# Oil Analysis & Lubricant Management Prove Successful

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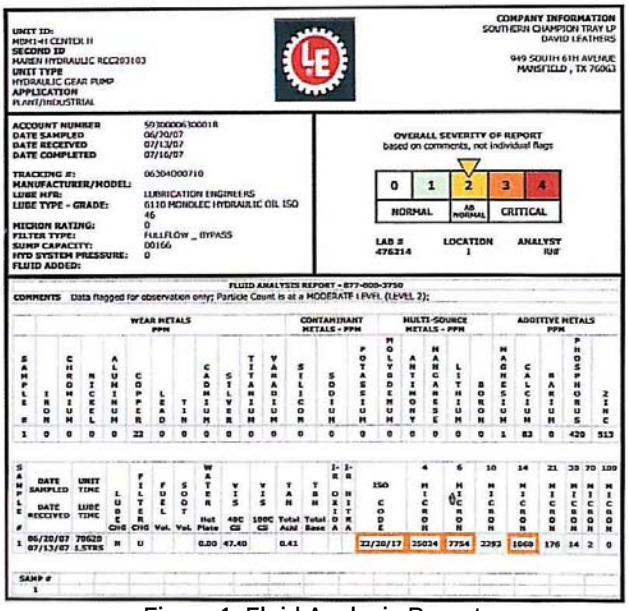
Southern Champion Tray Company is manufacturer and printer of food contains. The firm was motivated to change its oil analysis and lubricant management programs after company personnel were introduced to Noria Corporation's Machinery Lubrication Technician (MLT) training. This case study chronicles how plant personnel made important changes after oil analysis reflected high contamination levels.

## Solving the Problem

Southern Champion Tray made a proactive decision to implement a filtration process. Two targets were selected for improvement: the baler's hydraulic systems and printing press' circulating oil. The company installed desiccant breathers on all of its hydraulic systems, with quick-disconnects and sample ports, then added an off-line filtration cart (kidney system) with 12- and 6-micron filtration. From philosophical standpoint, the plant veered away from using time as an oil change interval. Instead, it utilized condition monitoring with the help of the Lubrication Engineers Analysis Program (LEAP).



COMPANY INFORMATION
SOUTHERN CHAMPION TRAY LP
DAVID HEATHERS
949 SOUTH 6TH AVENUE
MANSFIELD , TX 76063

UNIT ID:
MDM141 CENTER II
SECOND ID
MAREN HYDRAULIC RCC203103
UNIT TYPE
HYDRAULIC GEAR PUMP
APPLICATION
PLANT/INDUSTRIAL

ACCOUNT NUMBER 5010000610001R
DATE SAMPLED 06/20/07
DATE RECEIVED 07/13/07
DATE COMPLETED 07/16/07
TRACKING #: 0630400710
MANUFACTURER/MODEL:
LUBE MFR: LUBRICATION ENGINEERS
LUBE TYPE - GRADE: 6110 MONOLEC HYDRAULIC OIL ISO 46
MICRON RATING: 0
FILTER TYPE: FULLFLOW _ BYPASS
SUMP CAPACITY: 00166
HYD SYSTEM PRESSURE: 0
FLUID ADDED: 0

OVERALL SEVERITY OF REPORT
based on comments, not individual flags

| 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| NORMAL | | AB NORMAL | CRITICAL | |

LAB # 476214 LOCATION 1 ANALYST RNF

FLUID ANALYSIS REPORT - 877-600-3750

COMMENTS Data flagged for observation only: Particle Count is at a MODERATE LEVEL (LEVEL 2):

| SAMPLE # | IRON | CHROMIUM | NICKEL | ALUMINUM | COPPER | LEAD | TIN | CADMIUM | SILVER | TITANIUM | VANADIUM | SILICON | SODIUM | POTASSIUM | MOLYBDENUM | ANTIMONY | BARIUM | CALCIUM | MAGNESIUM | PHOSPHORUS | ZINC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 82 | 1 | 429 | 513 |

| SAMPLE # | DATE SAMPLED / DATE RECEIVED | UNIT TIME / LUBE TIME | FILTER CHG | FUEL CHG | FUEL Vol. | SOOT Vol. | WATER Hot Plate | V/S 40C cS | V/S 100C cS | TAN Total Acid | TBN Total Base | I-R OXIDATION | I-R NITRATION | ISO CODE | 4 MICRON | 6 MICRON | 10 MICRON | 14 MICRON | 21 MICRON | 38 MICRON | 70 MICRON | 100 MICRON |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 06/20/07 07/13/07 | 70620 LSTRS | N | U | | | 0.00 | 47.40 | | 0.41 | | | | 22/20/17 | 25034 | 7754 | 2293 | 1060 | 176 | 14 | 2 | 0 |
| SAMP # 1 | | | | | | | | | | | | | | | | | | | | | | |

Figure 1. Fluid Analysis Report

Before, oil analysis showed that system lubricant (an ISO-46 product) was in good condition but highly contaminated. The filtration measures improved the lubricant from an ISO cleanliness level of 22/20/17 to 18/15/11; this is essentially 32 times cleaner oil. A higher level of cleanliness is expected when the site begins to implement 6-micron to 3-micron filters on the filter cart.

## Results of the Case Study

One of the benefits of the work completed was that lubricant consumption was reduced by 75 percent. Southern Champion Tray's efforts completely solved the

Figure 2. Site Glass to Check for Water

Figure 3. Breather Keeps Contamination and Water Out of System

problem of having to use time-based drains on these units. Before, the plant was changing oil annually. Now, it changes oil every five years or longer. Time to failure is now more than five times longer before a failure is anticipated. And, disposal costs were cut by 75 percent.

To monitor the program's process, the plant has used on-site visual inspections, infrared thermography and oil analysis.

The real costs of implementing the improvements included:

- Filtration costs, including off-line system, $3,396
- Sight glasses for units, $302
- LEAP (oil analysis) , $295

The total cost to implement the changes was $3,993. Add in labor costs of $18 per hour for two hours, and the grand total was $4,029.

From a technical perspective, no special skills were involved in this project, other than sizing the filtration to the equipment.

**Figure 4. Breather Keeps Paper Dust Out of Gearbox**


**Figure 5. Clean Oil Storage**

## Making it Happen

At first, the implementation team was resistant to change because team members didn't fully understand the benefits that would be realized at their level. Management wanted to know what kind of a return on investment was possible, and when those returns would be noticed. The work and data supplied by plant engineer David Leathers and the author helped push the programs through those potential roadblocks.

Return on investment (ROI) came at the first oil change not needed, or four months after implementation.

Contamination control served a significant role in achieving the target of extended drain intervals without compromising equipment life. The contamination level before the improvements was 22/20/17. The current level is 18/15/11. Breathers were incorporated at the fill port.

The LEAP program (laboratory service) included particle count along with spectronalysis. A full report showed particle count, viscosity, water and acid, along with all additive and wear metals. The program provided assistance through online and on-site programs in reading and understanding the oil analysis results.

In addition to the work of David Leathers and suppliers, credit for program success could be attributed to integrated lubrication and oil analysis with other maintenance technologies. As the units are checked and hours of operation recorded, personnel take oil samples and visually inspect the machines. Units are checked using thermographic techniques as added insurance that nothing is out of line.

## Lessons Learned

Looking back, the plant admits it would have done a few things differently. It would have communicated to everyone in the plant what benefits would be achieved by implementing the different filtration units. It would have done a better job from the onset to at making sure everyone was as knowledgeable as those in the engineering department.

**Figure 6. Oil Storage Before Cleanup**