



Herguth Laboratories, Inc.

People and Data You Can Count On! SM

10 Successful Methods For Analyzing Oil Analysis Data

Number

10

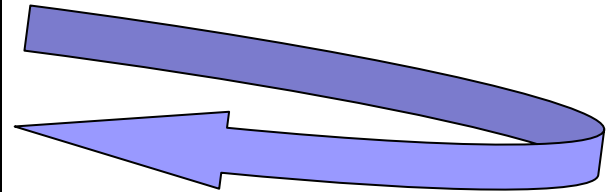
Know Your Lubricants

You got to be careful if you don't know where you're going, because you might not get there.

— Yogi Berra

New AW Hydraulic Oil

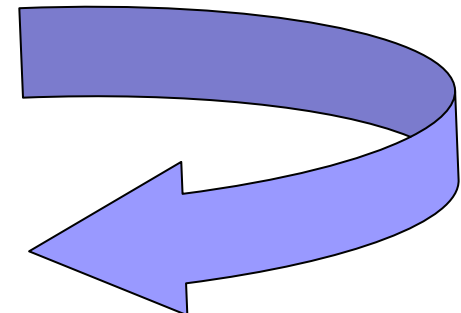
	June	Aug.	Oct.	Dec.
Zinc	345	344	345	<1
Phosphorus	323	326	345	<1
Calcium	123	134	122	<1
Viscosity	46.23	46.45	46.43	32.45
Acid No.	0.34	0.35	0.36	0.04



Used AW Hydraulic Oil

	June	Aug.	Oct.	Dec.
Zinc	345	344	345	323
Phosphorus	323	326	345	325
Calcium	123	134	122	127
Viscosity	46.23	46.45	46.43	46.32
Acid No.	0.34	0.35	0.36	0.32

When do I want to find out?



Know Your Machines!

“That particular mistake will not be repeated.
There are plenty of mistakes left that have not yet
been used.”

— Andy Tanenbaum

Pump Oil

	June	Aug.	Oct.	Dec.
Iron	<1	<1	<1	<1
Copper	<1	<1	<1	<1
Aluminum	<1	<1	<1	<1
Chromium	<1	<1	<1	<1
Ferrous Debris	nil	nil	nil	nil

*When do I want
to find out?*



Tin Bearing

Oops!



Develop Rapid Database

Establish Limits / Alarms

Manage The Database and Alarms

“I couldn't wait for success, so I went ahead without it.”
 - Jonathan Winters



When do I want to know?

<i>All Machines Using R&O Type Oils</i>																
<i>Test</i>	<i>Fe</i>	<i>Al</i>	<i>Cu</i>	<i>Pb</i>	<i>Sn</i>	<i>Si</i>	<i>Na</i>	<i>B</i>	<i>Zn</i>	<i>P</i>	<i>Ca</i>	<i>Mg</i>	<i>Ba</i>	<i>Acid</i>	<i>Water</i>	<i>Vis.</i>
<i>Caution</i>	10	3	20	5	5	5	15	10	50	50	50	50	50	0.1	75	33
<i>Alarm</i>	15	5	30	10	10	10	25	15	n/a	n/a	n/a	n/a	n/a	0.2	100	36

The sooner the BETTER!!

Don't Rationalize Away Data Find The Answer!!

***“Real data are full of
surprises.”***

— Anonymous

Sample Point?

Sample Method?

Lab Results?

Wrong Sample?



***Example: Low flash point on used diesel engine oil when
measured by PMCC. Flash OK by COC.***

Wet Fuel Blow-by?

Bad Lab Data?

Sample Point?

