

Troubleshooting a CIP System

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Common CLP Problems

Identifying Root Causes & Possible Solutions

Equipment Must Be Sanitary & CIPable



Equipment Must Be Sanitary & CIPable



Common CIP Problems

PERFORMANCE PROBLEMS

1) High microbial / ATP counts

- *Tank/Vessel cleaning - Areas in vessel not getting clean*
- *Pipelines / Valves not getting clean*
- *Re-Contamination*
- *Improper Sanitizing*

2) Corrosion

OPERATIONAL PROBLEMS (Causes of Performance Problems)

A) CIP supply pump fails to maintain proper flow or pressure

B) No / Low Return Flow

C) Tanks or vats are not evacuating completely

D) Detergent / Sanitizer concentration high – (overusing / corrosion)

E) Detergent / Sanitizer concentration low – (poor cleaning / sanitizing)

F) Tanks collapsed

G) CIP cycle won't reach proper temperature setpoint or heats slowly

H) CIP tank overflows to floor or drain

I) CIP system goes over temperature.

J) High / low pH in post rinse or final rinse

The background of the slide is a blue-tinted image of Earth from space. The top half shows a dark blue sky with many small white stars. The bottom half shows the curved horizon of the Earth, with visible landmasses and clouds in shades of blue and white. The text 'Five Why's' is centered in the upper half of the image.

Five Why's

Root Causes of All CIP Problems

- ***Time***
 - ***Action (Flow / Pressure)***
 - ***Chemistry / Concentration***
 - ***Temperature***
-
- ***Water***
 - ***Individual***
 - ***Nature of Soil***
 - ***Surface to be cleaned***

TACTWINS

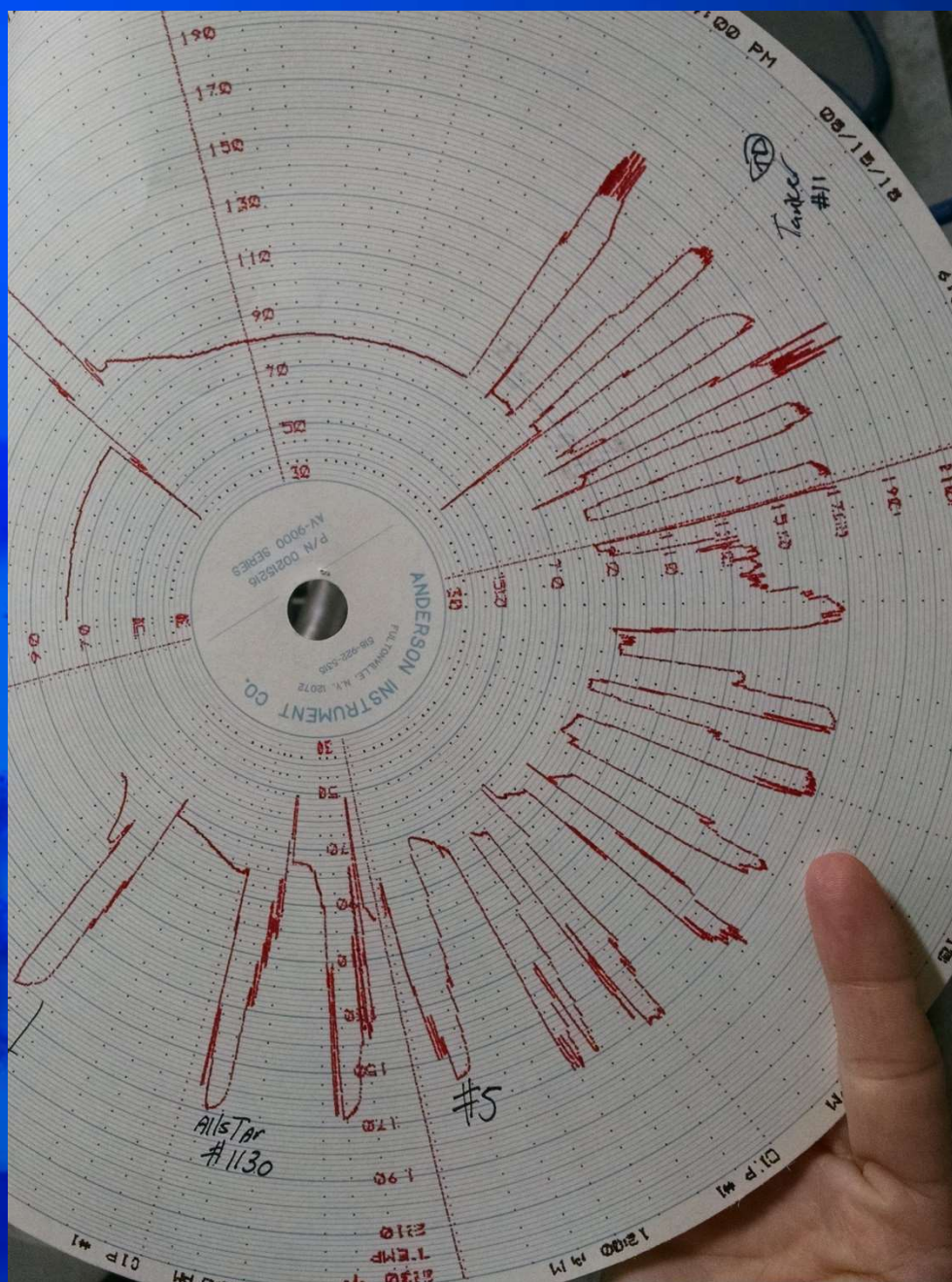
- **Time**
 - Time elapsed before cleaning is performed*
 - Time spent cleaning*
 - Time until cleaned equipment is reused*
- **Action – Kinetic Energy**
 - Flow (pipelines) / Cascade / Impingement*
 - Flow rate / pressure*
 - Contact required to assure effectiveness*
- **Chemistry / Concentration**
 - Selection of proper chemistry for the soil conditions*
 - Control and monitoring of concentration*
- **Temperature**
 - What temp. works best? Higher is not always better*
 - Equipment / drain limitations*
 - Has the optimum temperature for cleaning been defined?*

