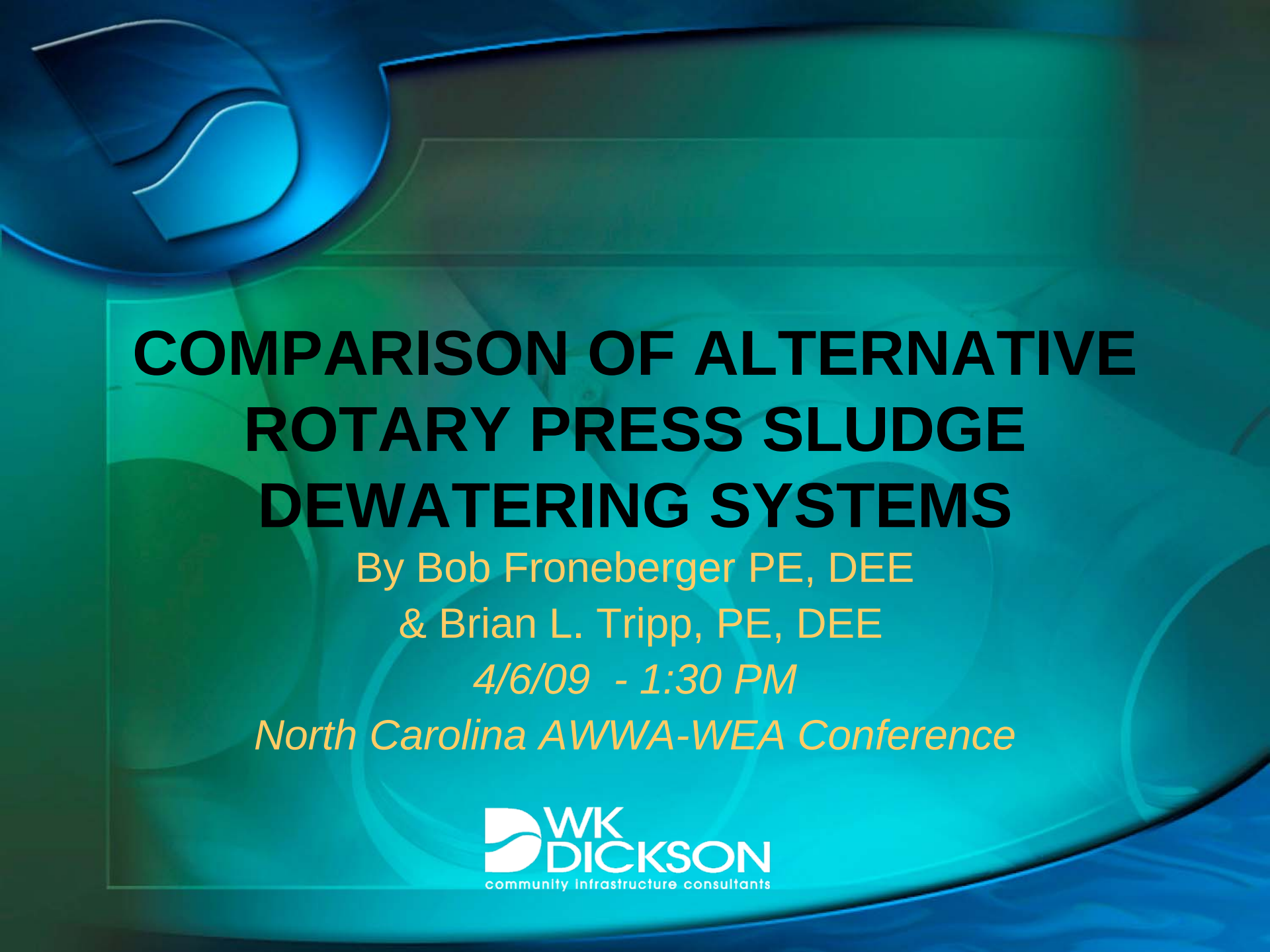




COMPARISON OF ALTERNATIVE ROTARY PRESS SLUDGE DEWATERING SYSTEMS

By Bob Froneberger PE, DEE
& Brian L. Tripp, PE, DEE

4/6/09 - 1:30 PM

North Carolina AWWA-WEA Conference

Special Thanks:

- Mac McDonald, Public Utilities Director, City of Lancaster
- David Stancil, Superintendent, Clemson University WWTP
- Prime Solution, Inc.
- Fournier Industries, Inc.

