

The role of Oil Analysis in Predictive Maintenance

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Question: Why Oil Analysis.....?

Answer: To improve the lives of Maintenance & Reliability Engineers.....

An effectively executed fluid analysis program eliminates the guesswork, risk and reactionary nature of your maintenance department. When companies transition from preventive maintenance to predictive maintenance, they realize greater impact, uptime and savings. These are proven results that drive performance and business success.

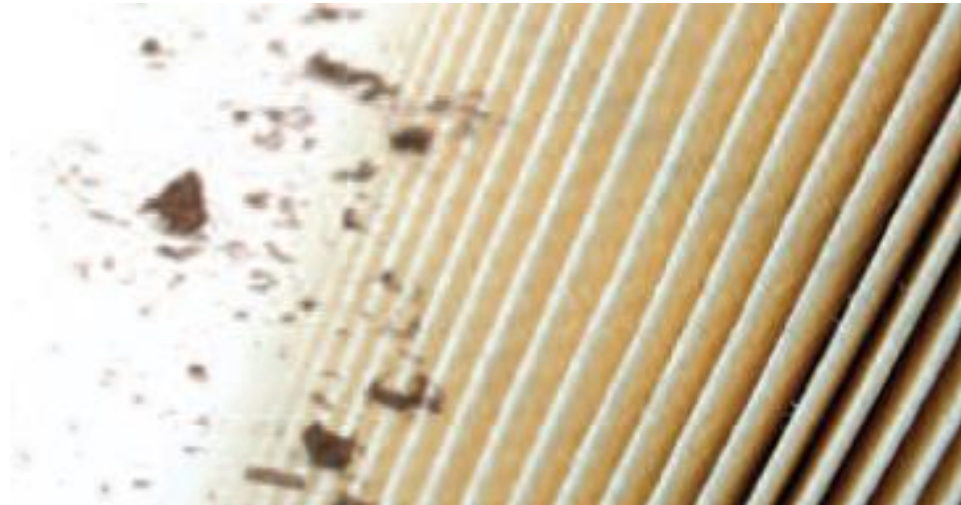
POLARIS Laboratories, 2015

Why Test Oil...?

Over 80% of equipment failures are contamination related breakdowns, oil analysis is one of the easiest ways to monitor contamination

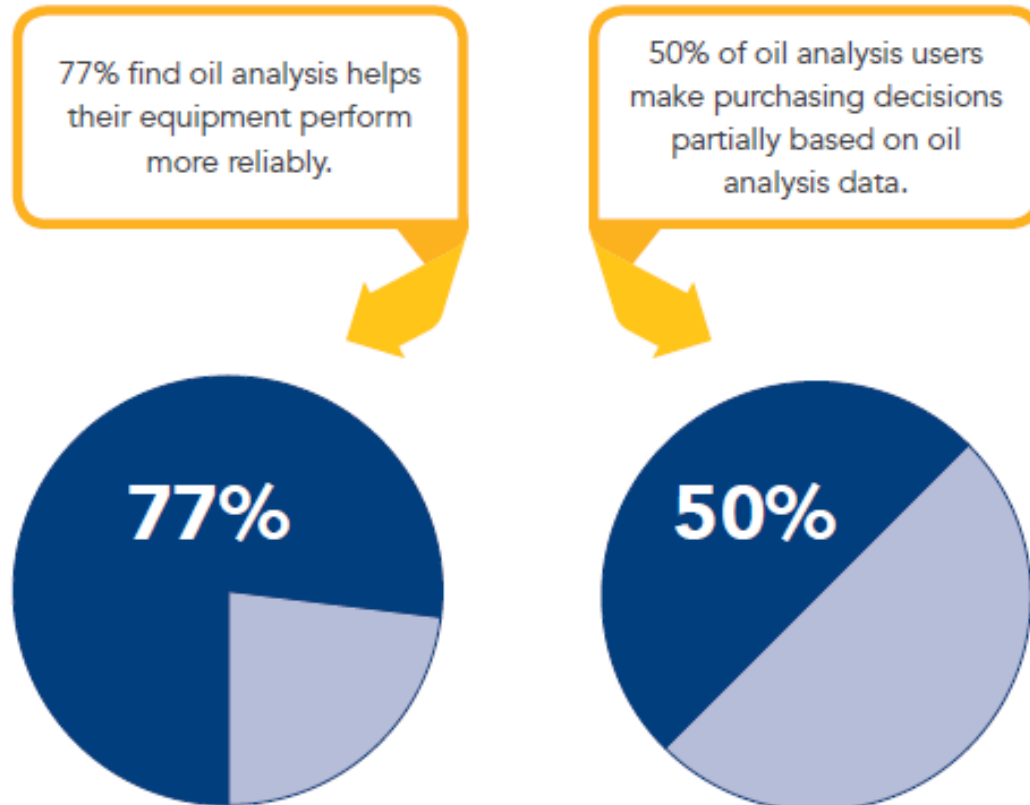
Common Problems:

