CIP Chemical Solutions

Emma Swyers

NE Milk Quality Specialist

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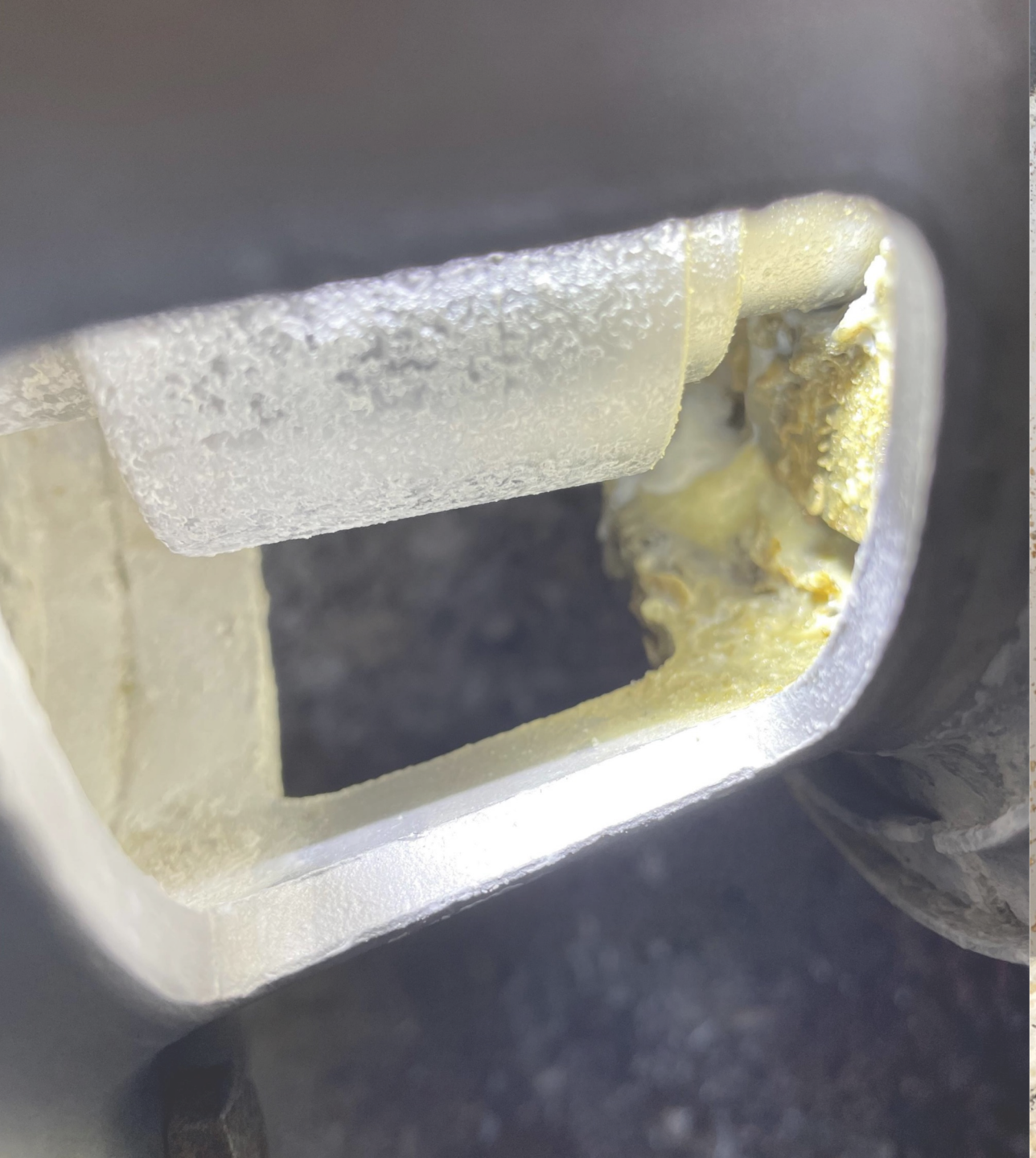

