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Lubrication Based Reliability Consulting

PRODUCTS AND SERVICES OVERVIEW KEY ELEMENTS OF A PROGRESSIVE LUBRICATION PROGRAM

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CLS OMA CMRP MLT MLA





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OVERVIEW

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Safety Moment

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SFM Reliability Solutions Overview

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Lubrication Program Planning,
Implementation, Management, and KPIs

05

Field Reliability Maintenance

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Lubrication Excellence Value Add

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Open Discussion Questions



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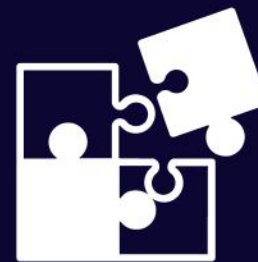
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WHAT WE DO

WE IMPROVE THE RELIABILITY OF OUR CUSTOMER'S EQUIPMENT, AND WE BUILD OUR BUSINESS AROUND BEING A RELIABLE BUSINESS PARTNER.



**LUBRICATION AND FUEL
PROGRAMS**



**RELIABILITY CENTERED
CONSULTING**



**FIELD RELIABILITY
MAINTENANCE**



**TA FUELING-DISASTER
SUPPORT**





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SAFETY FOCUSED CULTURE

We have experienced personnel in paper, refinery, chemical, plastic, rubber, steel facilities. Providing consistent safety training of all employees.

- Member ISNET World
- Houston Area Safety Council
- DISA
- ISTC
- TRIR for SFM RS of 0.00





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SFM RS ALLIANCES

Ameriforge



ELLWOOD
Specialty Metals USA



Kaneka



SUNBELT
MATERIAL HANDLING



TOKAI CARBON

kuraray





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TECHNICAL EXPERTISE

- SFM Reliability Solutions Technical Certifications
- Lubrication and Reliability Expertise



LUBRICATION AND RELIABILITY BEST PRACTICES

“We bring the lubrication related know how and expertise to an industrial operation to drive reliability by not only addressing equipment failures through the identification of their root cause, but also through the hands-on implementation of the appropriate processes, procedures and products necessary to prevent its reoccurrence.”





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LUBRICATION EXCELLENCE PROJECT PLAN OVERVIEW

- Contamination Removal
- Product Storage & Handling
- Product Integrity
- Product Identification
- Product Consolidation
- Key Manager Training

- Sampling Program
- On-Going Contamination Removal
- Routine Maintenance of Contamination Control Measures
- Plant-wide Continuing

PHASE 1

Lubrication Assessment & Documentation

- Lubrication Audit
- Field Lubrication Assessment
- Lubrication Project Plan

PHASE 2

Contamination Removal & Control

PHASE 3

Process/Cultural Enhancements

- Lubrication Intervals & SOPs
- Lubrication Personnel
- Lubrication Leadership
- Documentation & Scheduling
- Plant-wide Personnel Training

PHASE 4

Monitoring & Continuous Improvement

PATH TO WORLD-CLASS LUBRICATION DRIVEN RELIABILITY



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PHASE 1 DETAILS

Lubrication Assessment & Documentation



Lubrication Audit

- Initial assessment
- Documents current practices
- Identifies gaps from best practices and recommends areas for improvement
- Focuses on problem identification
- Determines general scope



Field Lubrication Survey

- Comprehensive equipment data capturing
- Criticality ranking of all equipment
- Prioritization of identified problems and corrective actions
- Provides detailed basis for Lubrication Project Plan



Lubrication Project Plan

- Detailed scope plan for actionable items
- Detailed cost calculations for all project items
- Prioritization of action items based on equipment criticality and condition
- Valuable budgeting tool for total project
- Includes cost justification for all project items



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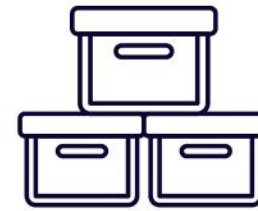
PHASE 2 DETAILS

Contamination Elimination & Control



Contamination Removal

- Oil Filtration (Particulate removal)
- Vacuum Dehydration (H₂O & gas removal)
- High Velocity Flushing
- Chemical Cleaning
- Tank Decontamination