- Dirt
- Water
- Fuel Dilution
- Coolant
- Process
- Contaminants
- Grease
- Sealant/Build Debris



What Impact can Oil Analysis Generate

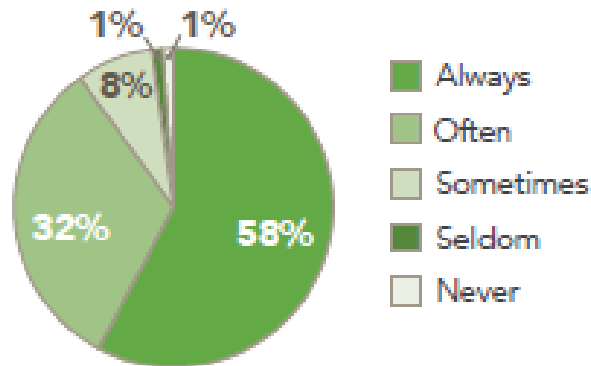
What percentage of companies find Oil Analysis helps equipment perform reliably



What Impact can Oil Analysis Generate

What percentage of companies find Oil Analysis saves money

Q: Oil analysis recommends maintenance before damage is visible or symptoms can be noticed.

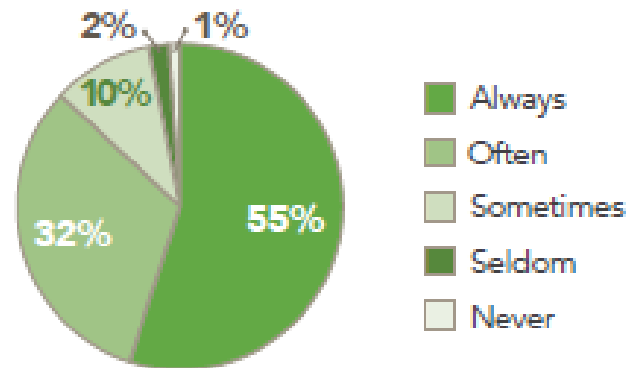


90% of companies with effective oil analysis programs save money by preventing damage

What Impact can Oil Analysis Generate

What percentage of companies find Oil Analysis improves confidence

I am more confident in the reliability of equipment that has had a recent oil analysis test.

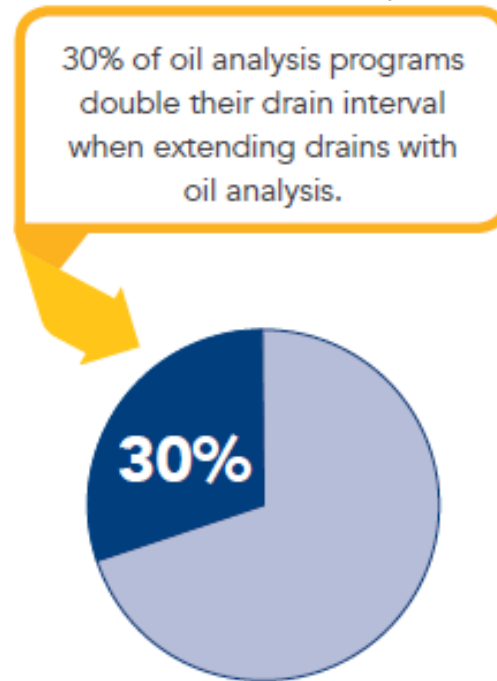


87% ARE MORE CONFIDENT IN THE RELIABILITY OF THEIR EQUIPMENT WHEN IT HAS HAD A RECENT OIL ANALYSIS TEST.

87% of Oil analysis users are more confident in their equipment's reliability

What Impact can Oil Analysis Generate

What percentage of companies find Oil Analysis helps extend oil drains



The safest way to achieve extended drain intervals

- 30% of oil analysis users double their drain intervals safely with Oil Analysis

The 6 R's of Lubrication Management

- Right Supplier
- Right Lubricant
- Right Time
- Right Amount
- Right Location
- Right Procedure

- Why not a 7th R.....?