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- 1.8 MGD
- Discharge To Lake Hartwell
- Liquid Train Unit Processes
 - Primary Clarifiers
 - Alum Addition for Phosphorus Removal
 - Sequencing Batch Reactor with Post EQ
 - Polishing Clarifiers (From Previous Plant)
 - Gas Chlorination & Dechlorination

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Biosolids Handling Unit Processes

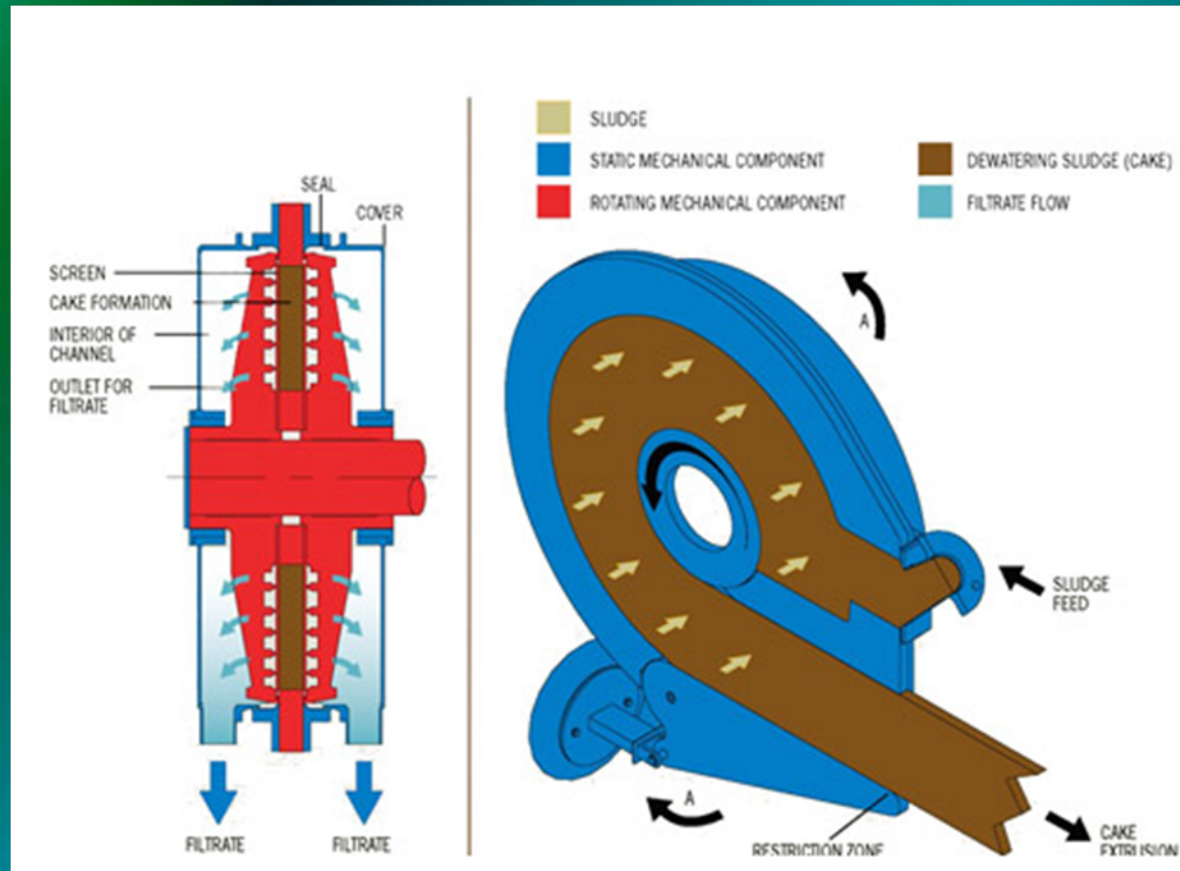
- Two Stage Mesophillic Digesters
- Progressive Cavity Sludge Feed Pumps
- Fournier Rotary Press Dewatering System
- Waste Biosolids to Landfill