Product Storage & Handling

- Lubricant storage design
- Lubricant storage cabinets
- Oil Safe containers
- Filtration carts / drum toppers



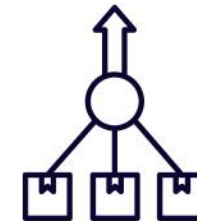
Product Integrity

- Filter audit and installation
- BS&W unit installation
- Sampling & filtration port installation



Product Identification

- Equipment lubricant product tagging
- Lubricant reservoir labeling
- Lubricant color-coding system



Product Consolidation

- Product compatibility review
- Existing lubricant depletion plan
- SOP modification where necessary



Key Manager Training

- Contamination control
- Machinery Lubrication Technician (MLT)
- Machinery Lubrication Analyst (MLA)

PHASE 3 DETAILS

Process & Cultural Enhancements



Lubrication Intervals & SOPs

- Determine optimum lubrication intervals
- Develop written lubrication SOPs



Lubrication Personnel

- Develop or source a team of MLT certified Lubrication Technicians
- Develop job description and duties



Lubrication Leadership

- MLT certified Lubrication Engineer
- MLT certified lubrication technician supervisor
- MLA certified lab technician



Documentation & Scheduling

- Design & implement CMMS program
- Design & implement a lubrication technician task accountability program
- Determine lubrication program metrics



Plant-wide Personnel Training

- Contamination control
- Fundamentals of machinery lubrication



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PHASE 4 DETAILS

Monitoring & Continuous Improvement



Sampling Program

- Determination of equipment and lubricant storage tanks to be sampled
- Identification of sampling points and Test Slates
- Timely and accurate analysis of sample results (contamination and wear)
- On-site sample lab



On-Going Contamination Removal

- Preventative filtration and high velocity flushing
- Condition based H2O and contaminant removal
- Service interval based contamination removal



Routine Maintenance of Contamination Control Measures

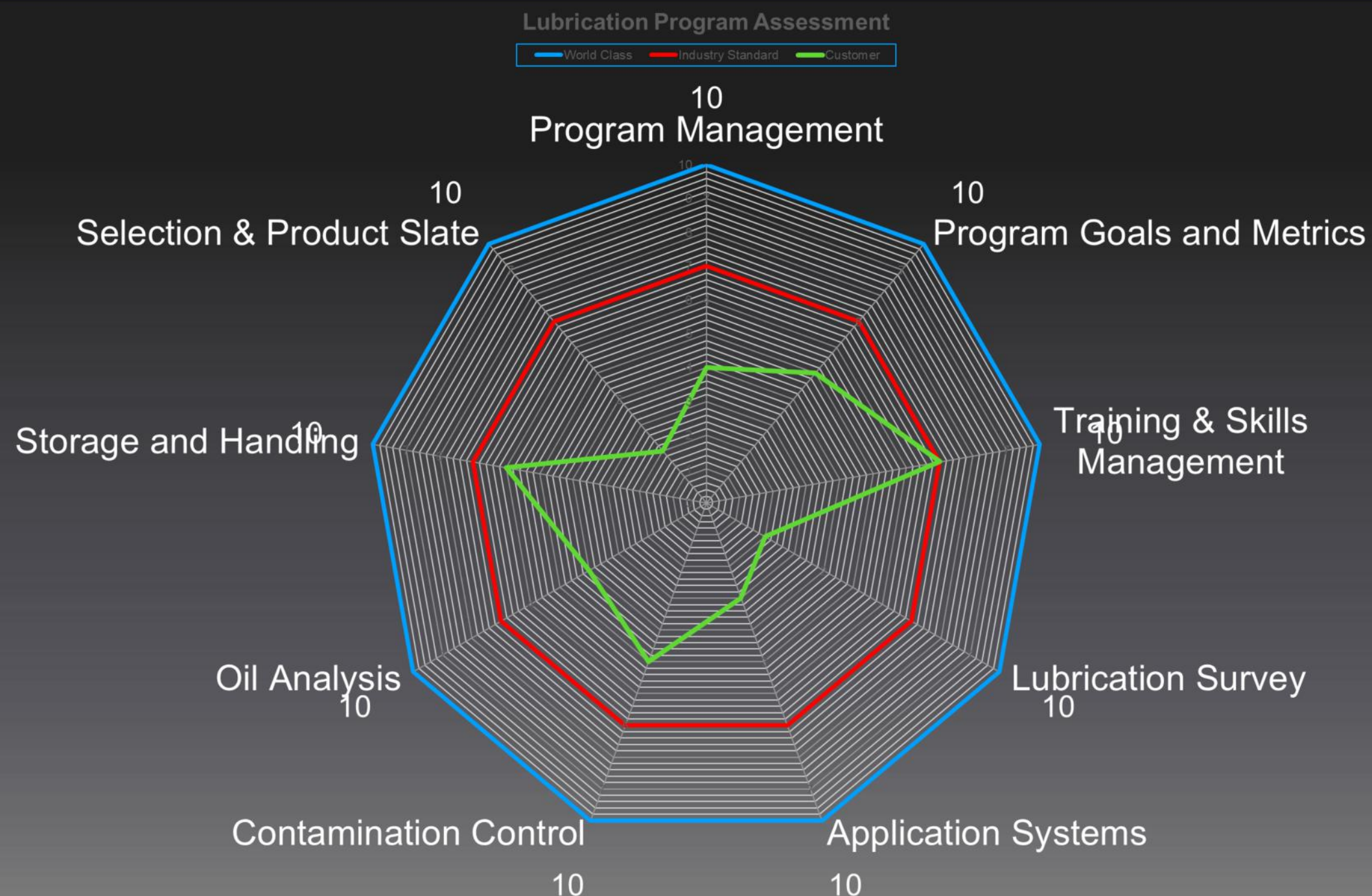
- Regular inspection and replacement of desiccant breathers
- Regular inspection and replacement of filters
- Regular inspection of oil reservoirs