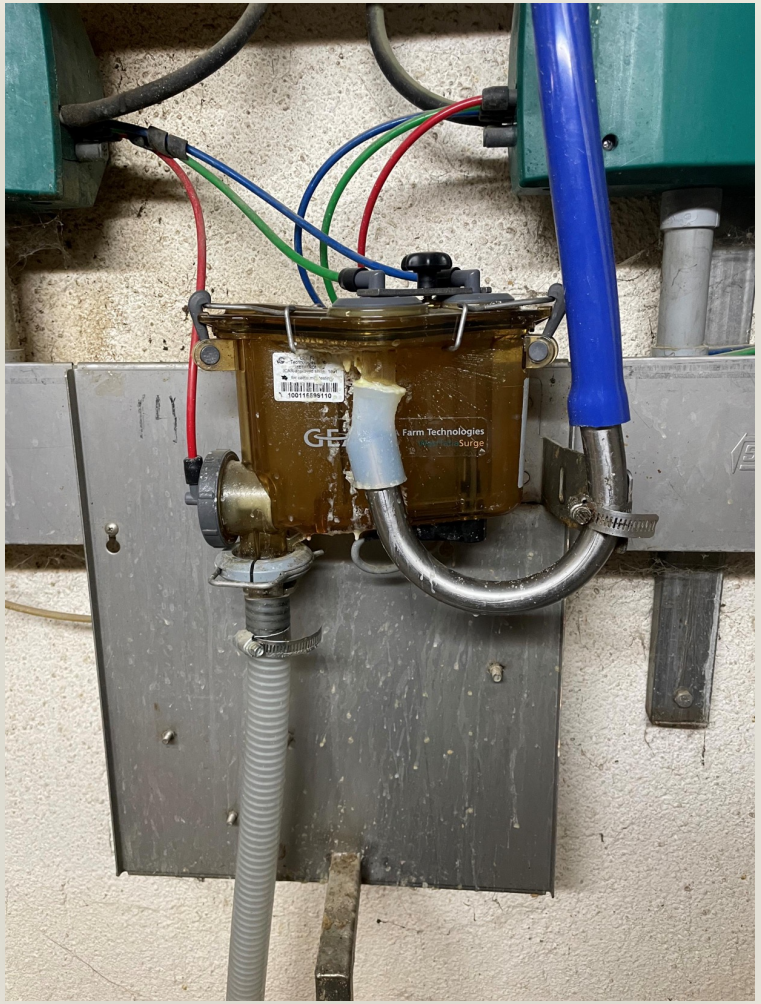
Farm Technologies
Surge

What is the purpose of wash ups?

Maintain or Achieve Milk quality premiums

Increase proactiveness – more maintenance

Reduce organic load amongst milk equipment

To provide the end consumer with a wholesome, quality, and delicious product

2 Parts of Wash Cycle

Chemical

Remove milk residue

Remove minerals from the water and equipment

Sanitize the system prior to milking

Physical

- Making contact to all milk contact surfaces
- Scrubbing action in milk lines, receiver, meters, and plate coolers
- Drainage

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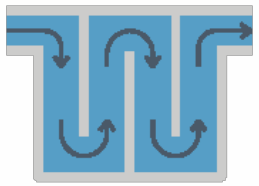
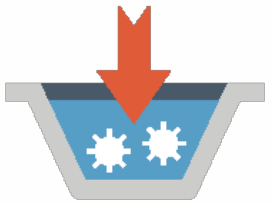
What are the steps to *correct* CIP Cleaning



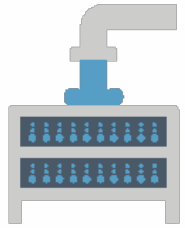
1 PRE-RINSE



2 CAUSTIC WASH

(140°–185° F)

Traditional detergent



3 INTERMEDIATE RINSE

optional

4 FINAL RINSE

Acid Rinse

5 SANITIZING RINSE

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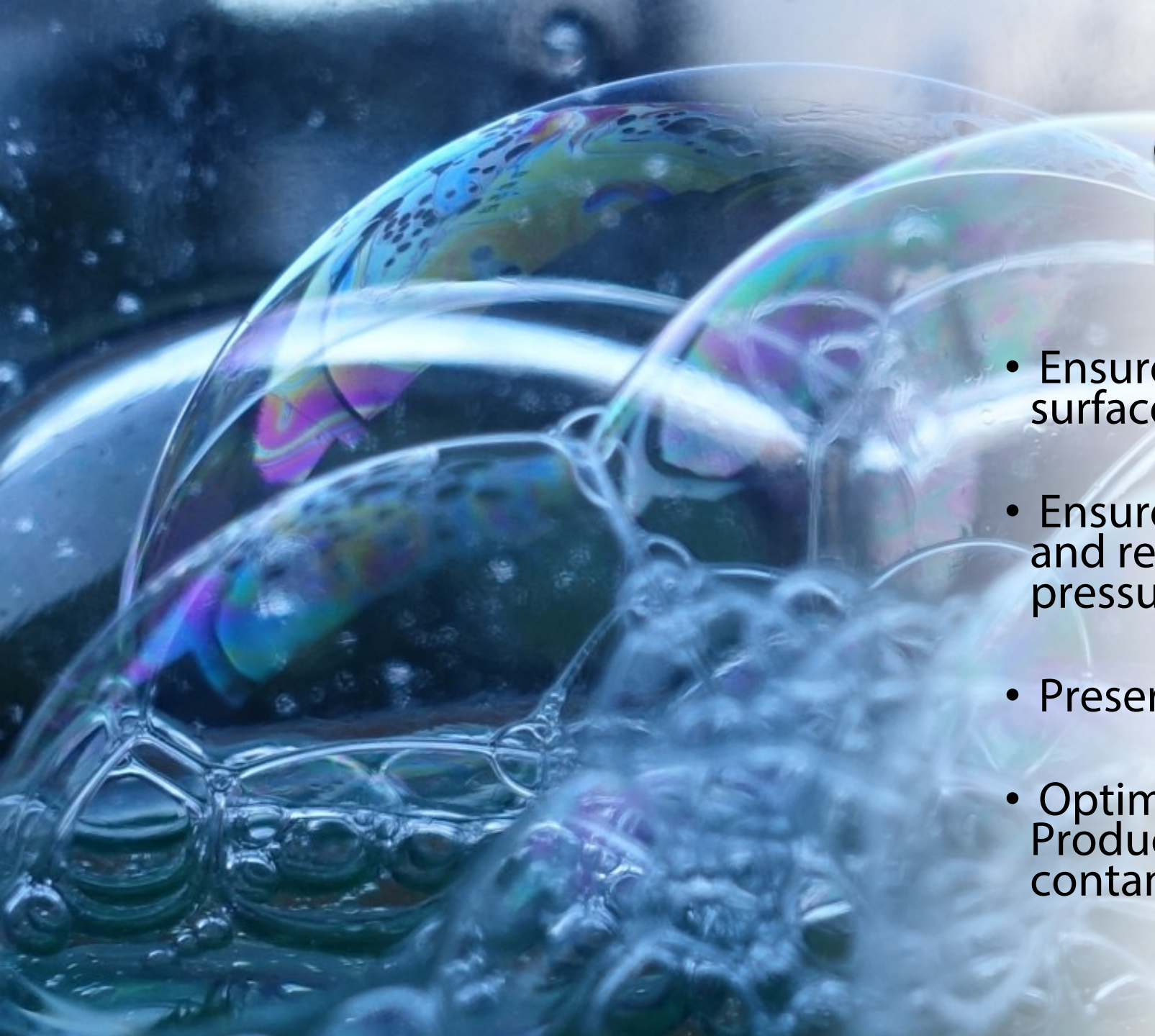