Clemson University WWTP

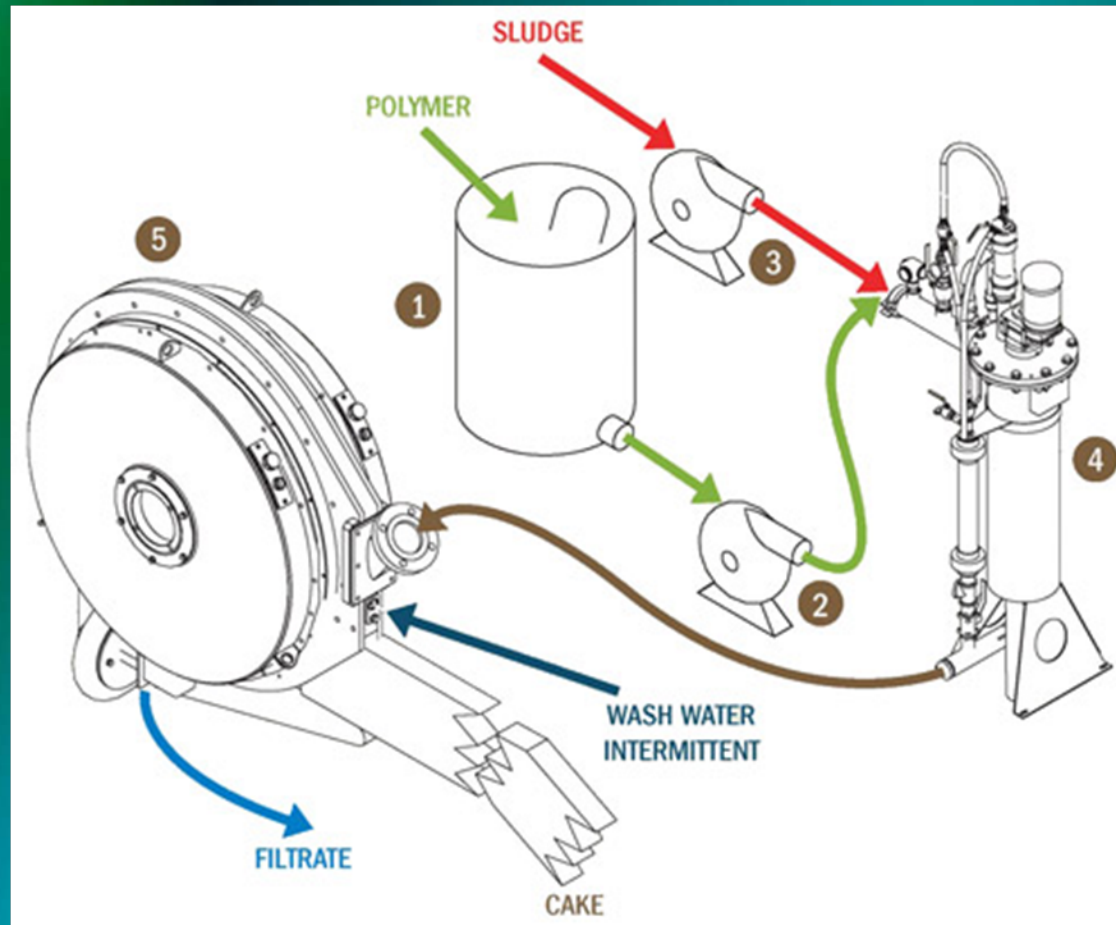
Considerations for Selection of Fournier Rotary Press

- Increased dewatering capacity for future needs
- Replacement of Existing 1.5 M Belt Press
- Cake solids and capture rate equal or greater than Belt Press
- Low wash water requirements
- Totally enclosed operation
- Reduced operational costs
- Ability to easily expand capacity in future
- Slow rotation reducing maintenance costs
- Ability to pilot test on full scale channel to verify performance