- Right Analysis Program

*'There is an A.R.T to Fluid Analysis – it must be Accurate, Reliable and Timely' –
Henry Neicamp, 2013*

Testing Requirements

Fluid Properties

Analysis helps determine condition of the lubricant, if oil changes or Top-Ups are required, also aids drain extension

Wear Metal Analysis

Vital for monitoring and trending wear patterns and possible component failures, backbone of all analysis programs

Contamination

Testing determined by equipment & lubricant type, accuracy is important for Predictive Strategies

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Accuracy of Data: Recommended Maintenance decisions based on variance, reliability and accuracy of testing and reporting capabilities

	Water Content Result Reported	Maintenance Action & Decision
Lab 1 Result	Water Present	Check Unit for source of contamination, but as quantity of contaminant is not known, do I change oil?
Lab 2 Result	Water > 0.2%	Check Unit for source of contamination, but as definitive level of contaminant is not known do I change oil?
Lab 3 Result	Water = 0.35%	Check Unit for source of contamination, but as level is below OEM recommendation of 0.45% no oil change required

	Water Content Result Reported	Maintenance Action & Decision
Lab 1 Result	No Water Present	No problem reported, continue to monitor as normal
Lab 2 Result	Water <0.1%	No problem reported, continue to monitor as normal
Lab 3 Result	Water = 432ppm	Check Unit for source of contamination and change oil as level is above acceptable level of 350ppm for this application.

Integrate Oil Analysis into your Maintenance Program

- Goals are the ruler by which you can measure the success of your program.
- Carefully examine your current maintenance practices and strategies and determine whether or not they are helping you accomplish your goals.
- How are you measuring that accomplishment?
- Documenting equipment “saves” you can credit to fluid analysis and savings in increased up-time, reductions in oil, fuel and coolant consumption and parts replacement allows you to easily justify to management the cost of doing fluid analysis.

Program Management

Correct leadership links programs to successful maintenance programs

Program Champion

- Reviews results

- Feedback to management

- Discover root causes

- Support corporate objectives

Sample Taking

- Common Procedures

- Complete Equipment List

- Criticality of Units

- Sampling Schedules

Know your equipment and share your knowledge

- Full Details for Equipment
- Manufacturer
- Model
- Lubricant Type & Grade
- Filtration
- Sump Volume
- Running Hours
- Specific Issues with a machine