OBJECTIVES OF DETERGENCY

- Ensure Visual Cleanliness of surfaces, eliminate fat residue
- Ensure optimal disinfection step and reduce microbiological pressure
- Preserve Life of Milk Equipment
- Optimize the Quality of Finished Product of Milk (odor, color, reduce contamination, shelf life of food)

CIP Cleaner Line

Chlorinated

Ultra Chlorine CIP Cleaner

Works in all instances

Regular Chlorine CIP Cleaner

Systems with minimal problems

Cold Water Detergent

Reduced Temperature Situations (Warm)

Non- Chlorinated

AMS Detergent/ Non-Chlorinated CIP

AgroClean305

- Heavy Duty, caustic, non-foaming alkaline CIP detergent
- Ultra duty, chlorinated formula
- Scale inhibitors and rinse aids promote rapid and clean sheeting
- Chelating agents bind metallic salts for efficiency in hard water conditions
- Incorporates Poly-TEC polymer technology for superior emulsification

ACID DETERGENCY

	Nitric acid	Methansulfonic acid	Sulfamic acid	Phosphoric acid	Sulfuric acid
Anti-scaling properties	++++	+++	+++	++	+
Detergency capacities	++	+++	+++	++++	+
Inconvenient	Toxic gas under high temperature Corrosive CLP Classification Destroy surfactant	Corrosive	High nitrogen content	Phosphorus reject	Corrosive Weak descaling properties
Advantages	Oxydizing properties Use for stainless steel passivation	Phoshorus free Nitrogen free Good ratio Descaling / detergent properties	Low corrosivity	Less agressive Strong detergent Dispersing properties	Not a toxic gas
Examples	Oxystrike	One Step	n/a	Stronghold 2510,4200,3505,7500	Stronghold 2510,3505, NP 1000

StrongHold

Acid rinse for use following AgroClean CIP Detergent.

Features

Dissolves mineral deposits, neutralizes alkaline cleaners, and reacts with milk minerals so they can be removed in the rinse cycle.

Helps keep equipment surfaces free from hardened deposits which can harbor biofilms of bacteria.

Formulated to neutralize alkalinity and react with minerals to prevent build-up in the system.

Multiple concentrated formulations available with differing acids.

Peracetic Acid Sanitizer

OXYSAN ACID SANITIZER

Features

5.3% peracetic acid sanitizer for circulation cleaning and for sanitizing pre-cleaned hard, non-porous food contact surfaces and equipment.

Acid rinse and sanitizer in one convenient product.

Rapidly sanitizes at a range of temperatures.

Use at low concentrations for broad-spectrum kill of gram-positive and gram-negative bacteria.

This product may be used in the sanitization of ultra-filtration (UF) and reverse osmosis (RO) membranes and other similar type membranes and their associated piping systems.

Sanitizing of Animal and Poultry Premises, Trucks, Coops and Crates

Sanitization of Conveyors, Peelers, Slicers and Saws for Meat, Poultry, Seafood, Fruits and Vegetables

OXY STRIKE

Features

5.3% peracetic acid sanitizer with a punch of nitric acid is registered by the EPA for use in the USA.