Plant-Wide Continuing Education

- Training of new personnel in applicable areas
- Regular "Lunch & Learn" events on lubrication related advances
- Frequent communication of lubrication program successes and metrics

LUBRICATION PROGRAM AREA AUDIT SUMMARY





ESTIMATED OPPORTUNITY COSTS

- Data provided by your plant personnel.
- Analysis and quantitative estimate.
- Total Estimated Savings= \$1.7 M Annually

| | | | | |
|---|--------------------|--------------|------------------|--|
| Lube Excellence Cost Benefit Analysis | | | | |
| Company Name | ABC Manufacturing | | Date of Estimate | 10-May-05 |
| Location | Anywhersville, USA | | Estimates by | Mark Barnes |
| Benefits Potential Rollup | Low Case | Likely Case | High Case | Comments |
| Input estimated total annual maintenance costs to nearest thousand | \$12,000,000 | \$13,000,000 | \$14,000,000 | Parts, labor, supervision, management, overhead, insurance, risk-based, incidentals, etc. |
| Input estimated annual downtime costs and risk-based costs to nearest thousand | \$4,000,000 | \$5,000,000 | \$6,000,000 | Includes unscheduled downtime, excessive scheduled downtime, production derate costs. |
| Select percentage of maintenance and other costs attributable to repair | 40% | 60% | 70% | Excludes PMs, inspections, etc. Includes inspection/PM follow-up work and scheduled rebuilds and replacements. |
| Select percentage of repair that is attributable to mechanical wear of lubricated components | 30% | 40% | 50% | Abrasion, fatigue, adhesion, cavitation, corrosion, etc. Excludes operations failures, electrical failures, etc. |
| Select estimated percentage of mechanical wear that is attributable to poor lubrication | 50% | 60% | 70% | Poorly selected lube, overlubrication, underlubrication, ineffective contamination control, ineffective oil analysis, etc. |
| Estimate percentage of lubrication-related wear that could have been avoided with a well-defined lubrication program | 40% | 50% | 70% | |
| Input percentage of total maintenance costs attributable to lubrication PMs, inspections, oil analysis and other nonrepair-related activities | 5% | 5% | 5% | Includes parts, labor, supplies, supervision, management, overhead, etc. |
| Input estimated percentage of these activities that are waste | 10% | 20% | 30% | Either fail to add value or actually induce failure. |
| Estimated Potential Annual Savings | \$444,000 | \$1,426,000 | \$3,640,000 | |

