**Course Contents**

**Basic Lubrication 103: Overview**

STLE Annual Meeting 2012

**Course Chairman:** John O. Sewall, STLE-C.L.S., ExxonMobil Lubricants & Specialties, Fairfax, VA

Mr. Sewall received a B.S. in Marine Engineering & Operations (1987) with a Minor in Management and Naval Science from the Maine Maritime Academy located in Castine, Maine. He also received his United States Coast Guard 3rd Assistant Engineers License of Steam and Diesel Marine Power Plants of any Horsepower U.S. or Foreign Flag Registry. Upon graduation, he received a commission in the United States Navy and attended The Navy Surface Warfare Officers School and the Navy Gas Turbine Engineering School (DD-963 Class Destroyer) located in Newport, RI. After completion of training in Newport, he was assigned duties as the Main Propulsion Officer aboard the U.S.S. John Rodgers DD-983 from 1987-1991. Mr. Sewall joined ExxonMobil as a Sales Engineer responsible for sales and technical support based in Shreveport, LA. In 1996 John was promoted to a Lubrication Engineers position based in Portland, Maine serving the Pulp & Paper Industry along with general manufacturing for the New England Territory. John was promoted to Chief Engineering Manager for the NE Region responsible for managing ten lubrication engineers, customer service, and technical training for the North Eastern United States. He is a member of the Society of Tribologists and Lubrication Engineers, and has earned their Certified Lubrication Specialist designation.

Basic Lubrication 103 is a condensed one-day course. It is designed primarily for the person entering the lubrication field who needs a broad introduction to lubricants, lubricant building blocks, and lubricating materials. This course is also for persons not directly involved, but who need a broad overview of lubricants and basic lubricating components. This course does not require the course attendee to have a formal scientific degree or background, although many technical terms and concepts are covered. Experienced people attend the course to be kept up to date on the latest developments especially in those areas not directly related to their job function or area of expertise. This Basic Lubrication 103 is usually attended by a broad cross section of people, such as technical, technical service, sales, marketing, manufacturing, maintenance, and management, who in some way are involved in the industry. The Basic course will focus on the fundamentals of lubrication associated with fluid film lubrication and grease as it applies to basic lubricated components such as gears and bearings. Also, the course will review some basics around base stocks, synthetic lubricants and lab testing.

**LUBRICANT REFINING & BASE OILS** presented by Jim Arner, Chevron Global Lubricants, Richmond, CA

Page 1-24

Mr. James (Jim) Arner received an Honours Bachelor of Science degree in Chemistry in 1979 from the University of Western Ontario in London, Ontario, Canada. He started as a chemist in the product development laboratories for Texaco Canada Inc. where he developed new products and modified others to meet the demanding challenges of the Canadian operating environment. Other responsibilities at the laboratory included analysis of lubricants, championing the quality assurance process, product training, and providing troubleshooting services for the plant production. With several years of experience and his gained knowledge of lubricants, he transferred to the Technical Services department where he became more involved in supporting customers by providing lubrication advice. He continued in various technical services roles through several mergers and acquisitions, and he is now a Technical Specialist for Chevron Global Lubricants. Graduating with a degree in chemistry provided him a baseline of knowledge but attending seminars like those conducted by the STLE helped provide him with the depth of understanding of the lubricants business. In turn, he has actively supported the STLE on a local and international basis, holding positions of Toronto Section Chair, Regional Vice-President and currently the Oil Monitoring Specialist Committee Chair. Mr. Arner earned the STLE certifications of CLS, OMA I, and OMA II.

The presentation touches on the processing necessary to produce base stocks from crude oil. Lubricant refining, base stock fundamentals and performance are also addressed.

**BASIC LUBRICANT FUNDAMENTALS** presented by Dan Holdmeyer, Chevron Global Lubricants

Page 25-43

Mr. Holdmeyer received his Bachelor of Science degree in Chemical Engineering from the University of Missouri-Columbia. He is currently a member of the Cleveland Section of STLE, and is STLE CLS and OMA I Certified. Dan is the Chair for the STLE OMA Committee, an active member of the STLE Certification Committee, and the Co-Chair for Basic Lubrication Course at the STLE National Meeting. He is currently a Lubrication Engineer at Chevron Lubricants. Dan has also worked as a Field Sales Engineer, Field Lubrication Program Engineer, National Account Manager, Global Account Manager, and OEM Service Engineer during his 31 year career, working with a myriad of different industries, such as Automotive, Heavy Duty Engine On-Highway, Off-Highway Quarry & Mining, Agriculture,
Power Generation, Primary Metal, Pulp & Paper, Glass, Metalworking, and General Manufacturing. As a Lubrication Engineer, Dan works with these industries in lubrication engineering with the end-user customers, assuring proper product application, implementation of or improvement of sound lubrication programs, and troubleshooting analysis of lubrication issues.