TACTWINS

- **Water**
 - What is the water source?*
 - What is the hardness?*
 - Temperature / availability of water to be used for cleaning*
- **Individual**
 - Do they understand the cleaning process / follow SOP's?*
 - Do they properly perform CIP prep or manual cleaning operations?*
 - Are they checking the vessel or documentation following the CIP cycle*
- **Nature of Soil**
 - What is the type of soil – protein / fat / mineral / solids / allergens?*
 - How is the soil deposited on the surface to be cleaned?*
 - How long does the product sit before cleaning?*
- **Surface to be cleaned**
 - Material (s)*
 - What is the surface finish?*
 - Is it built for CIP?*

CIP Documentation

- ***Step Elapsed Times***
- ***Flow Rate***
- ***Pressure***
- ***Chemical Concentration –
Conductivity / pH / ion specific***
- ***Temperature – rate / setpoints***
- ***Cycle identity***
- ***Alarms***
- ***Operator ID***
- ***Cycle approval***



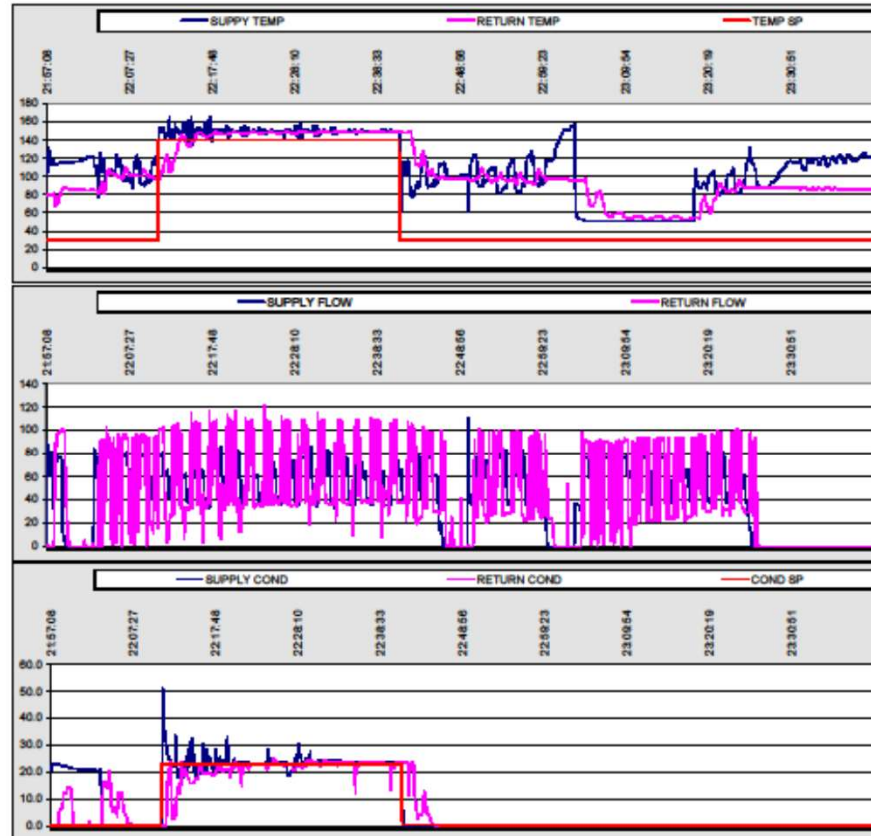
FSMA Foods

1234 Drink Lane
Anywhere, USA

Ticket No. PROCESSOR - FILLER - CHEM SANI2157022107
Date: 2/21/2007

Wash Info:

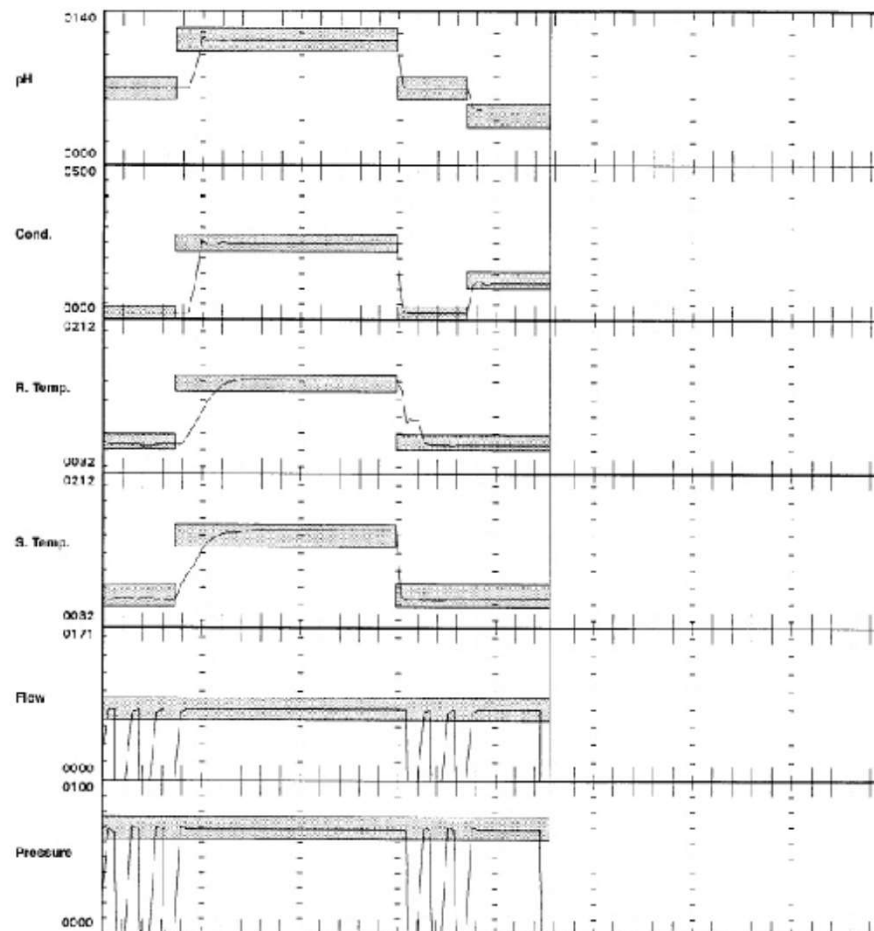
Program # : 8
Program Name: PROCESSOR - FILLER - CHEM SANI
Program : COMPLETED
Wash Start Time: 9:57 PM
Wash Stop Time: 11:41 PM



Water Usage 2356.99 Gallons
Steam Usage 1364.41 Pounds
Det Usage 7.43333 Gallons
Sanitizer Usage 29.3666 Gallons

Cleaned And Inspected By : _____

Program: CREAM-DAK #12 Date: 10/21/99 Time: 15:04 Elapsed Time: 00:22
Location: JEFFERY DAIRY #05