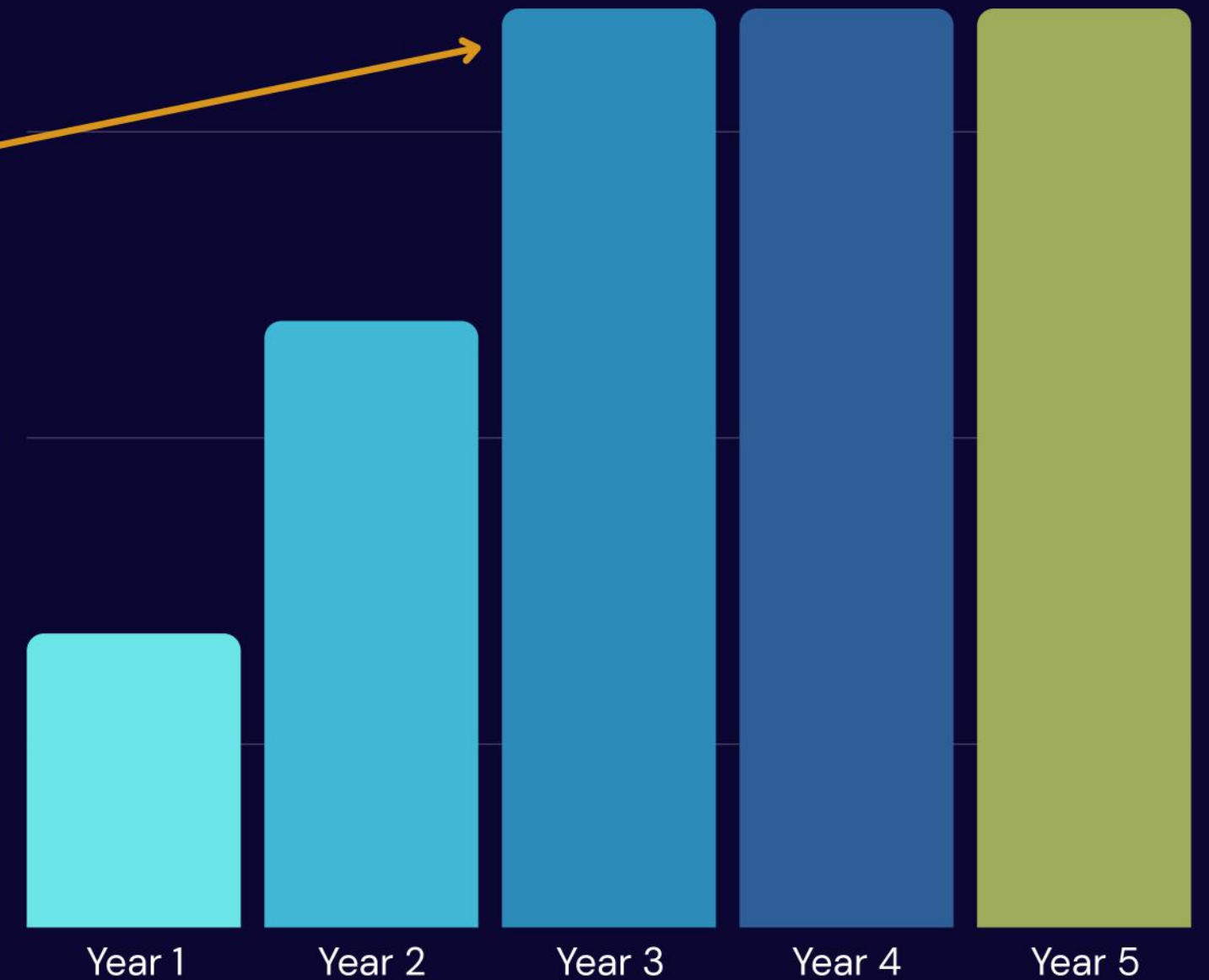
Opportunity ROI

● Year 1 ● Year 2 ● Year 3 ● Year 4 ● Year 5

1500000

1000000

500000





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WEB BASED ROUTE MANAGEMENT

- Web based lube route management
- Utilizes smart phones as data loggers
- Intrinsically safe covers
- Can read QR codes
- Easy set up by downloading spreadsheets or other lube survey documents
- Team of experts inputs data
- Helps with key performance indicators when used properly