Acid rinse and sanitizer in one convenient product.

Rapidly sanitizes at a range of temperatures.

Use at low concentrations for broad-spectrum kill of gram-positive and gram-negative bacteria.

This product may be used in the sanitization of ultra-filtration (UF) and reverse osmosis (RO) membranes and other similar type membranes and their associated piping systems.

No-rinse, non-foaming formula ideal for circulation clean-in-place (CIP) systems.

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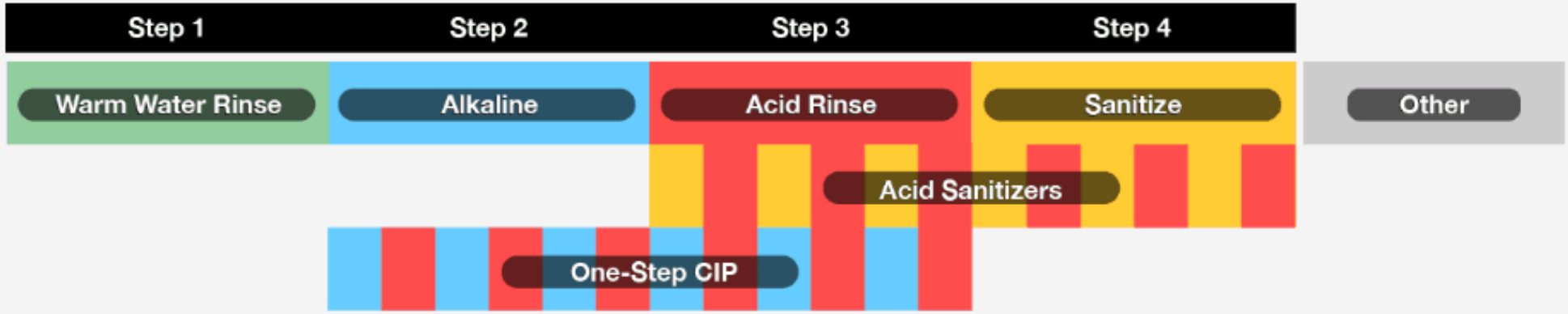
Peracetic Acid Sanitizer

- **Excellent Sanitizing Properties**

- **No residual** - When peracetic acid dissolves in water, it disintegrates to **hydrogen peroxide and acetic acid**, which will fall apart to water, oxygen and carbon dioxide. Peracetic acid degradation products are non-toxic and can easily dissolve in water

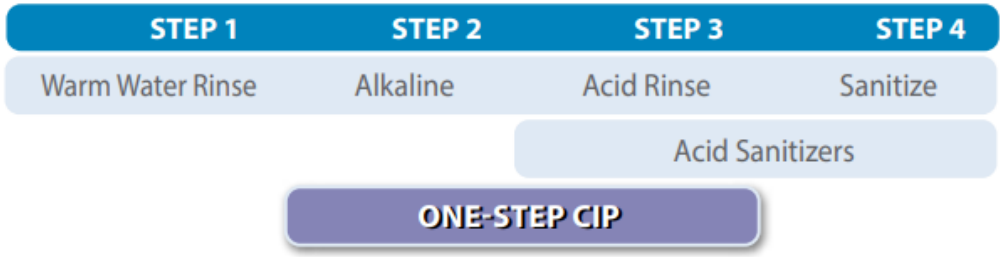
- **Secondary advantage**
- Oxidizes material to remove unwanted buildup



AgroChem offers products that not only address each of these steps, but in some cases accomplishes two steps in one product.

Different Ways to Wash

ONE-STEP
CIP DETERGENT



Two Proven Germicides, One Powerful Product

This highly concentrated, non-foaming acid detergent is formulated to clean an entire milking system in a single wash, replacing the standard acid and chlor-alkaline detergent steps. One-Step CIP can be used in a range of water temperatures.

- **Cleans without foaming** to leave the milking system clean and sparkling.
- **Contains well known acids** to increase the potential for premiums.
- **Combination of acids**, surfactants and emulsifiers dissolves fats, mineral deposits and proteins.
- **Reduces build-up** of teat sealant residues in claws and lines.

***With traditional detergent & Chlorine price increases One Step Products are now closer than ever in cost.

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Include	Size <Select>	Cost Container	Type	Product Name <Select>	Usage Rate Oz / X Gal	Total Ounces Used	Washes per Drum	Cost per Wash
	55							
Y	55	$ 546.71	Alkaline	AgroClean AMS TR	3.00	52.0	135	$ 4.04
	55					70.0	101	
	55				2.0	78.0	90	
Y	55	$ 410.56	Acid Rinse	StrongHold 2510	10.0	15.6	451.282051	$ 0.91
	55				4.0	39.0	180.512821	
	55							
	55	$ 304.31	Chlorine Booster	SurChlor - Booster	5.90	26.44	266	$ 1.14

