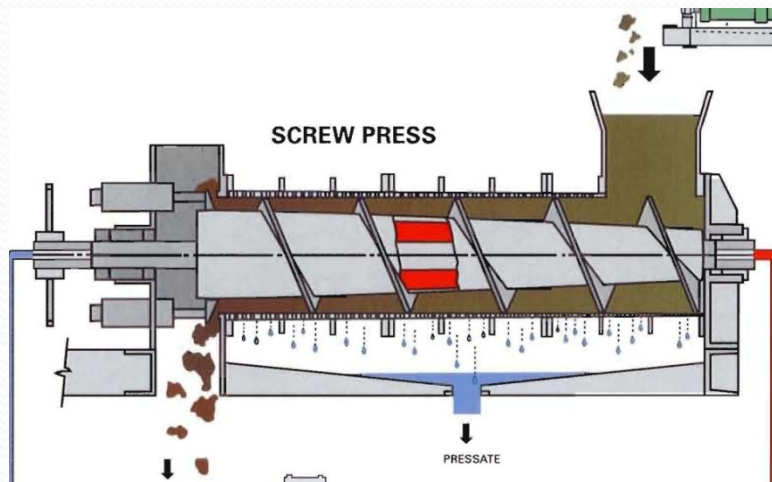
Vertical Pressure Zone



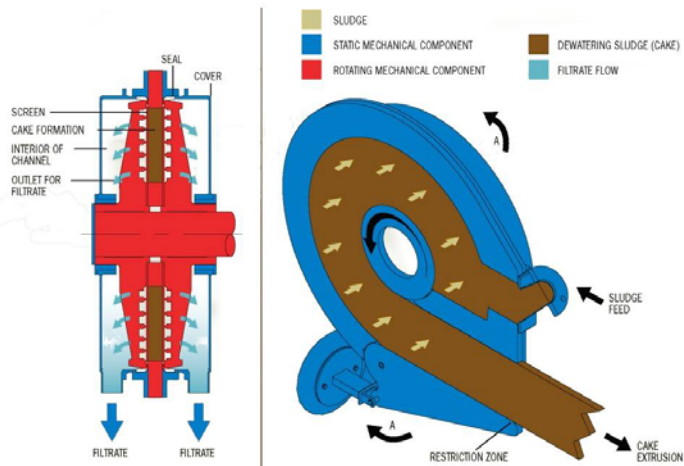
BDP Industries: Model 3DP



Screw Press / Rotary Press



Principle of operation



Advantages:

- Containment of process fluids.
- Low energy consumption, similar to belt press.
- Lower maintenance costs than a chamber press, similar to a belt press.
- Lower polymer dosages, similar to a belt press.
- Less operator attention than a belt press.

Screw Press / Rotary Press

Advantages:

- Insensitive to coarse material.
- High system availability.
- Low noise levels.
- Some Designs Upgradable to produce Class A Sludge.
- Most maintenance can be handled by staff.
- Facility easy to keep clean.
- Easy start up and shutdown amenable to intermittent operation, a few hours daily or unattended operation.

Belt Press Advantages

- Least expensive, other than Dewatering Box.
- Simple to Operate and Maintain.
- Lowest energy requirement.
- Lowest polymer dosage.
- Easy start up and shutdown amenable to intermittent operation a few hours daily.
- Maintenance can be done by plant personnel.
- Operators can easily be trained to properly operate unit.
- Process is observable allowing quick operator response to unstable conditions to avoid upsets.
- Most repairs can be made in a couple of hours.

Dewatering Box:

Advantages :

- Least expensive option.
- Handles all sludge types.
- Grit removal not required.
- No building, simple foundation requirements.
- Simple to Operate and Maintain.
- Lowest energy requirement.
- Low polymer dosage.
- Simple Maintenance.



Recessed Chamber Press:

Disadvantages

- Batch process.
- Complicated Systems for: Feed pump, pre-coating, conditioning and metering of lime, ferric and fly ash.
- Blow outs / Plate Breakage.
- Labor intensive for performing cake discharge and plate washing etc. or spend more \$ for an automated system.
- Can't effectively use polymer flocculants because conditioning must be done in bulk mix tanks and then pumped to press, polymers can't take shear of pumping.
- Large footprint for press and accessory systems: Feed pumps, conditioning tank, pre-coat make up, lime metering, pressure washer etc.
- Significant building structure to deal with size and weight of press and accessories.
- Frequent maintenance and cleaning.
- Can't observe process, At end of 2 hr cycle, cake discharge can be wet due to improper conditioning or blinded cloth.
- Expensive Discharge System: cake breakage and storage required due to batch operation.
- Operators potentially exposed to process fluids more than other options.
- Odor containment difficult.