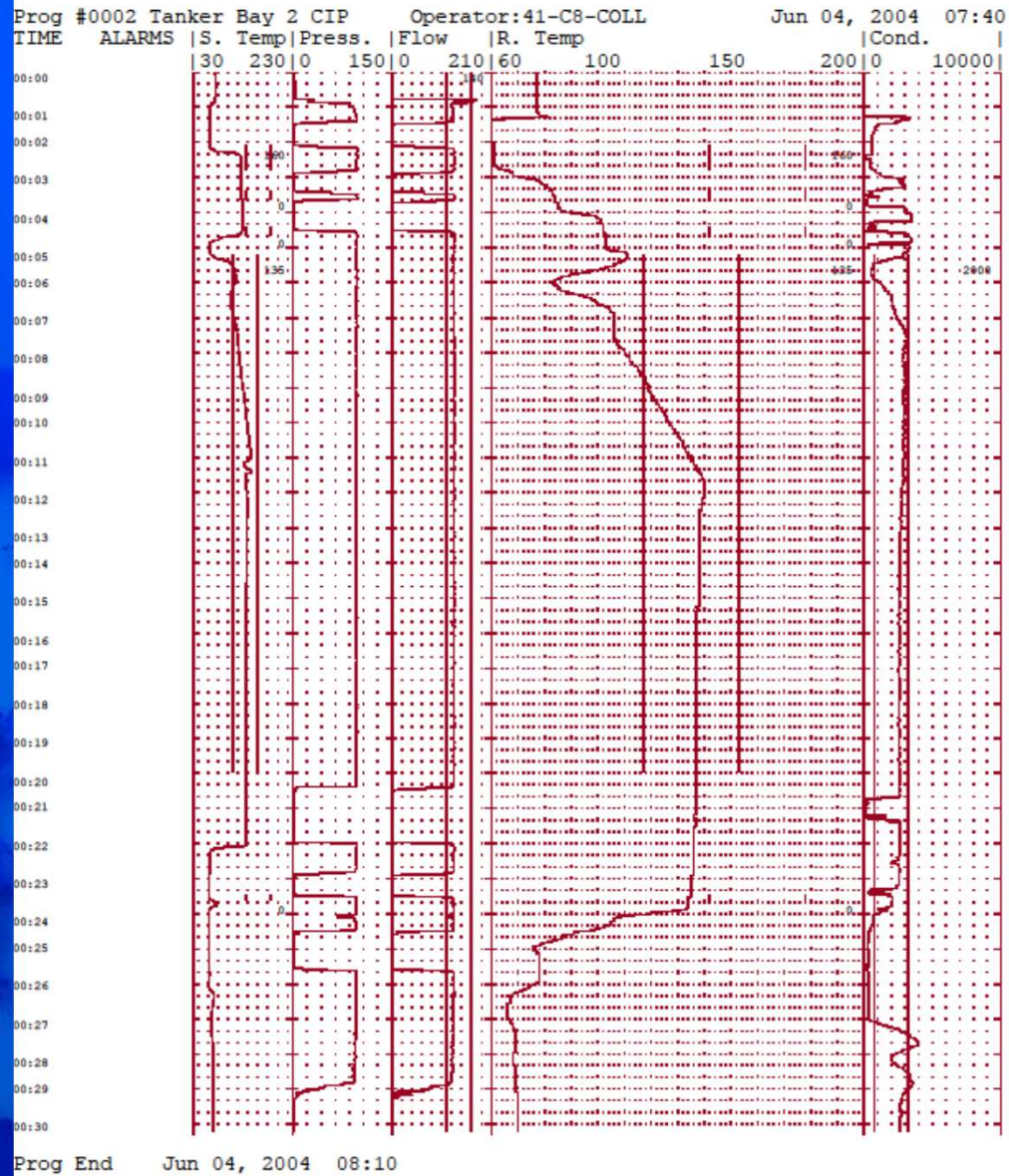
1. Sensor Name
2. Time increments
3. Value and Deadband
4. Company name, program, date, time, elapsed time and location.

FSMA Foods
Anywhere, USA

- CIP 302
34-1594

ID:01020002200406040740
Page 01

Remarks:



Performance Problem #1

High Microbial / ATP Counts

- ***Why? Probable causes***
 - 1) ***Equipment not cleaning properly***
 - 2) ***Sanitizer concentration incorrect***
 - 3) ***Re-Contamination***



Possible Causes #1

Common Root Causes

- A. *Partially plugged spray device***
- B. Low CIP supply flow***
- C. Spray device missing (high flow/low psi)***
- D. Wrong chemical?***
- E. Wrong chemical concentration?***
- F. Wrong spray device***
- G. Soil dried on surface***
- H. Has the soil changed?***
- I. Plugged strainer (low flow/high psi)***
- J. Are spray devices rotating?***
- K. Are process valves opening***
- L. Are process valves pulsing***
- M. Shadowing***
- N. Dead legs***
- O. Damage to equipment / agitator shield***