***Automatic PMCC Method had residue built up
on thermocouple!!***

Understand The Relevance of The Data

Severity and Predictive Nature

“I hear and I forget. I see and I remember. I do and I understand.” Confucius

Not Predictive

Sludge

Viscosity



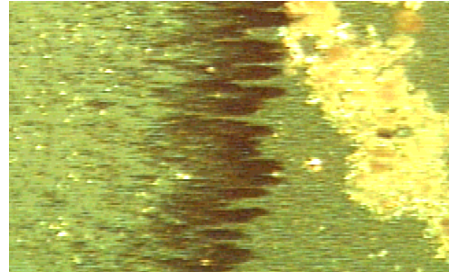
Acidity

Predictive

RULER_{tm}

RPVOT

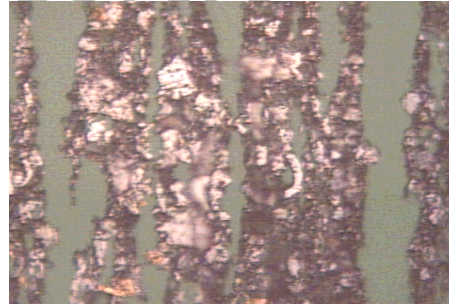
Abnormal, But Not Severe



100 ppm Fe

Plus Corrosive Wear

Severe

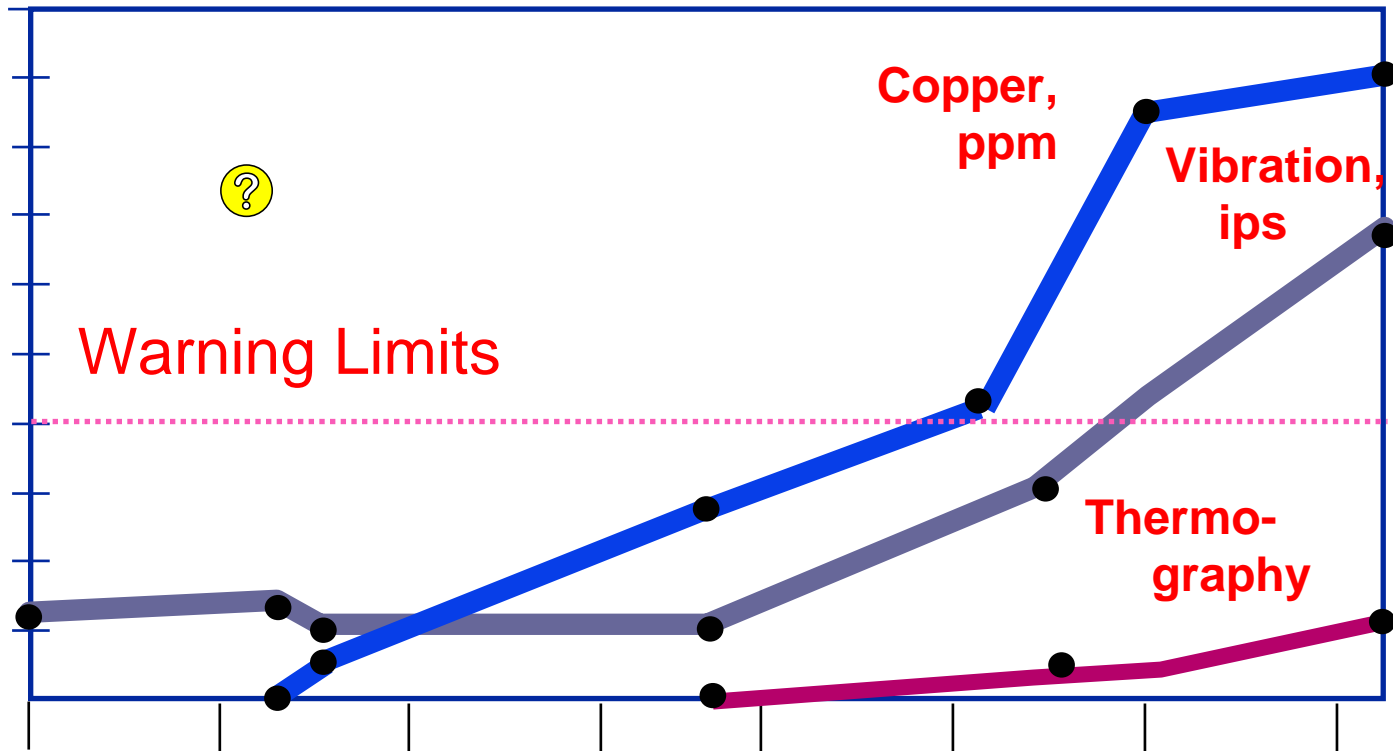


100 ppm Fe

Plus Contact Fatigue
& Cutting Wear

Use All Of The Tools in your Box

“Is that your final answer.” Regis Philbin



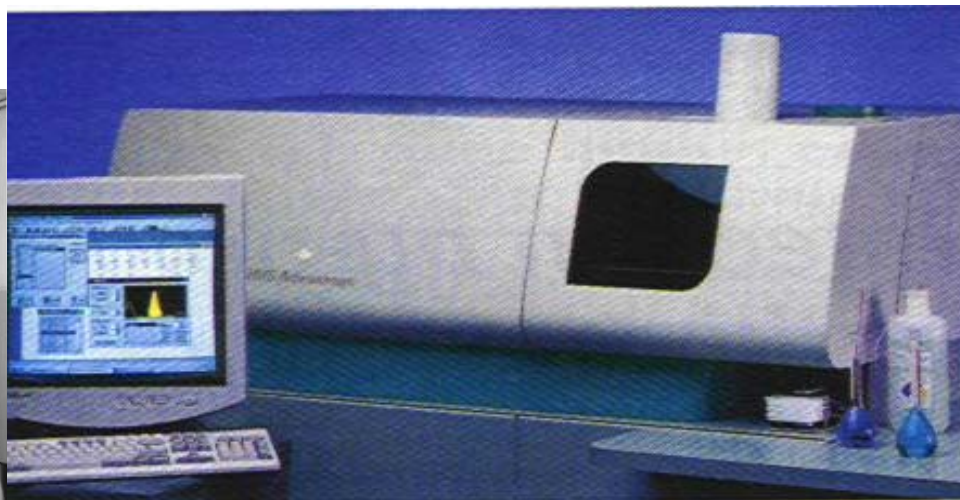
Know The Limitation Of The Laboratory Equipment