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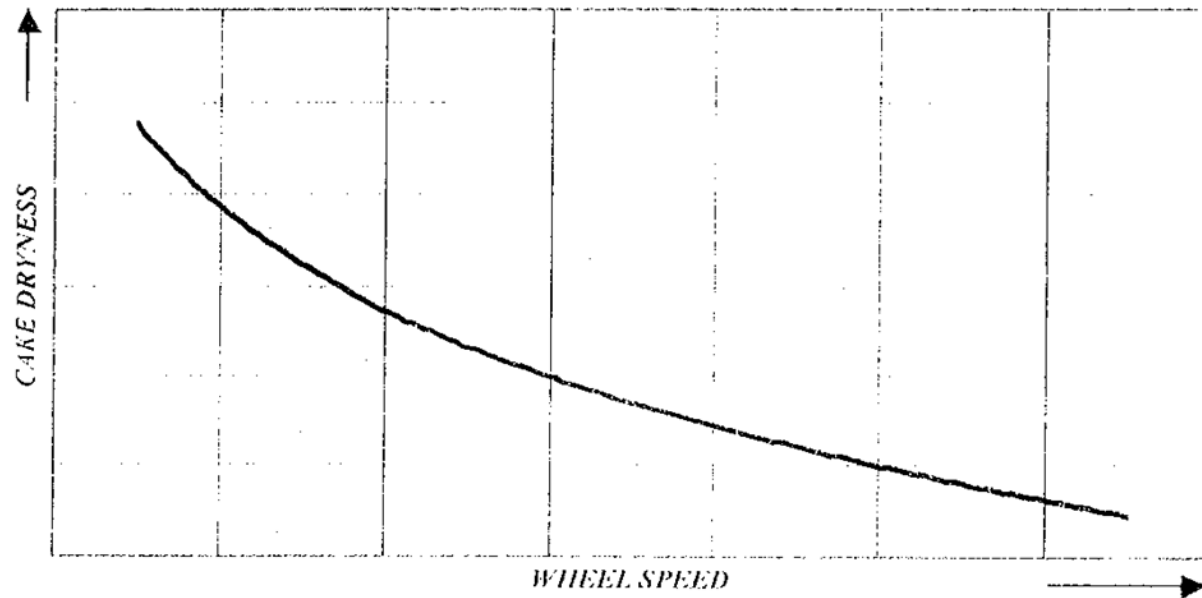
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Pilot Test Results (December 2006)

	<u>Average</u>	<u>Range</u>
Cake Solids	23.9%	18.2 to 26.4%
Capture Rate	98.0 %	97.9% to 99.5%
Production (dry lbs/chan./hr)	142	87 to 188

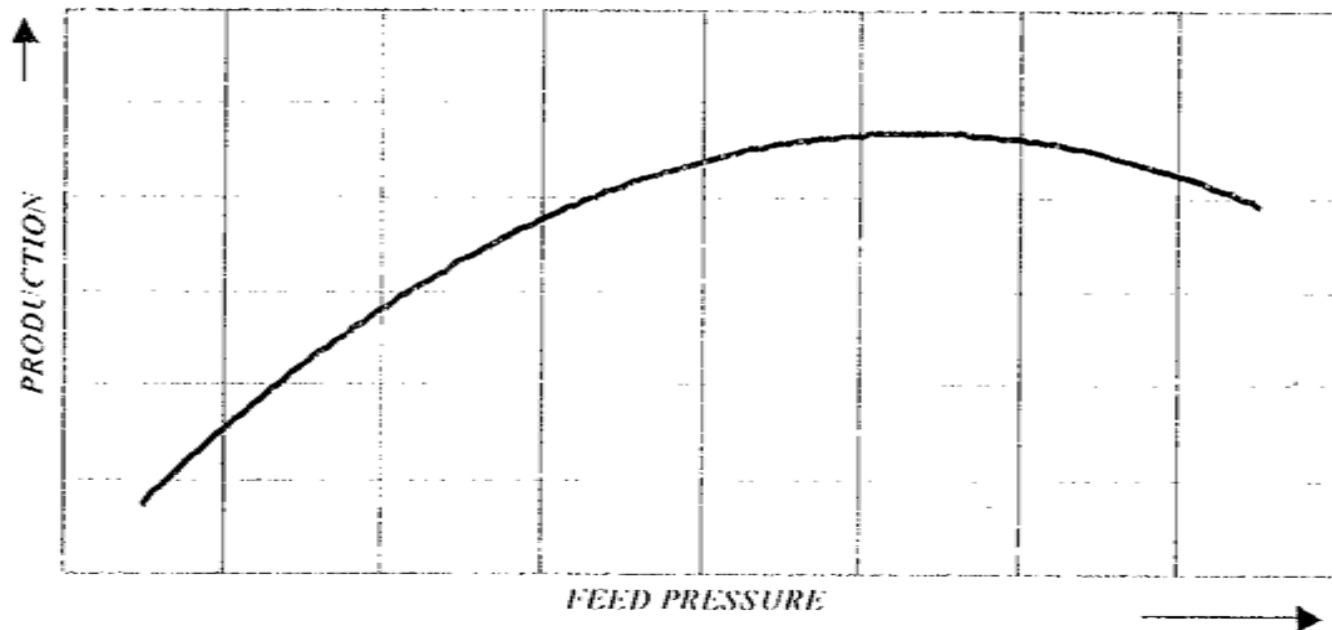
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*THE EFFECT OF WHEEL SPEED
ON CAKE DRYNESS*