General Disadvantages

- Centrifuge:
 - Highest energy consumer, largest carbon footprint
 - Highest usage of polymer
 - Down time for repairs take weeks
 - Start-up and Shutdown can take an hour and must be done carefully to avoid major damage to unit.
 - Recommended Operation is continuous, not daily start up/shutdown.
 - Performance difficult to monitor and make proper adjustments when feed isn't stable.
 - Special structural requirements for equipment foundation.
 - Noisy.
 - Solid capture often poor.

Screw Press / Rotary Press

Disadvantages

- Lowest capacity per unit
- Lower solids capture than belt press
- Can't maintain solids loading if influent concentration drops.
- Can't clean blinded filtration surface without shutting down and emptying the unit.
- Potential for Plug formation.

Belt Press:

Disadvantages:

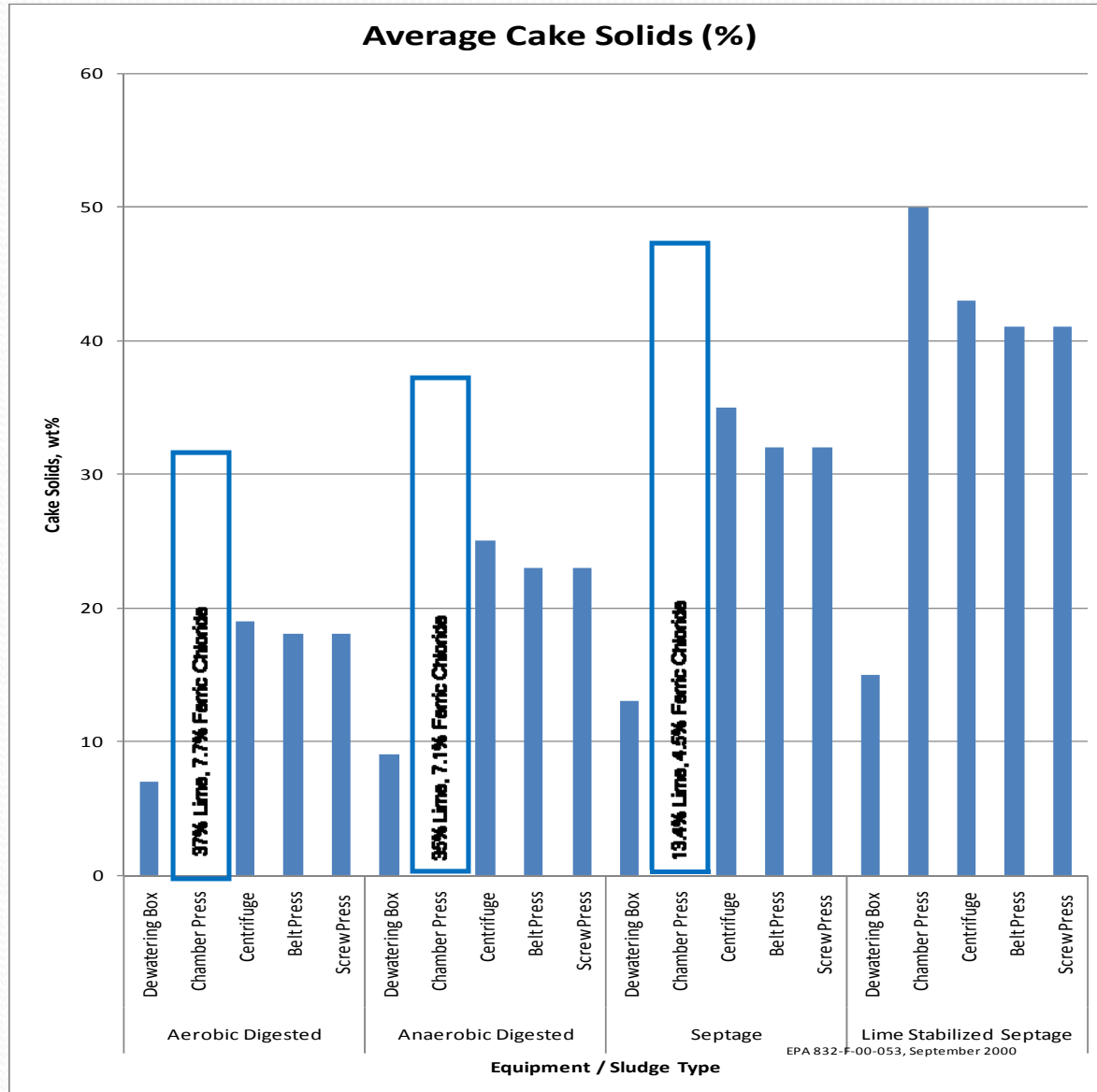
- Containment of odor and process fluids requires special enclosures
- Lower unit capacity than centrifuge, requires more units for large plants
- Frequent maintenance and cleaning
- Operator attention to monitor and make adjustments: Belt Tracking / Feed Distribution.