All this affects Data Interpretation

Component Information

Component ID: GATE-PA
GEARBOX

Secondary ID: GOLDEN GATE

Component Type: MARINE TRANSMISSION

Manufacturer: ZF

Model: 7550

Application: MARINE

Sump Capacity: 15 gal

Product Information

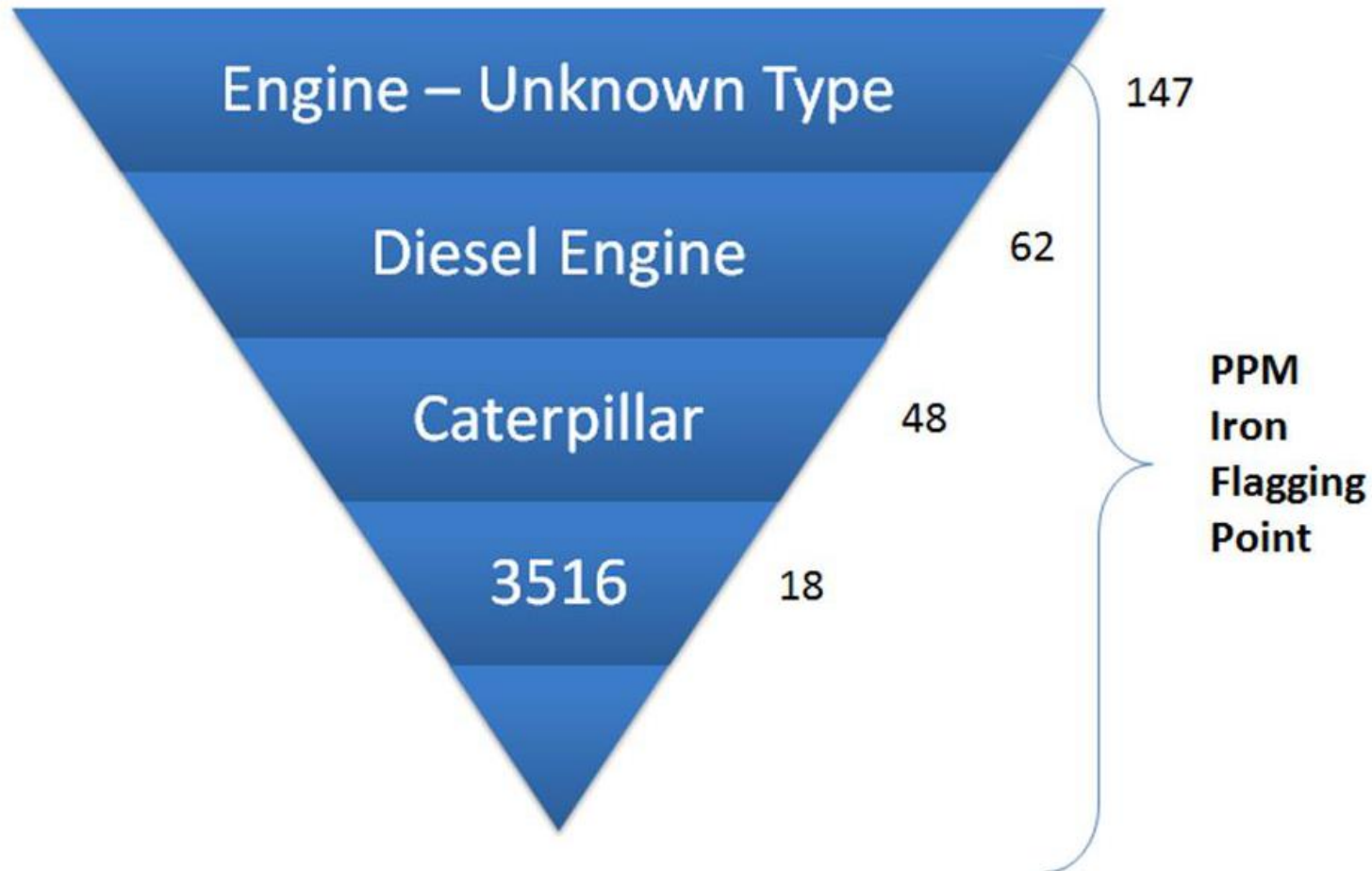
Product Manufacturer: CHEVRON

Product Name: DELO 400

Viscosity Grade: SAE 15W40

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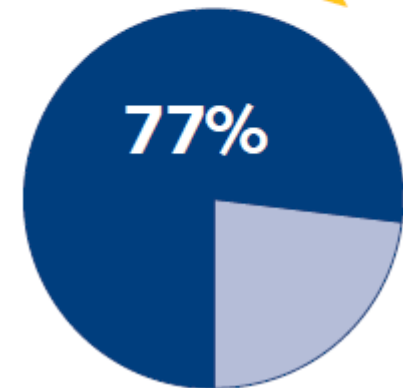
**Know your equipment and share your knowledge –
Importance of information**



Review your reports and take action

Well managed programs increases Uptime,
not just reduction in Downtime

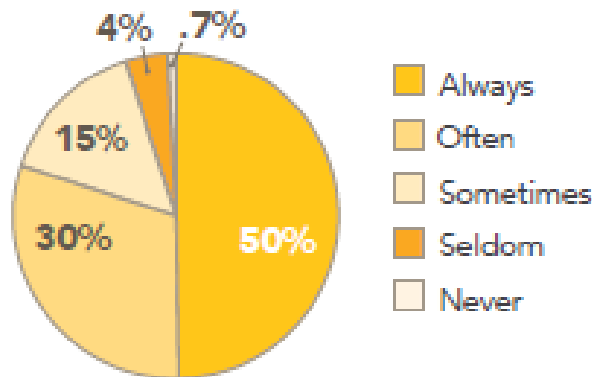
77% of programs believe
oil analysis decreases the
number of unexpected
equipment breakdowns.