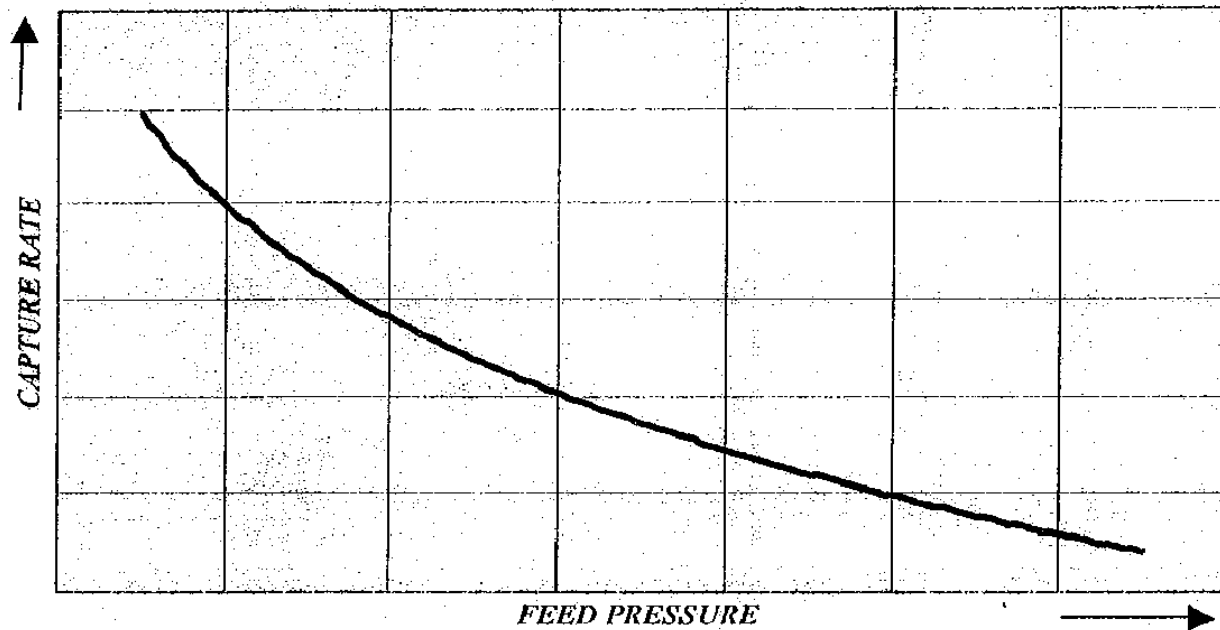
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*THE EFFECT OF FEED PRESSURE
ON CAKE PRODUCTION*