Total Cost per wash: **$4.95**

Include	Size <Select>	Cost Container	Type	Product Name <Select>	Usage Rate Oz / X Gal	Total Ounces Used	Washes per Drum	Cost per Wash
	55							
Y	55	$ 490.99	Chlor-Alkaline	AgroClean 305 TR	2.59	60.3	117	$ 4.21
	55					70.0	101	
	55				2.0	78.0	90	
Y	55	$ 410.56	Acid Rinse	StrongHold 2510	10.0	15.6	451.282051	$ 0.91
	55				4.0	39.0	180.512821	
	55							
	55							

Total Cost per wash: **$5.12**

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Include	Size <Select>	Cost Container	Type	Product Name <Select>	Usage Rate Oz / X Gal	Total Ounces Used	Washes per Drum	Cost per Wash
	55							
Y	55	$ 405.99	Chlor-Alkaline	AgroClean 273	1.85	84.5	83	$ 4.87
	55					70.0	101	
	55				2.0	78.0	90	
Y	55	$ 410.56	Acid Rinse	StrongHold 2510	10.0	15.6	451.282051	$ 0.91
	55				4.0	39.0	180.512821	
	55							
	55							

Total Cost per wash:
$5.78

Include	Size <Select>	Cost Container	Type	Product Name <Select>	Usage Rate Oz / X Gal	Total Ounces Used	Washes per Drum	Cost per Wash
	55							
	55							
	55					70.0	101	
Y	55	$ 988.73	One -Step	One-Step w/ PAA	2.0	78.0	90	$ 10.95
	55							
	55				4.0	39.0	180.512821	
	55							
	55							

Total Cost per Wash:
$10.95*
***Not including the cost savings of time**

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Physical

Time

Temperature

Water Volume

Velocity

Drainage

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WASH SHEET

Farm Name:	Daily Wash: 2x ☐ 3x ☐	Type of Meters:
Date:	Daily Milk: 2x ☐ 3x ☐	Water Hardness:
Time:	Number of Units:	Wash Vat Size (gal):

Rinse

Start Temp	End Temp	Total Cycle Time	Water Drains Clear?	Does this farm use One Step CIP Detergent?
			Y ☐ N ☐	Y ☐ N ☐ If YES, skip to the One Step CIP line.

Detergent

Detergent Amt: oz. Chlorine Amt: oz.

Start Temp	End Temp	Total Cycle Time	pH	Alkalinity	Chlorine
				PPM	

Acid

Acid Amt: oz.

Start Temp	End Temp	Total Cycle Time	pH	ppm

One Step CIP / Hot Acid Wash

One Step/Hot Acid Amt: oz.

Start Temp	End Temp	Total Cycle Time	pH	ppm

Sanitize Cycle

Sanitizer Amt: oz.

Start Temp	End Temp	Total Cycle Time	pH	ppm

Slug Air Injector Cycle

On-Time	Off-Time	Slugs Per Cycle

New and Improved Wash Analysis Sheet

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Conclusion

- What are we trying to achieve as an industry?
  - Chemical aspect of a wash
    - Rinse
    - Detergent
    - Acid
  - Physical aspect of a wash
    - Temperature
    - Consistency and Coverage
    - Drainage

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Producing “Quality Milk” takes

“Quality Time and Effort”

Producing “Quality Milk” Requires an

“Attitude for Milk Quality”

Producing “Quality Milk” doesn’t cost,

It Pays. This is the FUTURE.

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ONE-STEP CIP DETERGENT

OXYSAN ACID SANITIZER

SURCHLOR

AgroClean

AgroSan plus

AgroSolv

ONE-STEP CIP DETERGENT WITH PAA

OXY STRIKE

Vortex

StrongHold

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Thank You! Questions & Comments?

Contact info for additional questions and Comments

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Todd Raymond - Sales Manager
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Case Study