Review your reports and take action

Feedback on Problem Samples and use for Root Cause Analysis

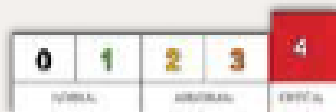
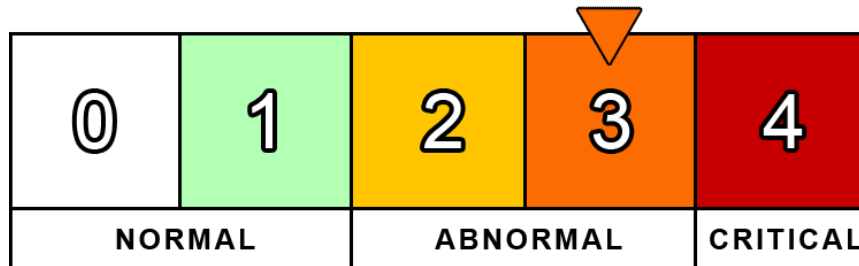
Q: I use oil analysis to discover the root cause of problems.



80% OF OIL ANALYSIS PROGRAMS SEARCH FOR THE ROOT CAUSE OF MAINTENANCE PROBLEMS.

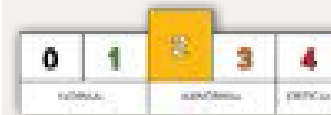
Review your reports and take action

Monitor All Samples, including lower severity samples



For example, a severity 4 result on a diesel engine shows wear

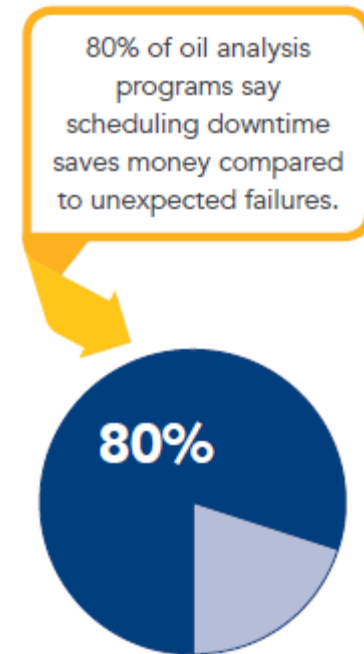
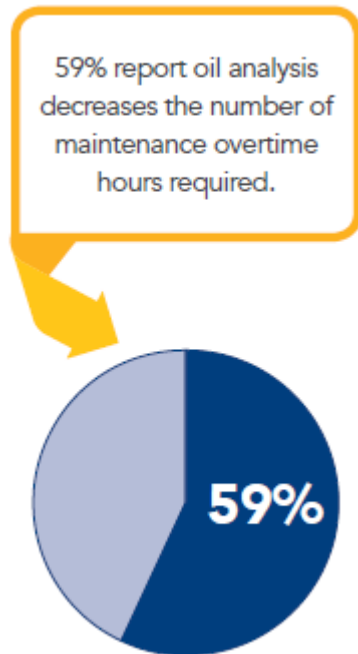
metals and contamination at high enough levels to warrant replacing the liners and rings. This predictive maintenance is still a large investment in parts, labor and downtime, but it avoids the larger expense of breaking down in the middle of a job, and the unit can continue to run until the replacement parts arrive.



