MANAGING EFFECTIVE FLUID ANALYSIS: REALIZING A RETURN ON YOUR INVESTMENT

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When managed effectively, fluid analysis is an informative diagnostic tool that can reduce maintenance costs, increase productivity and boost company profits for any well servicing application. Used alone or in conjunction with other diagnostic technologies, fluid analysis can detect a variety of problems before they become failures. On-site failures are often far more costly than just the repairs. When used to affect change in everyday maintenance practices, fluid analysis not only justifies itself by documenting what it saves you in repair and replacement costs, but also allows you to make relevant, well-informed maintenance management decisions.

Several considerations are necessary for implementing and maintaining an effective program. From setting realistic program goals to selecting a quality laboratory, planning is key. Fluid analysis places a wealth of information at your fingertips about the condition of your equipment and the lubricants and coolants you are using. But it’s worthless if you can’t maximize its value with a positive impact on your bottom line. It’s not just fluid analysis; it’s what you do with it that determines the return on your investment.

1 SET ATTAINABLE GOALS.

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.

2 DETERMINE THE PERSONNEL NEEDED TO SUFFICIENTLY RUN THE PROGRAM.

The size of your program will determine the number of people necessary to maintain it and whether or not fluid analysis should be their sole responsibility or only a portion of their job. It is necessary to identify who will be pulling samples and who will be managing the data. Samplers are typically the personnel also responsible for fluid and filter changes and other routine maintenance. They should be trained on the installation and use of the sampling devices and methods you've chosen to use, as well as how to properly document sample information sent to the laboratory. Data managers need access to a computer and the Internet and should have good computer skills and an understanding of databases. They should also be given extensive training on the fluid analysis data management software programs you intend to use.

3 SELECT TESTING THAT ACCOMPLISHES YOUR PROGRAM GOALS.

Most fluid analysis program goals are centered on saving money; whether those savings are realized in reduced downtime, increased production, or less fluid purchased, equipment replacement or repair. If you simply want to monitor the condition of the unit and the fluid, basic testing for wear and contamination will suffice. Testing Total Base Number, Total Acid Number and Oxidation/Nitration is vital to extending oil drain intervals. Particulate analysis by PQ (Particle Quantifier), ISO Particle Count or Analytical Ferrography and Micropatch monitor the size, count and distribution of ferrous and non-ferrous wear particles and can identify the source, allowing you to predict and prevent catastrophic failure.

4 DETERMINE SAMPLING FREQUENCIES.

Although an equipment manufacturer's recommendations provide a good starting point for developing preventive maintenance practices, sampling intervals can easily vary. The degree of criticality to production is the most important factor in determining which units or components you will test and how often.

Environmental factors such as hot, dirty operating conditions, short trips with heavy loads and excessive idle times are also important sampling considerations. Dirt, system debris, water and light fuels tend to separate from the oil when system temperatures cool so "representative" samples require sampling to be done while the system is operating or immediately after shutdown.

Timing is also critical. Trend analysis works best when sampling intervals are consistent and samples are shipped for analysis immediately. Maintenance personnel responsible for sampling should be well trained – and re-trained when necessary – on the appropriate sampling point(s), frequency and designated method for each piece of equipment being tested.

Diesel engine and transmission samples should be taken from a permanently installed valve upstream of the filter. When using a vacuum pump, draw the sample from the reservoir through the dipstick retaining tube. Be sure to insert the tubing only halfway between the oil level and the bottom of the reservoir to avoid contamination by settled debris.

Sample pumps using either a vacuum pump through the fill port or take it through a permanently installed petcock. Be sure to flush at least five times the volume of any dead space before catching the sample. If a drain plug is the only way to catch a sample, be sure to allow five times the volume of the sample container to flow before catching the sample (do not use the sample container for this).

5 KNOW YOUR EQUIPMENT AND SHARE YOUR KNOWLEDGE.

Accurate, thorough and complete fluid and equipment information allows for better, in-depth analysis and increases the value of a data analyst's comments and recommendations. Obtain the most current, accurate equipment identification information for your laboratory – including make, model, application, filter types and micron ratings, sump capacity, hours/miles on the unit and the fluid and whether or not the fluid has been changed. Consult every resource available to you – procurement records, inventory databases and OEM service manuals are good places to start. Once the laboratory has imported the information, request a copy to verify its accuracy and make sure to communicate any needed changes promptly.