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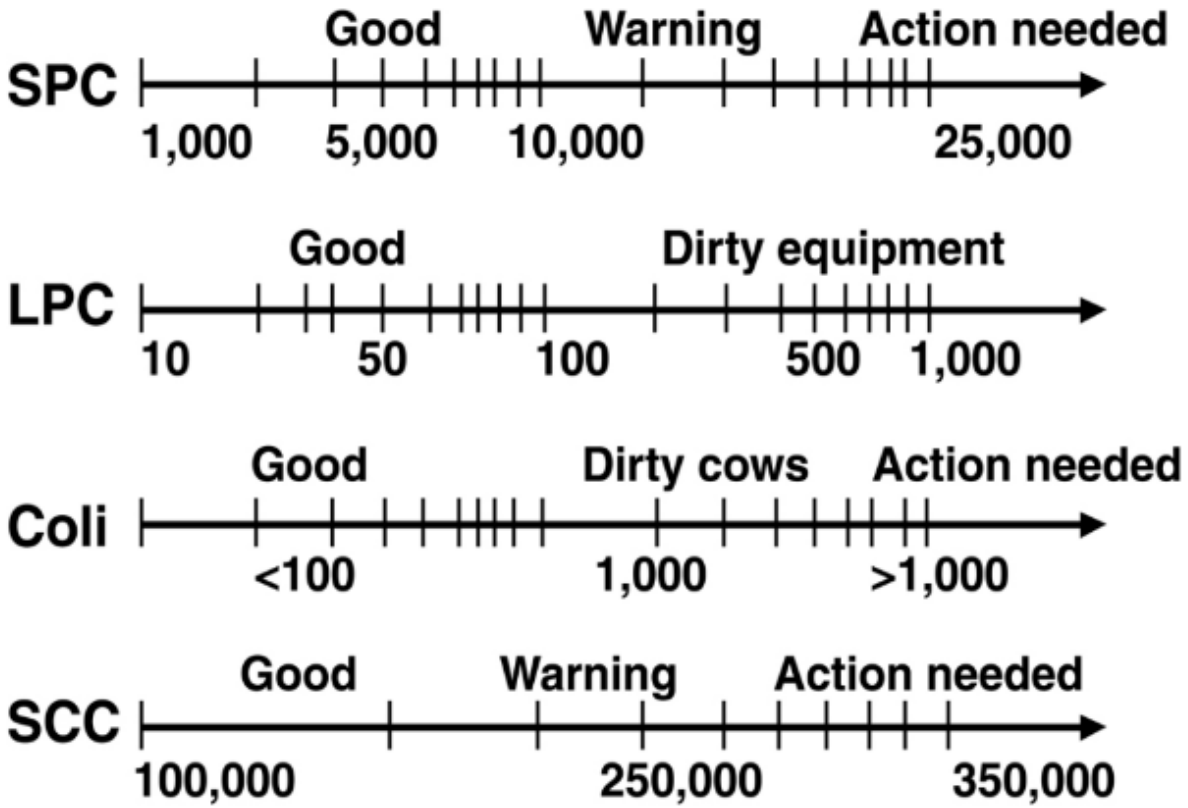
Interpretation of Bulk Milk Bacterial Counts

Comparison of diagnostic tests

Multiple tests should be used (at least 3 samples)



Farm

2000 cow farm

Double 20 parlor – no meters or take offs

Previous wash program:

- Traditional 3-step wash

Month	Raw count	Prelim Incubation	Past Count
June (Avg.)	2083	7385	202
July (Avg.)	2400	5105	192
August (Avg.)	2167	62333	134

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April Wash Analysis Notes

- drains on pvc Pipes
- Sample bags not properly stored, needles being stored in styrofoam
- Parlor units coming out of wash during cycles
- Air injector board adjustments not working
- Temp low during detergent cycle

- Rinse water was dirty, recommend washing down vat prior to starting wash

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May Wash Analysis Notes

milky foam on sides of wash vat after first rinse - need to rinse with hose
- Pulsation drains - detach Cylinder raise times slow, untis falling on deck
- pulsation tube dirty above trap - clean weekly
- check and clean vacuum filters
- flush pulsators with soapy water and drain pulsation tubes
- leaking gaskets above sink and left of wash vat pump
- milky water in wash trap during milking??
- washer machine too full and soap tube blocked
- NEEDLES EXPOSED IN FRIDGE - clean and sanitize fridge

June Wash Analysis Notes

- Recommend putting on new milk filters between milking and wash
- Jetter cup #22 on East side is torn
- Underneath both plate coolers milk is building up, should be cleaned
- Butterfly valve on left side of receiver has air leaking from its vacuum connection
- Wash vat pump seal is bad, should be replaced
- Milk trap trapped out, 10:30 mins into wash
- Debris lodged in unit #1 on the east side

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August Wash Analysis Notes

- HIGH FRIDGE TEMP
- MILK PAIL HOSE RED BACTERIA GROWTH
- STALL #15 NOT IN WASH TILL ACID CYCLE
- MILK LINE SLIGHT BUILDUP ON SOUTH END?? LOOKS LIKE GREASE/ORBESEAL
- NEED TO RUN A HOT ACID WASH
- TURNED TEMP BACK TO WARM DURING ACID CYCLE
- ADD HEAVY PHOSPHORIC ACID TO ACID RINSE
- FIRST RINSE DIVERT/SPRAY BALL DID NOT WORK 100%