Action

- A. Clean spray device / add strainer***
- B. (see problem #2)***
- C. Locate / Re-install spray device***
- D. Verify / replace chemical***
- E. (see problem #3)***
- F. Locate / install correct spray device(s)***
- G. Change procedures / chemical***
- H. Change chemical***
- I. Clean strainer / establish SSOP***
- J. Check sprays / add to PM***
- K. Check valve / program / output / solenoid / air line***
- L. Check program***
- M. Add / replace / relocate spray devices***
- N. Redesign / repipe***
- O. Inspect / correct as necessary***

Plugged Spray Device / Not Rotating



Shadowing



Dead Legs



Proper Chemistry



Equipment Damaged



Problem #2

- ***Low flow rate or pressure***

Why?



Possible Causes #2

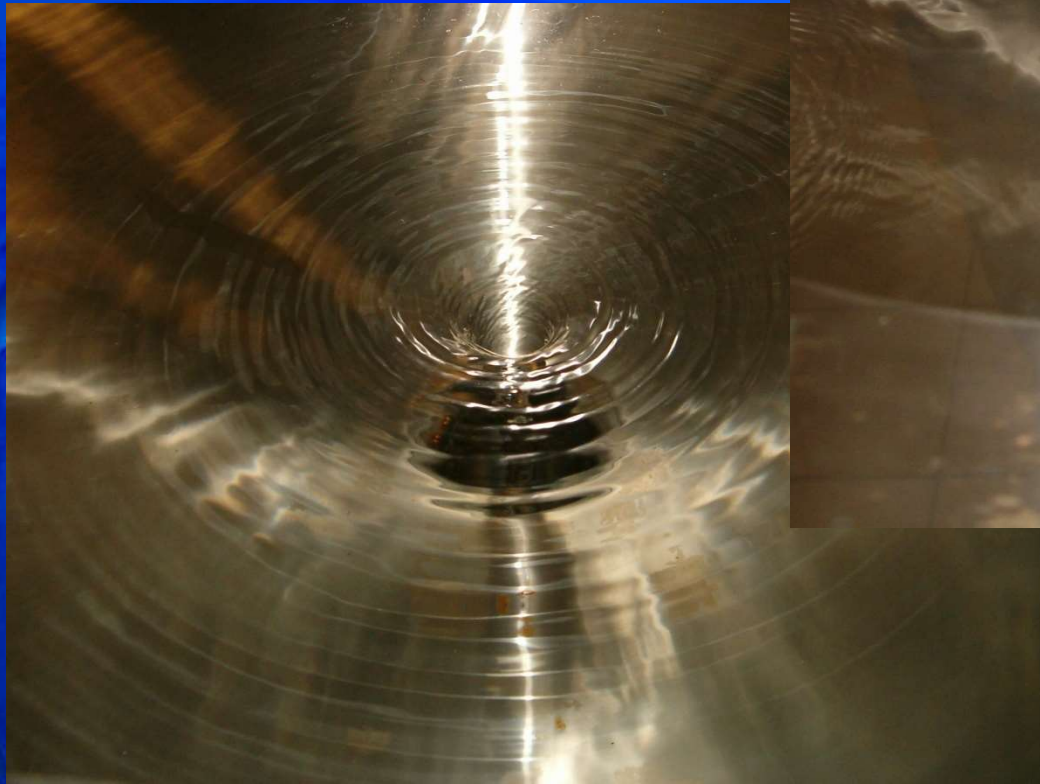
Common Root Causes

- A. Pump seal leaking on pump***
- B. No water or low water supply to pump***
- C. Impeller and/or pump head plugged***
- D. No / low return flow to CIP system***
- E. Are the valves open?***
- F. Spray device plugged (low flow/high psi)***
- G. Strainer plugged***
- H. Pump direction incorrect***
- I. Setpoint too low***
- J. Air bound CIP supply pump***
- K. Air getting into pump suction***
- L. Plugged lines / orifice plate***

Action

- A. Replace pump seal***
- B. Check water supply in CIP tank.***
- B. CIP water valve not open / low supply flow***
- C. Clean pump head / suction line strainer***
- D. (see problem #4)***
- E. Check air lines / solenoids / air pressure***
- F. Clean spray device(s) / add strainer***
- G. Inspect & clean strainer / add to SSOP***
- H. Rewire pump motor***
- I. Verify correct setpoints***
- I. Modify setpoint / program***
- J. Check Return Flow (see problem #4)***
- J. Check for vortexing / add vortex breaker***
- J. Add air relief valve***
- J. Change to self-priming pump***
- K. Loose / leaking fittings***

Vortexxing



Air Relief Valves



Problem #3

- ***Low chemical concentration***

Why?