LUBRICATION-FOCUSED RELIABILITY PRODUCTS AND SOLUTIONS

Contamination Control Products

- Automatic Grease Lubricators
- BS&W Bowls
- Custom Pre-Filtered Lubricant Containers
- Desiccant Breathers
- Filter Carts & Filtration Programs
- "Oil Safe" Dispensing Containers
- Oil Sample Port Installations
- 3D Bullseye Sight Glasses
- Online Particle / Moisture Counters

| | |
|--------|-----------------------------------|
| Yellow | Flammable and Oxidizing Fluids |
| Red | Fire-Quenching Fluids |
| Orange | Toxic and Corrosive Fluids |
| Green | All Water (Potable, Boiler, etc.) |
| Blue | All Air (Compressed, Lab, etc.) |
| Brown | Combustible Fluids |
| Purple | Definable by user |
| Black | Definable by user |
| White | Definable by user |
| Gray | Definable by user |

source: ANSI/ASME #13.1

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LUBE ROOMS AND LUBE ROOM EQUIPMENT

Customized Lube Rooms

- Dedicated Pumps, Hoses, Filtration, Tanks
- Color Code Labeling Systems
- Filtration Systems (various designs)
- Oil Container Filling – Tap Stations
- Filtration Programs for In-Service Reservoirs
- Oil Sample Port Installations
- Climate Control Options
- Oil Containment Berms
- Various Tank Options
- Fitted to your room, or Conex Rooms for Purchase





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RELIABILITY SERVICES

- On-Site Oil Purification
- System Decontamination
- Condition Monitoring
- Varnish Mitigation
- Chemical Cleaning





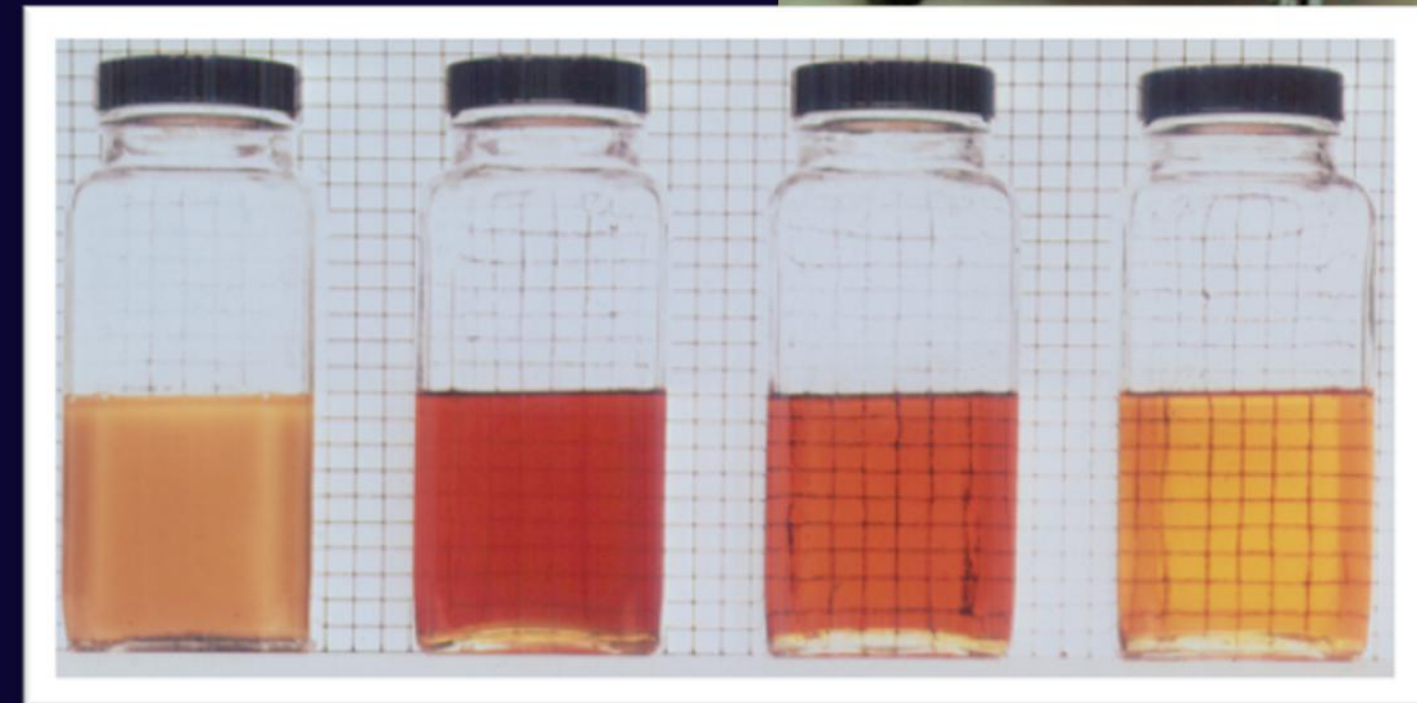
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SFM FLUID DECONTAMINATION SERVICES