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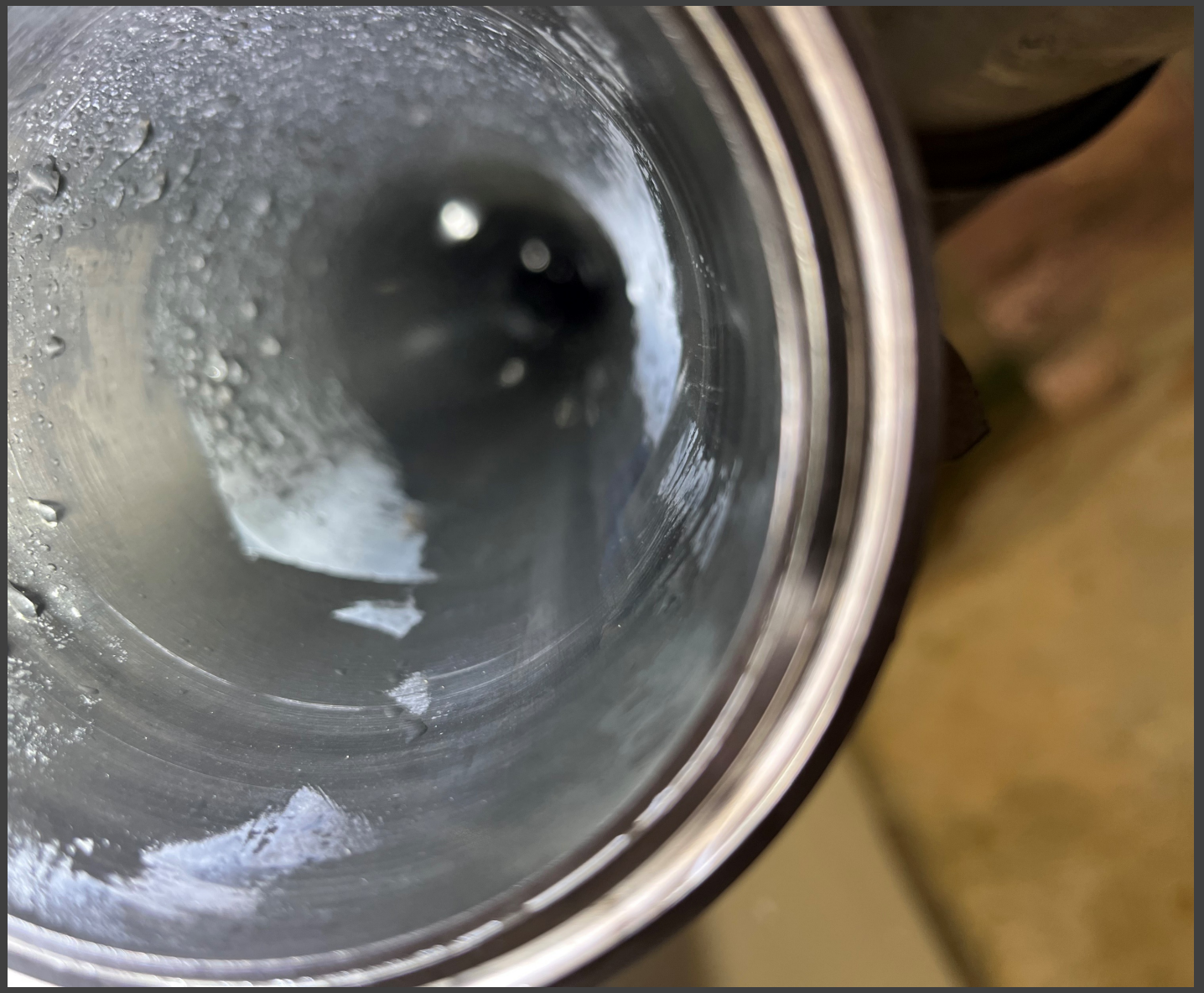

What to do??

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High lab pasteurized count >250

- Visibly dirty milk contact surfaces
- Visibly dirty, deteriorated or missing rubber/plastic parts
- Chronic improper CIP procedure-pipelines and bulk tanks
- Lack of sanitizing pipelines/bulk tanks prior to milking
- Dirty sanitary trap and/or vacuum reserve tank
- Poor udder/teat preparation
- End of milking water flush into bulk tank

High raw count >20,000

- System incubation
  - Warm milk (>50° for 45+ minutes)
    - Poor/slow bulk tank cooling
    - Improper refrigeration
  - Long milking times without CIP
  - Poorly washed equipment/not washing equipment
- Visible residues on milk contact surfaces
- Lack of sanitizing pipelines/bulk tanks prior to milking
- Low wash temperatures (<120°)
- Poor udder/teat preparation
- End of milking water flush into bulk tank
- Mastitic cows (rare occurrence)

Solutions

- Farm had an orbeseal like buildup inside pipeline, needed to run a hot acid wash → started with One-Step to remove orbeseal →ended up using stronghold 7500
- Employees must wash down wash vat prior to starting wash and at the end of the rinse the spray ball is activated
- Pump seal and butterfly valve fixed and stopped trapping out during wash
- Pulsation line flushed and clean to date