This presentation will discuss the basics of friction, wear, and lubrication - and how they are related. We will cover the regimes of lubrication and the basic selection criteria when applying lubricants to different machinery components. You will also learn about typical lubricant composition and how it varies by application. At the end of this section you will understand the fundamental principles of lubrication at a basic level.

TEST METHODS FOR LUBRICANTS presented by Ray Thibault, LTC Inc., Cypress, TX

Ray Thibault, CLS, OMA I & II MLT I & II and MLA II & III retired from ExxonMobil with 31 years of service in 2001 to form LTC, a lubrication training & consulting company. He has done extensive training and consulting worldwide for many of the leading manufacturing and lubricant companies. As a contributing editor for Lubrication Management & Technology magazine for the past six years, he writes bimonthly articles on lubrication. He has been the session chairman for Lubricants World held at the International Maintenance and Predictive Maintenance Conferences and is an active speaker at many other conferences such as STLE, Predictive Maintenance, and MARTS. He has worked with local STLE chapters such as Oklahoma, Houston, and Chicago as a presenter at their lube schools. He currently resides in Cypress, Texas.

This presentation investigates the relationship of Lubricant QA/QC and Qualification tests, as detailed on lubricant suppliers product data sheets against physical lubricant performance. This presentation will provide an overview of lubricants testing, results interpretation, and the relationship to performance in application. Many of the tests are specific to the different industrial lubricant classes such as turbine, gear, and hydraulic oils along with greases. Over twenty different tests will be examined with particular emphasis on testing procedures, result interpretation, and relevance to field application. Product data sheets from various lubricant suppliers will be used as illustrations.

ADDITIVES BASICS presented by Chris Schmid, CLS, The Lubrizol Corporation, Cleveland, OH

With 20 plus years' experience in the lubrication industry, Chris built his real-world lubrication knowledge managing field tests for Lubrizol and its customers and managing customer programs in Lubrizol's engine oil group. He has been responsible for field testing in all of the major lubricant market segments and in numerous regions around the world. By virtue of his work with dealerships, fleet maintenance managers, OEM representatives and lubricant marketers, Chris has unique insights into the knowledge and skills required of lubricant consumers and sales forces. Chris is now the Americas Commercial Manager for Lubrizol Custom Solutions. He has developed and taught courses on basic and advanced lubrication, equipment design and operation, and trouble-shooting techniques. Chris has a mechanical engineering degree from Carnegie-Mellon University and masters of business administration from John Carroll University. Chris is also an STLE Certified Lubrication Specialist.

In this course the learner will gain basic understanding of lubricant additives. The instructor will explore what additives are and why they are used. The major types of additives used in today's lubricants will be explored. Each additive will then be examined in depth as to how it works and why it is used. The benefits of each additive type will be highlighted. The instructor will use layman's terms to describe the additives and explain them in a way that an end user will be able to understand them. It is a goal of the course for the learner to understand the basics of additives and be able to explain them in a way to support their product line.

BEARINGS FUNDAMENTALS presented by Paul Shiller, University of Akron, Akron, OH

Paul Shiller received a Ph.D. degree in Physical Chemistry from Case Western Reserve University in Cleveland, OH studying the surface reactions at fuel cell electrodes using molecular orbital methods. He holds an M.S degree in Chemical Engineering also from Case Western Reserve University where he studied the characteristics of “Diamond-like films”. He received a BE degree in Chemical Engineering from Youngstown State University. He recently moved to the University of Akron as a Research Scientist in an “Open Innovation” collaborative effort between The University of Akron and The Timken Co. At The University of Akron he will be working in the Timken Engineered Surfaces lab, which is part of the Center for Surface Engineering and Lubrication Research. In this position he will carry out fundamental studies of lubrication additives and lubrication mechanisms with an emphasis on modeling and high-pressure properties. Previously he worked at The Timken Company as a Product Development Specialist for lubricants and lubrication in starting in 2004. He then moved
to a position as a Tribological Specialist within the Tribology and Next Generation Materials group at the Timken Technology Center in North Canton. At Timken he studies how the chemistry of lubricants affects bearings especially how additives can be used to extend bearing life. Before coming to Timken he managed a polymer analytical chemistry lab at the Packard Electric division of DELPHI. He started at Packard Electric as a quality control engineer in the ignition cable department when Packard Electric was a division of General Motors. He was a Process Engineer on the thin film deposition processes for liquid crystal display products at PanelVision in Pittsburgh. Paul worked as a Research Engineer at The General Tire Company in Akron studying polymer extrusion and molding and the performance of tennis balls. He started his lubrication career as a Summer Intern at The Penn State University. Paul has received a Professional Promise Award from AIChE and the Shell Lubricants award for Instructor Excellence from NLGI. He is also currently an Adjunct Professor of Chemistry at Kent State University. Paul is a member of STLE, ACS, and SOR.