Possible Causes #3

Common Root Causes

- A. Wrong chemical***
- B. Drum empty***
- C. Chemical pump failure***
- D. Chemical pump lost prime***
- E. Chemical suction line leaking***
- F. Leak in feed line***
- G. Chemical supply line valve failure***
- H. Program setpoint incorrect***
- I. Dilution of drum***
- J. High soil in CIP solution***
- K. Dilution of CIP solutions***
- L. Sensor failure***

Action

- A. Change chemical supply / verify SSOP's***
- B. Replace drum / add to SSOP***
- C. Replace / repair pump***
- D. Re-prime pump. Check suction line***
- E. Replace / tighten fittings or hoses***
- F. Follow MSDS precautions / fix leaks***
- G. Fix valve / follow MSDS precautions***
- H. Correct setpoint / limit access to program***
- I. Replace drum / Eliminate cause***
- J. Dump / clean / recharge CIP tanks***
- K. Check return flow / drain times. (refer to Secondary Problem #4)***
- L. Calibrate / replace sensor***

NOTE: Chemicals should always be periodically titrated!

Problem #4

- *Low / no return flow rate*
- *Water left in vessels following (during) CIP*
- *CIP Tanks overflowing*

Why?

Possible Causes #4

Common Root Causes

- A. Pump seal leaking on return pump***
- B. Valve pulsing closed too long***
- C. Impeller and/or pump head plugged***
- D. Are the valves open?***
- E. Pump direction incorrect***
- F. Air bound CIP return pump***
- G. Air getting into pump suction***
- H. Losing CIP solution***
- I. Blocked suction line***
- J. *Return line strainer plugged***
- K. Drain times too short***
- L. Balance system***

Action

- A. Replace pump seal***
- B. Revise program***
- C. Clean pump head / pre-rinse vessel?***
- D. Verify valve operation in return line***
- E. Rewire pump motor***
- F. Add air relief valve***
- F. Replace with self-priming pump.***
- G. Check for vortexing / add vortex breaker***
- G. Tighten loose / leaking fittings .***
- G. Check air relief valve***
- G. Replace / install gaskets***
- H. Add CIP Doors***
- I. Check for crushed hoses***
- I. Check for blockage in line***
- J. Check / clean strainer***
- K. Reprogram drain times***

Problem #5

- *CIP System won't get to temperature*
- *CIP cycles are too long*
- *CIP system overheating*

Why?

Possible Causes #5

Common Root Causes

- A. Losing CIP solution***
- B. Cooling left on process jacket***
- C. Poor return flow – adding water***
- D. Steam valve malfunction***
- E. Steam trap not opening***
- F. Condensate return pump failure***
- G. Blown heat exchanger***
- H. Too much water in system***
- I. RTD malfunction***
- J. Check boiler***

Action

- A. Identify solution losses and correct***
- B. Turn off cooling / drain jacket***
- C. Refer to problem #4 above***
- D. Check steam valve / program***
- E. Open condensate bypass / replace trap***
- F. Fix / replace pump***
- G. Replace tubes / reprogram CIP cycle***
- H. Check water valve / level controls***
- I. Inspect / recalibrate RTD***

Losing CLP Solution



Performance Problem #2

Corrosion / High Chemical Usage / Residues

- ***Why? Probable causes***
 - 1) ***Program setpoints changed***
 - 2) ***Siphoning***
 - 3) ***Valve failure***
 - 4) ***Chemicals left in vessels***
 - 5) ***Conductivity sensor failure***

Why?

Possible Causes

Common Root Causes

- A. Wrong chemical***
- B. CIP suction line siphoning***
- C. Chemical pump failure***
- D. Chemical supply line valve failure***
- E. Program setpoint incorrect***

NOTE: Chemicals should always be periodically titrated!

Action

- A. Change chemical supply / verify SSOP's***
- B. Add anti-siphon or shut-off valve***
- C. Repair / replace pump***
- D. Replace / repair chemical supply valve***
- E. Re-program setpoints / limit access***

Note: Follow MSDS precautions





Thank You!