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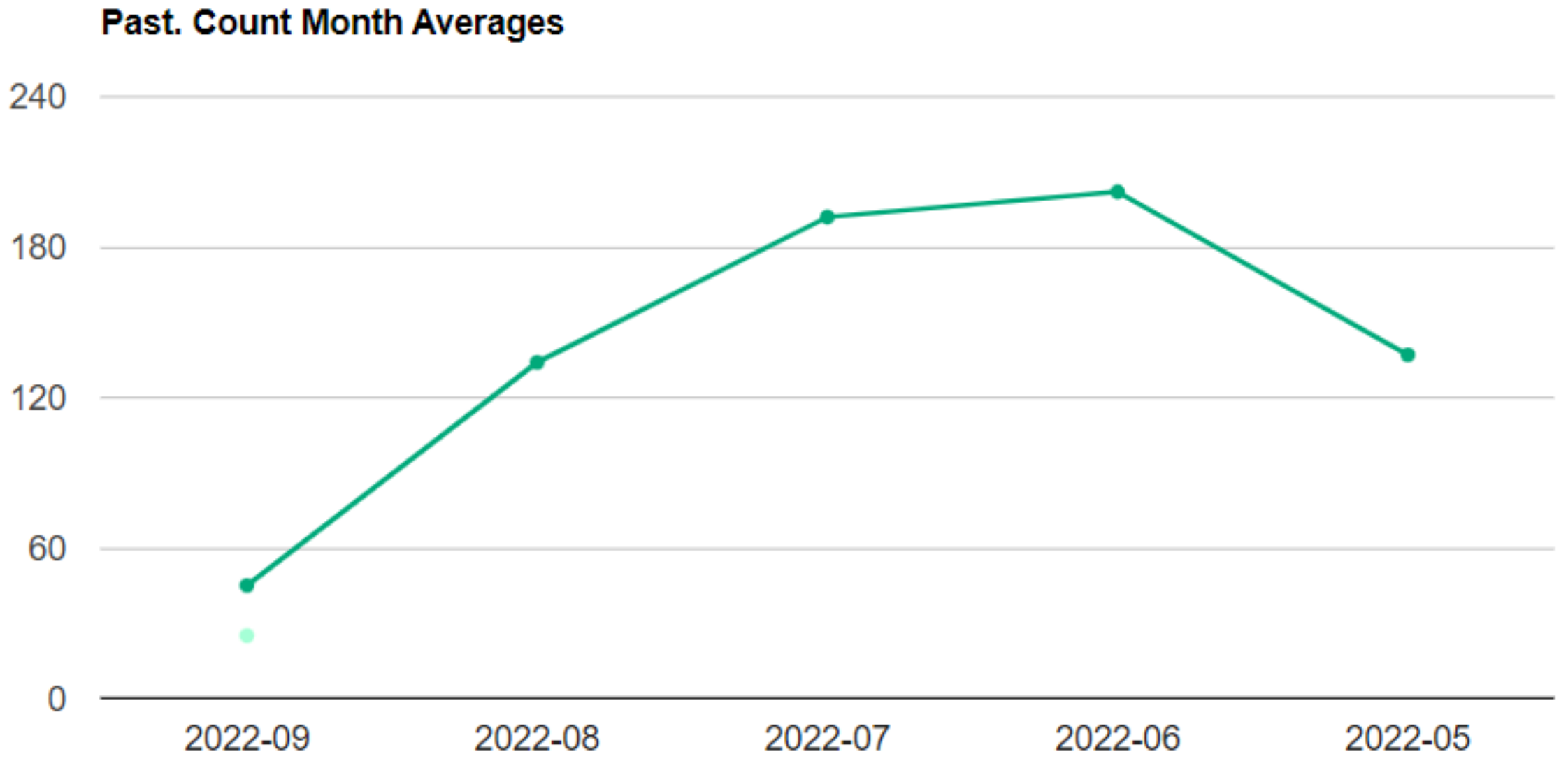
What was done?

- Wash cycle 1-4
  - Rinse
  - Detergent – Agroclean 305
  - Acid & Sanitizer – Oxystrike
- Wash Cycle 5
  - Rinse
  - Hot Acid – Stronghold 7500
  - Sanitize – Oxystrike


Past. Count Month Averages
240
180
120
60
0
2022-09
2022-08
2022-07
2022-06
2022-05

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	55					70.0	101	
	55				2.0	78.0	90	
Y	55	$ 410.56	Acid Rinse	StrongHold 2510	10.0	15.6	451.282051	$ 0.91
Y	55	$ 304.31	Sanitizer	SurChlor	4.0	39.0	180.512821	$ 1.69
	55							
	55							
							Cost per Wash	$ 6.80

$0.50 difference for a much more quality sanitation

Include	Size <Select>	Cost Container		Product Name <Select>	Usage Rate Oz / X Gal	al Ounces Used	Washes per Drum	Cost per Wash
	55							
Y	55	$ 490.99	Chlor-Alkaline	AgroClean 305	2.59	60.3	117	$ 4.21
	55					70.0	101	
	55				2.0	78.0	90	
Y	55	$ 837.56	Acid Sanitizer	Oxysan EPA	6.0	26.0	270.769231	$ 3.09
	55				3.3	48.0	146.666667	
	55							
	55							
							Cost per Wash	$ 7.30

Conclusions

Oxystrike more expensive

1 less step, less time, less water

Lowers pH, better protection through milking to milking

Thank You!

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References

Armand Dragon

Ron Robinson

Rick Watters