Dewatering Box:

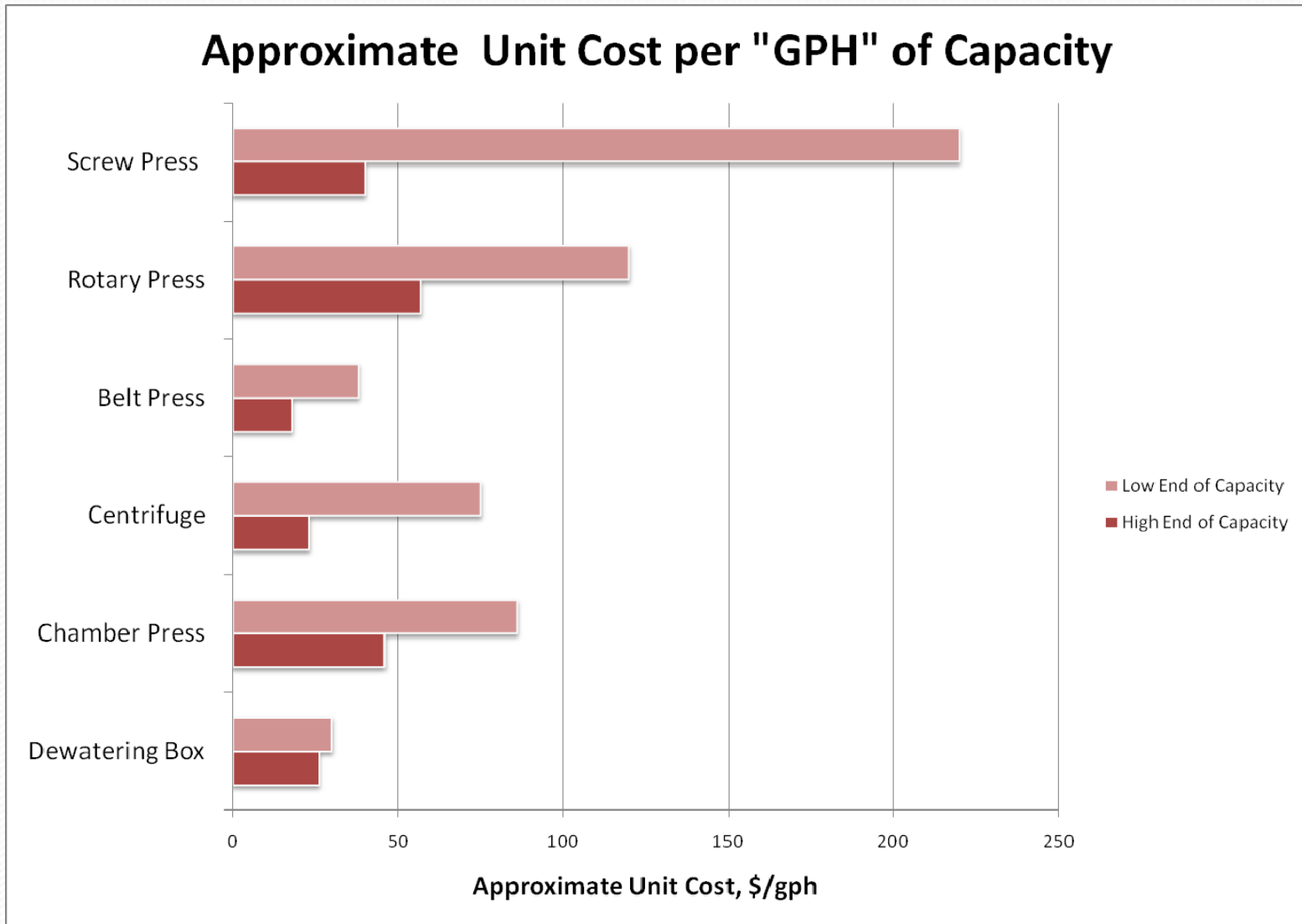
Disadvantages

- Batch operation.
- Low discharge cake solids, no compressive force on cake, Landfills won't take wet cake.
- Dewatering box is the cake haulage unit, piping and facility layout must allow for this.
- Lower unit capacity requires many units for large plants.
- Containment of odors difficult.

Cake Solids vs. Type of Sludge



Cost Comparison



Musser Sewer & Septic LLC.

Purchased in 2009 at Pump
Convention

Waste Water Plant Digester Clean out.

- 105 gpm capacity
- 14% to 20% cake solids
- Cake hauled to Landfills
- 3¢ to 9¢ per gallon treated



National Association of Wastewater Transporters Fourth Annual Waste Treatment Symposium Orlando, Florida



BDP Industries, model 3DP Belt Press



PERFORMANCE DATA NAWT SYMPOSIUM ON LIME STABILIZED BLEND OF SEPTAGE /

FLOW RATE	120 GPM
SOLIDS CAPACITY	3,120LB/HR
DISCHARGE CAKE SOLIDS	42%
APPROXIMATE CAPITAL COSTS PER LB/HR OF CAPACITY	\$140

Summary: Current Technologies

- Detailed Situational Evaluation Of Each Project Is Required To Determine Best Option.



Questions?????