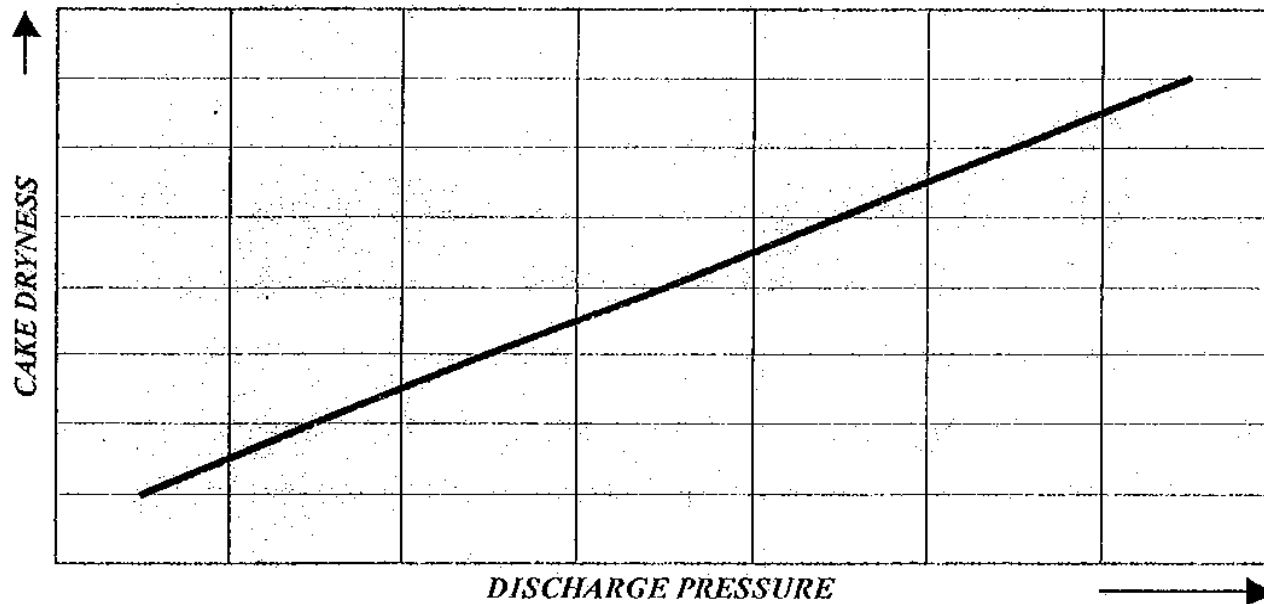
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*THE EFFECT OF FEED PRESSURE
ON CAPTURE RATE*



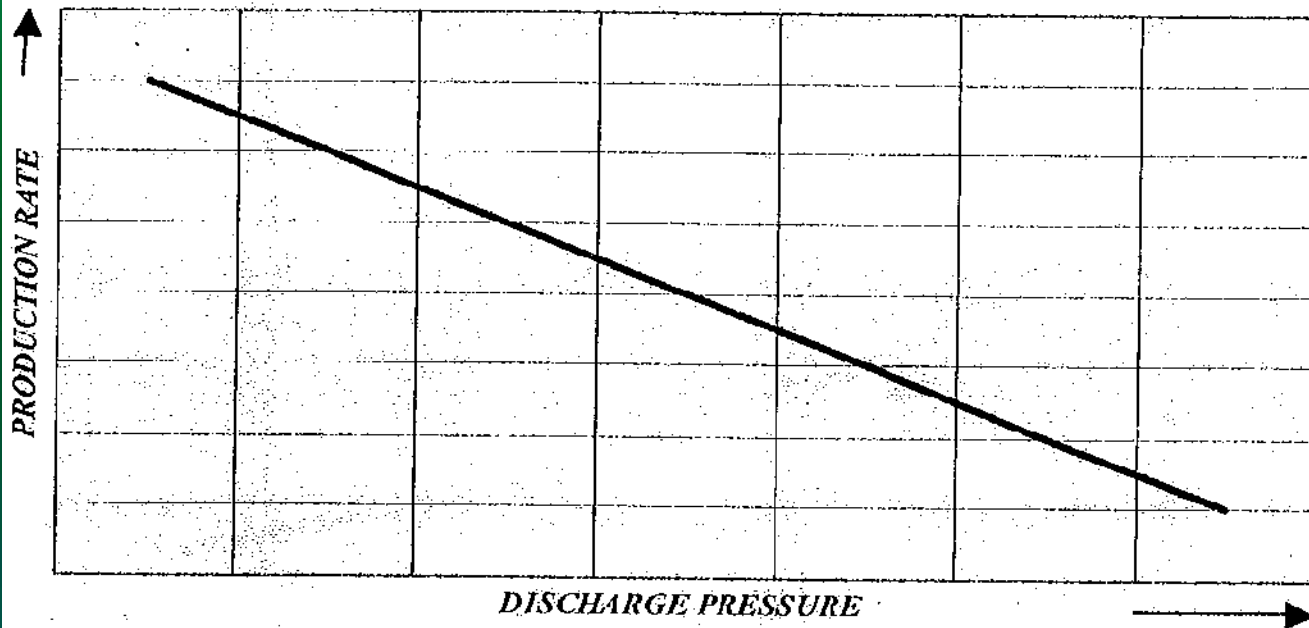
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*THE EFFECT OF DISCHARGE PRESSURE
ON CAKE DRYNESS*