Due to their availability and ease of installation and maintenance, ball or roller bearings are widely used in a broad variety of machines and equipment. Consequently, design and maintenance personnel, as well as lubricant suppliers, are often confronted with need for some knowledge of their theory and application. Accordingly, this presentation will include a review of the various types of rolling bearing and their salient characteristics, a very brief review of applicable theory, and then a discussion of practical application considerations with emphasis on lubrication.

HYDRAULIC FUNDAMENTALS presented by Ken Dulinski, Eaton Corporation

Ken has been working in the Electronics, Fluid Power and Motion Control field for over 30 years. His experience encompasses component level repair, field service, and design engineering of test systems in industrial manufacturing. He is currently employed by Eaton Corporation as a senior technology instructor for Hydraulics Group Training Services and designs training simulators to be sold to colleges and universities in the United States. He is actively involved in the International Fluid Power Society and currently serves on the Board of Directors. He holds all of the available certifications for hydraulics offered by the IFPS and is also certified by the IFPS as an Accredited Instructor. Ken holds a BS degree from St. Leo University – Tampa.

Hydraulic systems are found in almost every type of machinery, in almost every industry. Whether involved in designing, selling, or servicing hydraulic oils and other lubricants, it is important to understand the fundamentals of hydraulics. This presentation will review the basics of hydraulic principles, system components, and troubleshooting. We will also briefly discuss lubricant characteristics impacting performance in hydraulic systems. Finally, we will very briefly review fire resistant hydraulic fluids and their application.

GEARS FUNDAMENTALS presented by John Hermann, ExxonMobil Lubricants & Specialties

The Mobil Oil Corporation, now ExxonMobil Lubricants and Petroleum Specialties Company named John Hermann, Senior Equipment Builder Engineer effective July 1, 1998. July 1, 2006 John was named team lead of the Americas’ Equipment Builder Engineer’s group. In addition to team lead, John initiates, secures and maintains equipment builder endorsements and support for Mobil premium lubricants and programs in the Northeastern US and Eastern Canada. Prior to July 1, 1998, he was 27+ years with Texaco in a variety of sales, marketing, management and technical positions. He has earned the designation STLE (Society of Tribologists and Lubrication Engineers) CLS (Certified Lubrication Specialist) and STLE Oil Monitoring Analyst (OMA-1). He was named a STLE Fellow in 1999. In 2008, John was recognized with STLE’s PM KU Meritorious Award. John is currently a member of the STLE OMA Committee. He is also a member of the STLE Presidential Council.

John has served as President, Chairman of the Education Committee, Chairman of the OMA Committee, Director of STLE and Chairman of the STLE Philadelphia Section. John has lectured on the fundamentals of lubrication, gear lubrication, hydraulic oils and turbine lubrication throughout the world at universities, professional societies and industry forums.

This subject of gear lubrication is basic to industrial and automotive power transmission. The present-day scope of gear lubrication, factors affecting it, basic requirements, troubleshooting, and future developments will be covered.
Ken Hope graduated with a Ph.D. in physical chemistry from the University of Alabama at Birmingham in 1988. Ken has almost 20 years of experience in the lubricant industry. His research interests have been primarily focused in the area of polyalphaolefins and the use of synthetic lubricants. He is responsible for the product development, process improvement and technical service for PAO Technology for Chevron Phillips Chemical Company. Prior to his current position, he was responsible for PAO, Acetylene Black and the Pilot Plant Operations for Chevron Chemical. For several years, he worked in the Analytical group at Chevron doing NMR research on catalysts and structure/property relationships on various materials. Previous to joining Chevron, he was the Director of the NMR Research in the Chemistry Department at the University of Houston. Within STLE, Ken has served on the Board of Directors since 2006. He has organized the Lube School in Houston and participated as an instructor in Houston, Chicago and Oklahoma sections as well as instructed the synthetics part of the Basic Lubes course at the Annual Meeting for the last 13 years. He holds a CLS and is on the Editorial Board of the Journal of Lubrication Science and is a Technical Editor for Tribology & Lubrication Technology. He is also a member of the API Base Oil Interchange / Viscosity Grade Read Across Task Force as well as a member of ASTM and SAE. He has also presented several technical papers at STLE, AICHE and SAE meetings.

This presentation will provide a general overview of synthetic lubricants, touching on both composition and function. Where appropriate, performance comparisons with conventional lubricants will be presented.

Lucas Kerley is a Lubrication Engineer at ExxonMobil Lubricants and Specialties. Lucas received his B.S. Degree in Electrical Engineering Degree from United States Naval Academy in 1993. Since that time, he has had experience in the Surface Warfare office United States Navy, has served as a Reliability Engineer for the International Paper Company, and is presently Lubrication Engineer serving Industrial customers providing technical support. Lucas has expertise in the Paper Industry and has particular expertise in industrial greases.

This presentation will provide an overview of grease, covering grease terminology, composition and testing. Manufacturing methodologies and the benefits obtained from lubrication by grease shall be addressed as well.