Fluid Purification

- Vacuum Dehydration
- Removes Particles, 3 States of Water, and Gasses
- Ultra-Fine Filtration
- Centrifugal Separation





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SFM FLUID AND SYSTEM VARNISH MITIGATION AND PREVENTION

- Ability to Mitigate Varnish
 - Chemical Cleaning
 - Various Kidney Loop Skids
 - Oil Solvency Products
- Recommendations for Varnish Prevention
 - Training
 - On-site Consulting



SFM RS keeps your equipment in operation until you can plan on needed repairs or chemical cleaning project.



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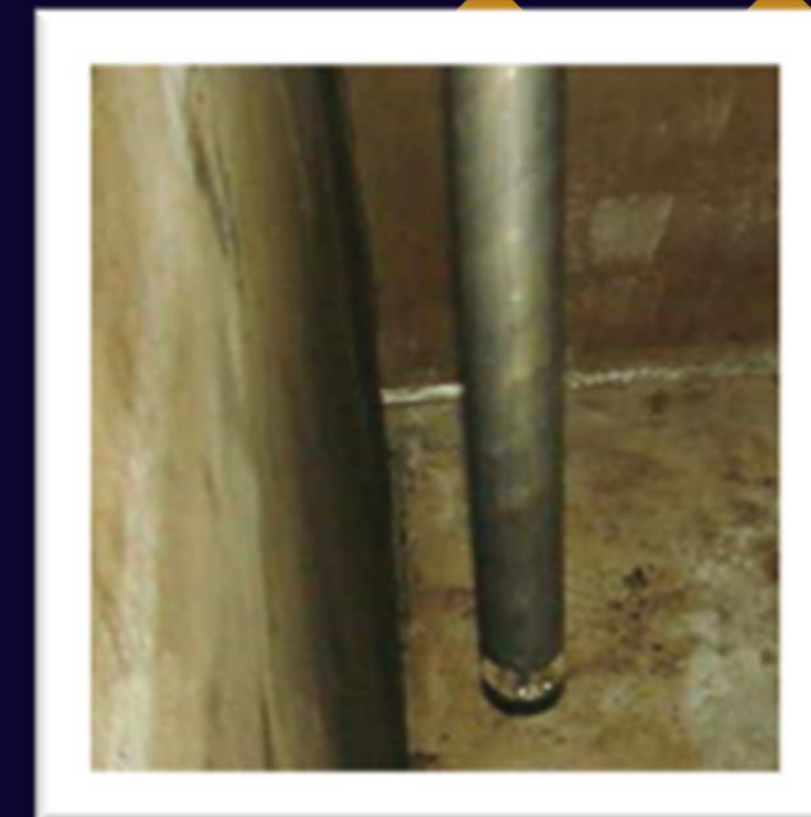
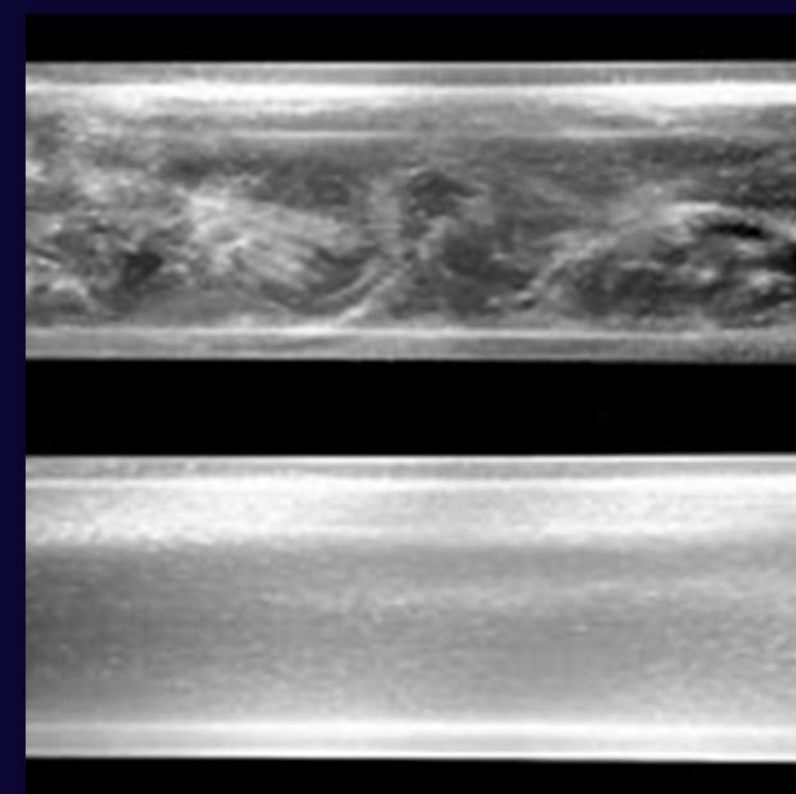