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THE EFFECT OF DISCHARGE PRESSURE ON PRODUCTION RATE



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TYPICAL FOURNIER ROTARY PRESS OPERATIONAL CHARACTERISTICS

	<u>Average</u>	<u>Range</u>
Cake Solids	23.9%	18.2 to 26.4%
Capture Rate	98.0 %	97.9% to 99.5%
Production (dry lbs/chan./hr)	142	87 to 188
Polymer Use	10 lbs/D Ton	

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- 7.5 MGD
- Discharge to Catawba River

Liquid Train Unit Processes

- Equalization
- Anoxic Contact
- Sanitaire Oxidation Ditch
- Secondary Clarifiers
- Gas Chlorination & Dechlorination
- Cascade reaeration

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Biosolids Handling Unit Processes

- Gravity Thickener
- Aerobic Sludge Digestion
- Prime Solutions Rotary Fan Press
- Land Application

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Primary Considerations For Dewatering System Upgrade

- Compact with minimal space requirements
- Automated with easy startup and shutdown
- Enclosed for nuisance odor control, health & safety
- Low operating and maintenance cost

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Biosolids Dewatering Systems Pilot Tested

- Fournier Rotary Press
- Prime Solutions Rotary Fan Press
- Huber Inclined Screw Press

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Summary of Pilot Testing Evaluations

	<u>Prime Sol.</u>	<u>Fournier</u>	<u>Huber ISP</u>
	<u>RP</u>	<u>RP</u>	
Polymer lbs/DT	10 -14	15	7 - 8
Capture Rate	92 – 96%	>95	>95%
Cake Solids	15 – 22%	15 – 22%	20 – 25%
Full Scale Unit	Dual Channel	Four Channels	Dual Screw
Capacity Full Scale	60 gpm @ 900 lbs/hr	50 gpm @ 510 lbs/hr	90 gpm @ 1200 lbs/hr
Present Worth Cost	\$781,315	\$998,878	\$1,345,011