Every laboratory's system for managing sample information is unique, but all of them rely on the information customers submit with the sample for setting alarm and severity limits. Missing or inaccurate information limits data interpretation.

6 TAKE AN ACTIVE ROLE IN MINIMIZING SAMPLE TURNAROUND TIME.

Don't let the value of fluid analysis results and recommendations be diminished by unnecessarily slowing down how the sample is processed. Samples can be received more quickly by the laboratory when they have been pre-logged online or the sample label information is legible and accurate. Clearly mark special instructions and close all lids tightly. Use a mail service that has online tracking to send samples to your laboratory and receive your results electronically. Remember, laboratory turnaround time begins when the sample is received and ends when results have been sent to the user. Therefore 24-hour turnaround means it takes 24 hours from receipt of the sample by the laboratory to log it, test it, analyze the results and send a report to the user.

7 REVIEW YOUR REPORTS AND TAKE ACTION.

When reviewing your most severe reports, consider all other available diagnostic information, such as: vibration analysis, specifically, vibration analysis, thermography, in-line sensors, or any other information you have at your disposal. Make a decision either to act on the analyst's recommendations or order more testing. If re-sampling is recommended, sample again immediately or at half the normal interval to verify results; if not, monitor the unit closely and sample again at the normal interval.

Cautionary reports may flag some wear and contamination results, although those results may not necessarily indicate a particular failure mode or be significant enough to warrant action. Retain the reports for later reference as more data is collected on subsequent samples. Trends will be easier to spot and the appropriate action to take more clear. Review normal reports as time permits. Knowing the starting point or condition helps in recognizing trends when reviewing historical data.

8 MANAGE THE DATA.

Raw data can be overwhelming, and it does not give clear recommendations on what to do next. Use the tools available to sort old and new data into reports to identify trends and correlations. That data can then be compared to industry standards or "normal" ranges to provide useful information, such as when to perform preventative maintenance and when to wait. Many data management systems can run reports automatically, providing easy-to-understand recommendations without a large time investment.

9 CONTINUALLY MONITOR FLUID ANALYSIS COMMUNICATION CHANNELS.

Have a system in place that allows you to take action. Failing to do so may not only lead to unnecessary failure and/or downtime, but it drastically reduces the value of your fluid analysis dollar. The effectiveness of fluid analysis is best measured when the maintenance performed can be correlated to fluid analysis recommendations. Your laboratory should be able to document your feedback on maintenance or diagnostics performed and use it to improve its flagging and severity protocols.

10 CHOOSE A LABORATORY WITH YOUR PROGRAM EXPECTATIONS IN MIND.

Expect quality results from your fluid analysis laboratory. Quality data should be repeatable, reproducible and have validated degrees of uncertainty available to the user. A2LA's accreditation of a laboratory's compliance with ISO 17025 – now the international standard for testing and calibration laboratories – is the highest level of quality attainable by a testing laboratory. Dedicated to formally recognizing competent testing and calibration laboratories, A2LA is the most stringent accrediting body in the industry.

When deciding if a fluid analysis laboratory is right for you, consider the following:

- Can it meet all the requirements of your program?
- Can it perform the testing you need in an appropriate amount of time?
- Can you call any laboratory location with questions or are you limited to just the one you sent the sample to?
- How does the laboratory ensure consistency from location to location?
- Will you always be able to speak with an analyst?
- Does your laboratory provide training so everyone involved with the program at your company is on the same page?

Although price is always a factor, quality results, good turnaround time and open lines of communication are essential to both a good relationship with your laboratory and to realizing a return on your fluid analysis investment.

ABOUT THE AUTHOR

Mark Minges has been involved in oil analysis for over 35 years. His experience ranges from owning and operating a small trucking fleet to repairing and maintaining off-shore drilling platforms in the Gulf of Mexico. Minges began his career with POLARIS as Vice-president of Sales and Marketing, moving to Chief Operating Officer nine years ago to capitalize on his strengths as a data analyst and technical consultant. Minges is a member of the Society of Tribologists and Lubrication Engineers (STLE), the American Society of Mechanical Engineers (ASME), as well as the Technical Maintenance Council (TMC) of the American Trucking Association. He is Oil Monitoring Analyst I (OMAI), OMAII and Certified Lubrication Specialist (CLS) certified through STLE.

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