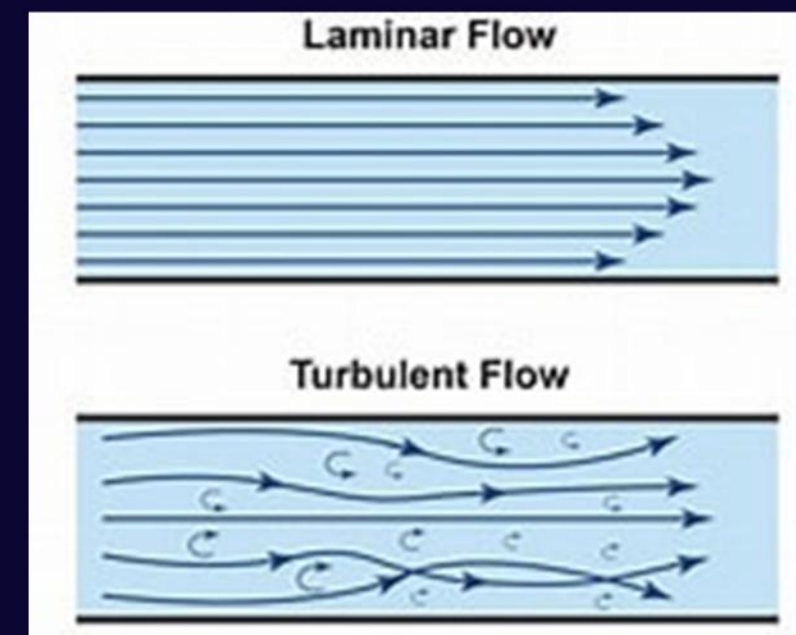
SFM SYSTEM DE-CONTAMINATION

Tank Decontamination

- Filtration
- Confined Space Entry Cleaning

System Decontamination

- High Velocity Flushing
- Chemical Cleaning
- Varnish Mitigation





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CONTRACT LUBE PROGRAM MANAGEMENT LUBE TECHNICIANS



- **TRAINED AND CERTIFIED ICML MACHINERY LUBRICATION TECHNICIANS LEVEL 1 (MLT1) & LEVEL 2 (MLT2)**

- **EXPERIENCED LUBRICATION PROGRAM MANAGERS FOR PROGRAM DEVELOPMENT AND IMPLEMENTATION**



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OPEN DISCUSSION NEXT STEPS



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