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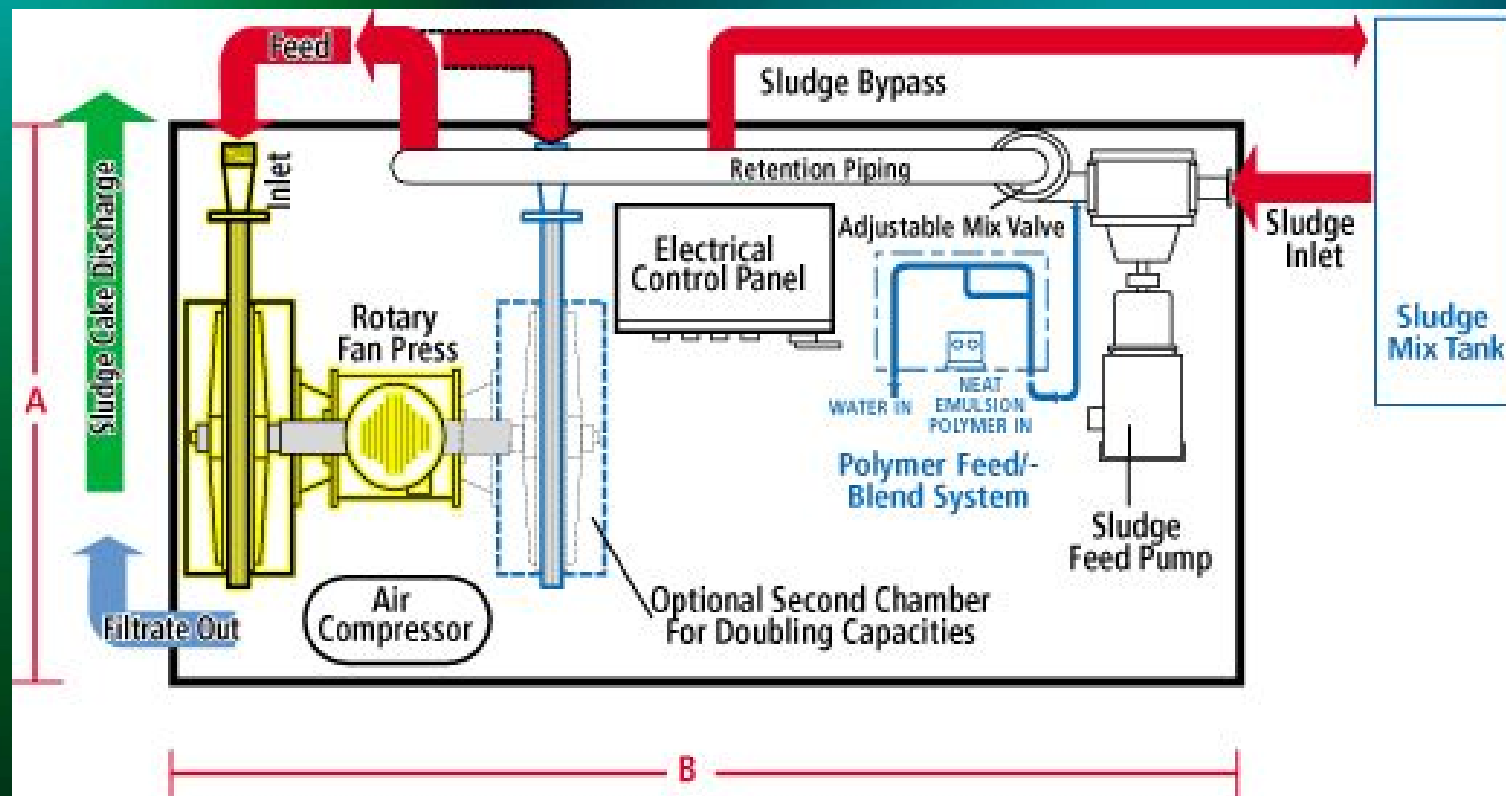
Basis for Selection of Prime Solutions Rotary Fan Press

- Favorable Solids Dryness And Capture Rate
- Automated Operation With Easy Startup And Shutdown
- Totally Enclosed System
- Slow Rotational Speed = Minimal Wear & Energy
- Compact Pre-engineered Skid Mounted With Polymer And Air Compressor Systems
- Lowest Capital And Installation Costs

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Solids Handling Equipment Evaluation



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Prime Solution Rotary Fan Press Typical Operational Characteristics

- Avg. feed, % D.S. = 1-3 % (aerobically digested sludge)
- Polymer Lbs. / Ton D.S. = 10 – 14 lbs.
- Capture rate = 92-96 %
- Typical Cake, % D.S. = 15 – 22%
- Capacity = 60 gpm, 900 lbs/hr
- Drive = 5 HP

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COMPARISON OF ALTERNATIVE ROTARY PRESS SLUDGE DEWATERING SYSTEMS

	Prime Solutions Rotary Fan Press (Lancaster WWTP)	Fournier Rotary Press (Clemson WWTP)
Sludge Type	Aerobic Digestion w/out Primary Clar.	Mesophillic Anaerobic Digestion
Totally Enclosed	Yes	Yes
Expandability	Two Channels Maximum per Unit	Up to 6 Channels per Unit

COMPARISON OF ALTERNATIVE ROTARY PRESS SLUDGE DEWATERING SYSTEMS

	Prime Solutions Rotary Fan Press	Fournier Rotary Press
Power Req'd	5 Hp	25 Hp
Continuous	Continuous	Continuous
Noise Level	Low	Low
Cake Solids	15-20%	20% +

COMPARISON OF ALTERNATIVE ROTARY PRESS SLUDGE DEWATERING SYSTEMS

	Prime Solutions Rotary Fan Press	Fournier Rotary Press
Solids Capture	Moderate >90%	High - > 95%
Automated Operation	Moderate to High	High
Cost	Low to Moderate	Moderate

COMPARISON OF ALTERNATIVE ROTARY PRESS SLUDGE DEWATERING SYSTEMS

QUESTIONS ?