“It depends upon what the meaning of 'is' is.” Bill Clinton



1959

2002

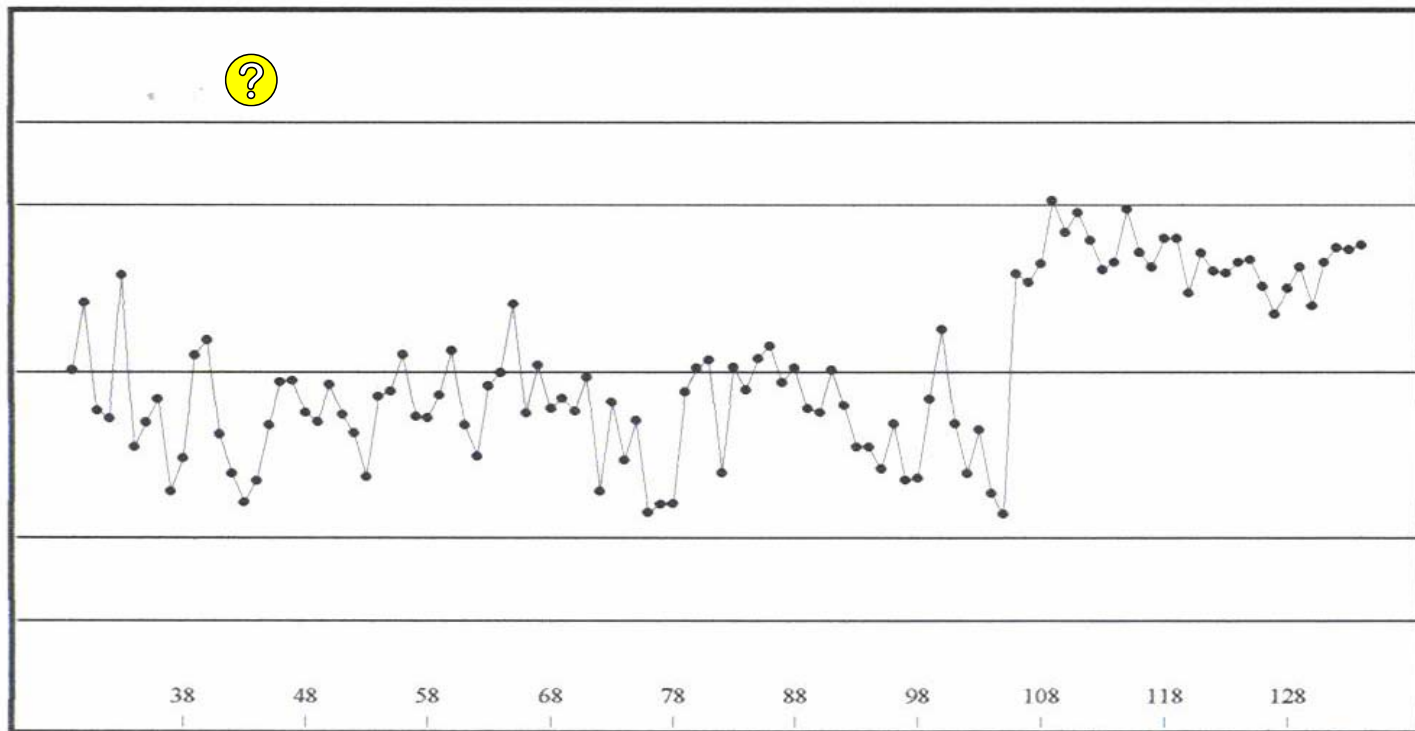


Calibration
Inter-element Interference
Carry-over

Know The Statistical Process Control (SPC) Values For Your Laboratory

“We're lost but we're making good time.” Yogi Berra

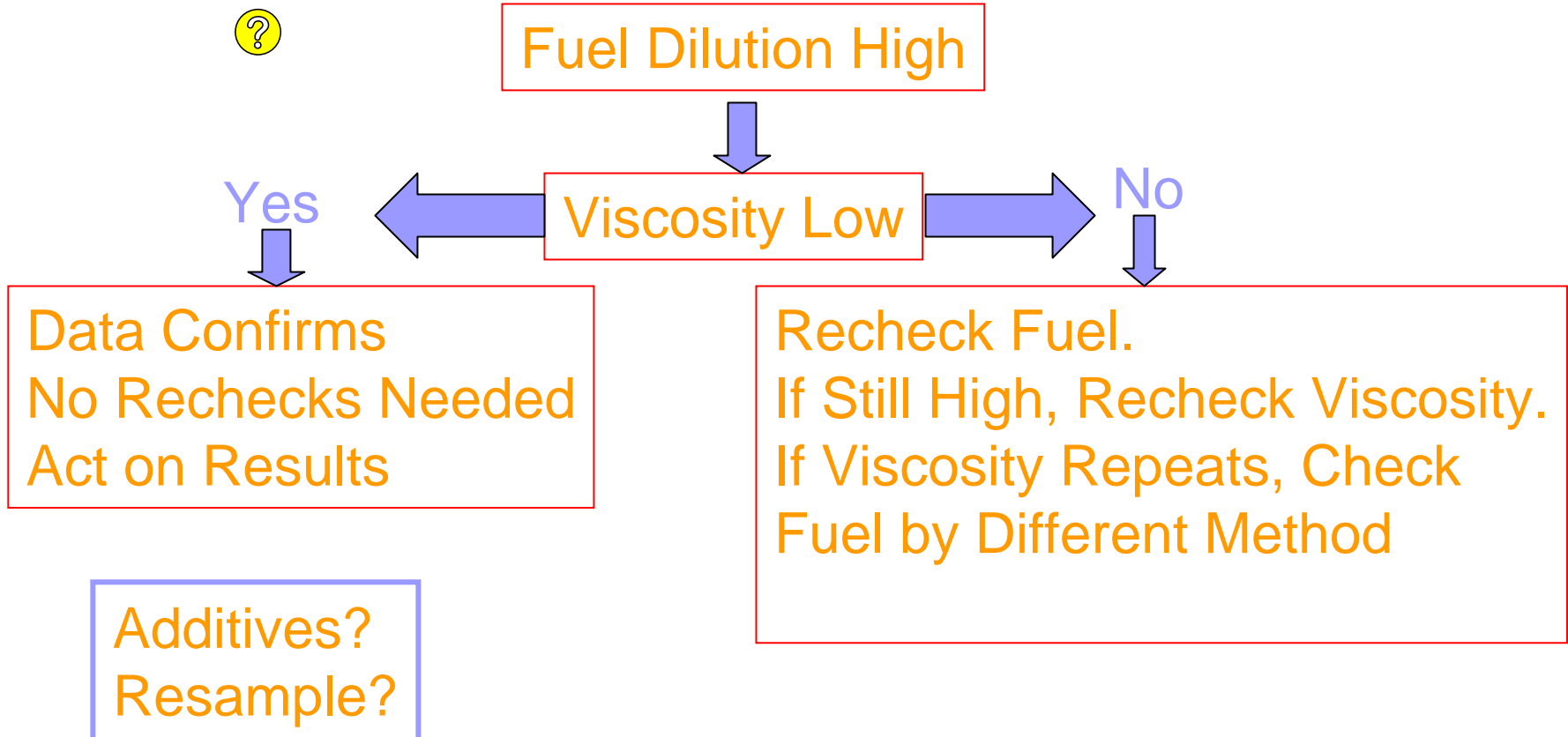
Quality Control Chart



n= 106 Mean= 32.169 SD= 8.036 %CV= 24.98% Min= 18.400 Max= 48.700

Confirm Data Prior To Extreme Actions

“Reality is merely an illusion, albeit a very persistent one.” Albert Einstein



Let Common Sense Be Your Guide & Trust Your Intuitions

“The secret of success is to know something nobody else knows.” - Aristotle Onassis