Rewind to six months earlier when a severity 2 test result showed

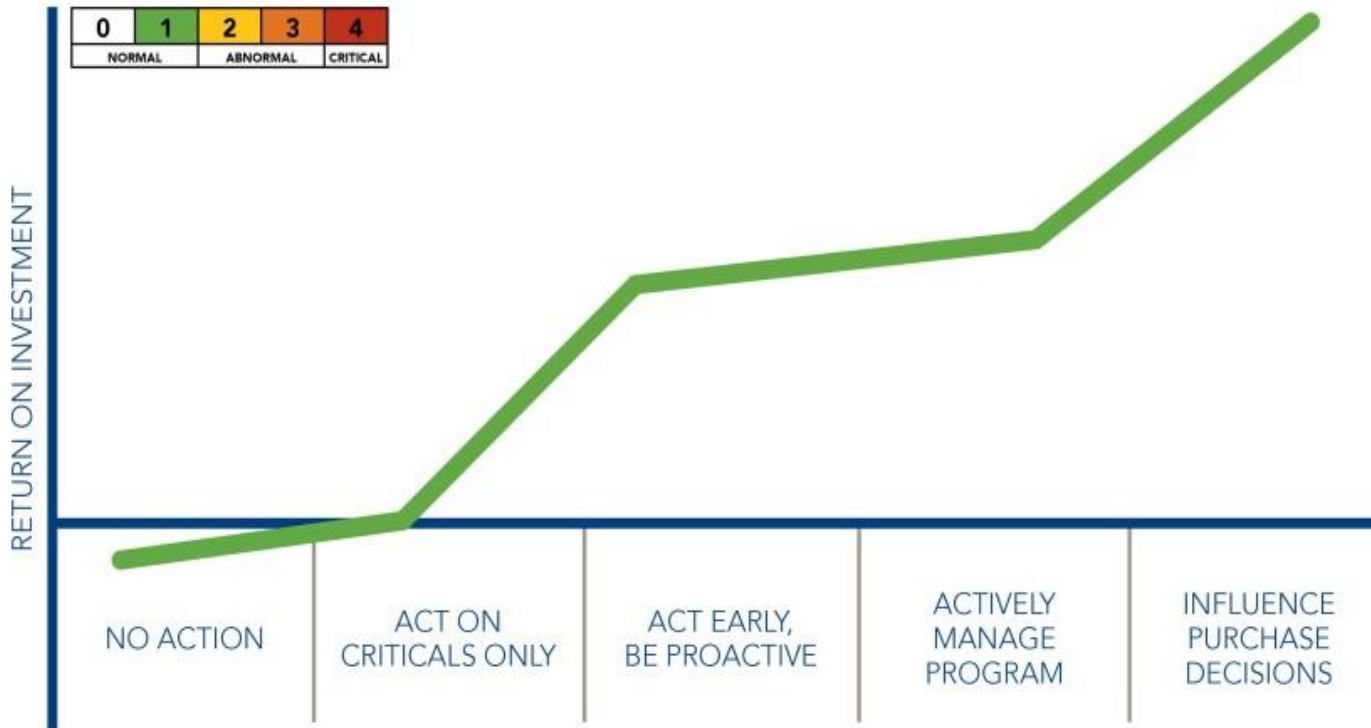
dirt contamination on that same engine. The levels didn't warrant immediate repairs, but they were much higher compared to similar units. If a program champion had recognized it as a concern and investigated, they could have prevented the contamination from continuing and avoided damage to the rings and liners.

How much does Oil Analysis save your company



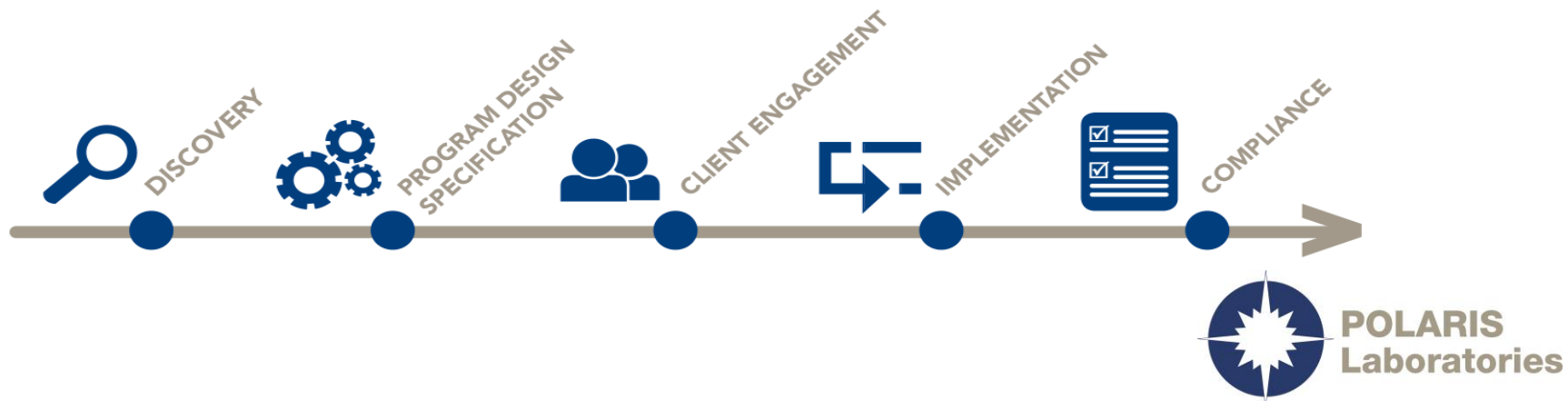
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How much does Oil Analysis save your company



Conclusions

- Oil Analysis is no longer just a report with sample data included
- It should not be ‘just about reducing Downtime’, increasing and tracking Uptime is just as important
- Data needs to be linked to alternative Maintenance Regimes
 - Lubrication Management
 - Other CM services
 - Maintenance Software, API links to providers
- Selection of a Program Champion & leadership buy-in can help generate ROI's of over 30:1



Thank you for your time...Any questions....?